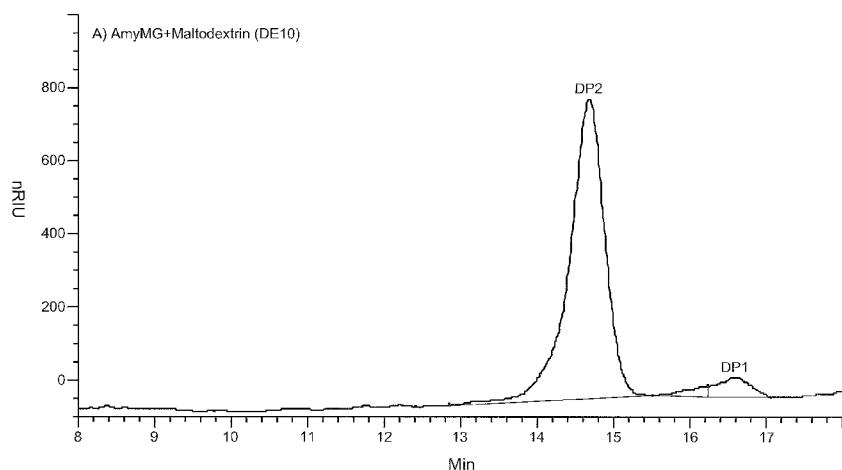(54) Title: AMYLASE WITH MALTOGENIC PROPERTIES

FIG. 1A

(57) Abstract: The present teachings provide an amylase with maltogenic properties. Nucleic acids encoding the maltogenic amylase and variants thereof, expression vectors, formulations, and host cells are also provided. Additional embodiments of the present teachings provide various methods of use and methods of manufacturing.

Amylase with Maltogenic Properties

Cross-Reference to Related Applications

This application claims benefit to international patent application no.

5   PCT/CN2012/084883, filed on November 20, 2012, the contents of which are hereby

incorporated by reference in its entirety.

Field of the Invention

The present teachings provide composition and methods relating to novel maltogenic

10   amylases.

Background

Starch is a mixture of amylose (15-30% w/w) and amylopectin (70-85% w/w).

Amylose is composed of linear chains of α-1,4-linked glucose units having a molecular

15   weight (MW) from about 60,000 to about 800,000.   Amylopectin is a branched polymer

containing α-1,6 branch points every 24-30 glucose units; its MW may be as high as 100

million.

Sugars from starch, in the form of concentrated dextrose syrups, are currently

produced by an enzyme catalyzed process involving: (1) liquefaction (or viscosity

20   reduction) of solid starch with an α-amylase into dextrins having an average degree of

polymerization of about 7-10, and (2) saccharification of the resulting liquefied starch (*i.e.*

starch hydrolysate) with amyloglucosidase (also called glucoamylase or GA).   The

resulting syrup has a high glucose content.   Much of the glucose syrup that is

commercially produced is subsequently enzymatically isomerized to a dextrose/fructose

25   mixture known as isosyrup.   The resulting syrup also may be fermented with

microorganisms, such as yeast, to produce commercial products including ethanol, citric

acid, lactic acid, succinic acid, itaconic acid, monosodium glutamate, gluconates, lysine,

other organic acids, other amino acids, and other biochemicals, for example.

Fermentation and saccharification can be conducted simultaneously (*i.e.*, an SSF process) to achieve greater economy and efficiency.

Alpha-amylases hydrolyze starch, glycogen, and related polysaccharides by cleaving internal α-1,4-glucosidic bonds at random.   Alpha amylases, particularly from
5   *Bacilli,* have been used for a variety of different purposes, including starch liquefaction and saccharification, textile desizing, starch modification in the paper and pulp industry, brewing, baking, production of syrups for the food industry, production of feedstocks for fermentation processes, and in animal feed to increase digestibility.   These enzymes can also be used to remove starchy soils and stains during dishwashing and laundry
10   washing.

Maltose, a di-saccharide composed of two D-glucopyranoses joined by a β-1,4'--glycosidic bond, has high commercial value in applications for the food/frozen foods, baking, brewing and beverage industries. Maltose is also a substrate for production of the non-caloric sugar sweetener, maltitol. High purity maltose or pure
15   maltose is an active component of intravenous injection liquids for diabetic patients. Commercial processes for the production of syrup containing different levels of maltose content, i.e. <50% maltose (high conversion or low maltose syrup), 50-55% maltose (high maltose syrup), 70-75% maltose (very high maltose) and >80% maltose (ultra high maltose) have been established depending on the applications. A common factor for
20   these processes is that they involve a dual enzyme process with two different steps, i.e. liquefaction and saccharification.

Historically, two enzyme steps are involved in the hydrolysis of starch to produce glucose or maltose syrups. The first step is a liquefaction step at high temperature, >95 °C and the second step is a saccharification step. In maltose production the second
25   step is called malto-saccharification and usually takes place at a temperature at or below 60 °C. In the liquefaction step, the insoluble starch granules are slurried in water, gelatinized with heat and hydrolyzed by a thermostable alpha-amylase (EC.3.2.1.1, α-1,4'- D-glucan glucanohydrolase) from *Bacillus* species, often in the presence of added calcium. Bacterial derived thermostable alpha-amylases from *Bacillus licheniformis* (for
30   example, SPEZYME® FRED from DuPont-Genencor or Termamyl® L-120 from

Novozymes), *Bacillus stearothermophilus* (for example SPEZYME® XTRA from

DuPont-Genencor, Termamyl® SC, and Termamyl® SUPRA from Novozymes) or blends

of *Bacillus licheniformis* and *Bacillus stearothermophilus* (for example Clearflow™ AA

from DuPont-Genencor or Liquozyme® Supra from Novozymes) are used to first liquefy

5   the starch at high temperature, >95°C at pH 5.2-6.5 to a low DE (dextrose equivalent)

soluble starch hydrolysate. In the malto–saccharification step, generally maltogenic

enzymes such as a fungal alpha-amylase (for example, CLARASE® L from

DuPont-Genencor or Fungamyl® 800L from Novozymes), a plant beta-amylase (for

example, OPTIMALT® BBA from DuPont-Genencor or Betalase 1500L from Senson) are

10   used at a much lower temperature to further hydrolyse the soluble starch hydrolysate.

For maltose syrup containing greater than 60% maltose, a debranching enzyme like

pullulanase (for example OPTIMAX® L-1000 from DuPont-Genencor, Promozyme® D2

from Novozymes or Promozyme® D6 from Novozymes) is added during

malto-saccharification of liquefied starch.

15

Summary

In some embodiments, the present teachings provide an isolated nucleic acid

comprising the nucleotide sequence of SEQ ID NO: 1 or of a degenerate variant of SEQ

ID NO: 1.

20   In some embodiments, the present teachings provide an isolated nucleic acid

comprising a sequence that encodes a polypeptide consisting of the amino acid

sequence of SEQ ID NO: 3.

In some embodiments, the present teachings provide an isolated nucleic acid

comprising a sequence that hybridizes under stringent conditions to a hybridization probe

25   the nucleotide sequence of which consists of SEQ ID NO: 1, or the complement of SEQ

ID NO: 1.

In some embodiments, the present teachings provide an isolated nucleic acid

comprising a sequence at least 66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%,

98%, 99%, or 99.5% identical to SEQ ID NO: 1. In some embodiments, the present

30   teachings provide such an isolated nucleic acid wherein the nucleic acid encodes a

polypeptide that has starch hydrolysis activity.

In some embodiments, the present teachings provide an isolated nucleic acid comprising a sequence that encodes a polypeptide at least 66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, 99%, or 99.5% identical to SEQ ID NO: 3, wherein the polypeptide has starch hydrolysis activity.

In some embodiments, the present teachings provide an isolated nucleic acid comprising a sequence that encodes a polypeptide comprising the sequence of SEQ ID NO: 3, or SEQ ID NO: 3 with up to 50 conservative amino acid substitutions, wherein the polypeptide has starch hydrolysis activity.

In some embodiments, the present teachings provide a purified polypeptide, the amino acid sequence of which comprises a sequence at least 66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, 99%, or 99.5% identical to SEQ ID NO: 3.

In some embodiments, the present teachings provide a purified polypeptide comprising the amino acid sequence of SEQ ID NO: 3, but with 0 to 20 conservative amino acid substitutions.

In some embodiments, the present teachings provide an expression vector comprising the nucleic acid sequence of any of claims 1-6 operably linked to an expression control sequence.   In some embodiments, the present teachings provide a cultured cell comprising such a vector.   In some embodiments, the present teachings provide cultured cell comprising any of the nucleic acids of the present teachings, operably linked to an expression control sequence.   In some embodiments, the present teachings provide a cultured cell tranfected with any of the vectors provided by the present teachings, or a progeny of said cell, wherein the cell expresses the nucleic acid to form a polypeptide.

In some embodiments, the present teachings provide a method of producing a protein, the method comprising culturing the cells provided by the present teachings under conditions permitting expression of the polypeptide.

In some embodiments, the present teachings provide a method of using the polypeptide of the present teachings, the method comprising including the polypeptide in any of: starch liquefaction, starch saccharification, textile desizing, starch modification in

the paper and pulp industry, brewing, baking, production of syrups for the food industry, production of feedstocks for fermentation processes, animal feed, and, removal of starchy soils and/or stains during dishwashing and/or laundry washing.

In some embodiments, the present teachings provide a composition comprising the polypeptide of the present teachings, and at least one accessory enzyme selected from the group consisting of phytase, protease, pullulanase, β-amylase, isoamylase, a different amylase, alpha-glucosidase, cellulase, xylanase, hemicellulase, beta-glucosidase, transferase, pectinase, lipase, cutinase, esterase, choline oxidases, peroxidases/oxidases, pectate lyases, mannanases, cutinases, laccases, phospholipases, lysophospholipases, acyltransferases, perhydrolases, arylesterases, and redox enzymes.

These and other aspects and embodiments of the compositions and methods of the present teachings will be apparent from the present description and drawings.

Brief Description of the Drawings

Figure 1, panels A and B depict some illustrative data according to some embodiments of the present teachings.

Figure 2, panels A and B depict some illustrative data according to some embodiments of the present teachings.

Figure 3 depicts some illustrative data according to some embodiments of the present teachings.

Figure 4 depicts some illustrative data according to some embodiments of the present teachings.

Figure 5 depicts some illustrative data according to some embodiments of the present teachings.

Figure 6 depicts some illustrative data according to some embodiments of the present teachings.

Figure 7 depicts some illustrative data according to some embodiments of the present teachings.

Figure 8 depicts some illustrative data according to some embodiments of the present teachings.

5   Figure 9 depicts an illustrative cloning map according to some embodiments of the present teachings.

Brief Description of the Sequences

SEQ ID NO: 1 sets forth the full-length nucleotide sequence for AmyMG.

10   SEQ ID NO: 2 sets forth the nucleotide sequence for the native signal sequence for AmyMG.

SEQ ID NO: 3 sets forth the full-length amino acid sequence for AmyMG.

SEQ ID NO: 4 sets forth the amino acid sequence for the native signal peptide.

SEQ ID NO: 5 sets forth the aprE signal nucleic acid sequence (underlined) + AGK

15   nucleic acid sequence (italics).

SEQ ID NO: 6 sets forth the aprE signal amino acid sequence (underlined) + AGK amino acid sequence (italics).

20   **Detailed Description**

Described are compositions and methods relating to maltogenic amylase enzymes.   This enzyme was discovered and analyzed by a combination of experimental approaches, as detailed in the Examples.   Exemplary applications for the variant amylase enzymes are for starch liquefaction and saccharification, for cleaning starchy

25   stains in laundry, dishwashing, and other applications, for textile processing (*e.g.*, desizing), in animal feed for improving digestibility, and and for baking and brewing. These and other aspects of the compositions and methods are described in detail, below.

Prior to describing the various aspects and embodiments of the present compositions and methods, the following definitions and abbreviations are described.

Definitions and Abbreviations

In accordance with this detailed description, the following abbreviations and definitions apply.   Note that the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise.   Thus, for example, reference to "an enzyme" includes a plurality of such enzymes, and reference to "the dosage" includes reference to one or more dosages and equivalents thereof known to those skilled in the art, and so forth.

The present document is organized into a number of sections for ease of reading; however, the reader will appreciate that statements made in one section may apply to other sections.   In this manner, the headings used for different sections of the disclosure should not be construed as limiting.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art.   The following terms are provided below.

Abbreviations and Acronyms

The following abbreviations/acronyms, when and if present, have the following meanings unless otherwise specified:

ABTS	2,2-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid
AE or AEO	alcohol ethoxylate
AES or AEOS	alcohol ethoxysulfate
AkAA	*Aspergillus kawachii* α-amylase
AnGA	*Aspergillus niger* glucoamylase
AOS	α-olefinsulfonate
AS	alkyl sulfate
cDNA	complementary DNA
CMC	carboxymethylcellulose
DE	dextrose equivalent
DNA	deoxyribonucleic acid
DPn	degree of saccharide polymerization having n subunits
ds or DS	dry solids
DTMPA	diethylenetriaminepentaacetic acid
EC	Enzyme Commission
EDTA	ethylenediaminetetraacetic acid

	EO	ethylene oxide (polymer fragment)
	EOF	End of Fermentation
	GA	glucoamylase
	GAU/g ds	glucoamylase activity unit/gram dry solids
5	HFCS	high fructose corn syrup
	HgGA	*Humicola grisea* glucoamylase
	IPTG	isopropyl β-D-thiogalactoside
	IRS	insoluble residual starch
	kDa	kiloDalton
10	LAS	linear alkylbenzenesulfonate
	LAT, BLA	*B. licheniformis* amylase
	MW	molecular weight
	MWU	modified Wohlgemuth unit; 1.6×10^{-5} mg/MWU = unit of activity
15	NCBI	National Center for Biotechnology Information
	NOBS	nonanoyloxybenzenesulfonate
	NTA	nitriloacetic acid
	OxAm	Purastar HPAM 5000L (Danisco US Inc.)
	PAHBAH	p-hydroxybenzoic acid hydrazide
20	PEG	polyethyleneglycol
	pI	isoelectric point
	PI	performance index
	ppm	parts per million, *e.g.*, µg protein per gram dry solid
	PVA	poly(vinyl alcohol)
25	PVP	poly(vinylpyrrolidone)
	RCF	relative centrifugal/centripetal force (*i.e.*, x gravity)
	RNA	ribonucleic acid
	SAS	alkanesulfonate
	SDS-PAGE	sodium dodecyl sulfate polyacrylamide gel electrophoresis
30	SSF	simultaneous saccharification and fermentation
	SSU/g solid	soluble starch unit/gram dry solids
	sp.	species
	TAED	tetraacetylethylenediamine
	Tm	melting temperature
35	TrGA	*Trichoderma reesei* glucoamylase
	w/v	weight/volume
	w/w	weight/weight
	v/v	volume/volume
	wt%	weight percent
40	°C	degrees Centigrade
	H_2O	water
	dH_2O or DI	deionized water
	dIH_2O	deionized water, Milli-Q filtration
	g or gm	grams
45	µg	micrograms

mg	milligrams
kg	kilograms
µL and µl	microliters
mL and ml	milliliters
mm	millimeters
µm	micrometer
M	molar
mM	millimolar
µM	micromolar
U	units
sec	seconds
min(s)	minute/minutes
hr(s)	hour/hours
DO	dissolved oxygen
Ncm	Newton centimeter
ETOH	ethanol
eq.	equivalents
N	normal
uPWA	variant α-amylase derived from *Pyrococcus woesei*
PWA	α-amylase from *Pyrococcus woesei*
MWCO	molecular weight cut-off
SSRL	Stanford Synchrotron Radiation Lightsource
PDB	Protein Database
CAZy	Carbohydrate-Active Enzymes database
Tris-HCl	tris(hydroxymethyl)aminomethane hydrochloride
HEPES	4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid

Definitions

The term "maltogenic amylase" refers to enzymes that are capable of producing significant amounts of maltose from starch or hydrolyzed starch. There are several enzymes falling under this definition. Some examples are:

1) Fungal alpha-amylases include those obtained from filamentous fungal strains including but not limited to strains of *Aspergillus* (e.g., *A. Niger*, *A. kawachi*, and *A. oryzae*); *Trichoderma sp.* (e.g. *Trichoderma reesie* alpha-amylase, disclosed in EP 2132307), *Rhisopus sp.*, *Mucor sp.*, and *Penicillium sp.* Commercial fungal alpha-amylase from *Aspergillus oryzae* are CLARASE® L from DuPont-Genencor and Fungamyl® 800L from Novozymes.

2) Acid stable fungal amylase from *Aspergillus niger* (For example, from Shin Nihon Chemicals).

9

3) Beta-amylases are found in plant materials like wheat, barley, rye, shorgum, soy, sweet potato, rice and microorganisms like *Bacillus cereus, Bacillus polymixa, Bacillus megaterium, Arabidopsis thaliana*. The most common commercial beta-amylases are derived from barley and are sold under trade the names OPTIMALT® BBA by DuPont-Genencor and Betalase 1500L by Senson. A commercial soy beta-amylase is β-amylase#1500S from Nagase ChemteX Corporation.

4) Maltogenic amylases (E.C. 3.2.1.133) are produced by microorganisms *Bacillus subtilis, Geobacillus stearothermophilus, Bacillus thermoalkalophilus, Lactobacillus gasseri, Thermus sp*. Commercial maltogenic amylases include but not limited to Maltogenase® L from Novozymes, Veron® XTENDER from AB Enzymes and MAX-LIFE™ P100 from DuPont-Danisco.

5) Maltogenic amylases provided by the present teachings, as illustrated for example by SEQ ID NO: 1 and SEQ ID NO: 3, and variants thereof taught herein.

As used herein, the term "Enzyme units" refers to the amount of product formed per time under the specified conditions of the assay. For example, a "glucoamylase activity unit" (GAU) is defined as the amount of enzyme that produces 1 g of glucose per hour from soluble starch substrate (4% DS) at 60 °C, pH 4.2. A "soluble starch unit" (SSU) is the amount of enzyme that produces 1 mg of glucose per minute from soluble starch substrate (4% DS) at pH 4.5, 50 °C. As another example, maltogenic amylase activity can be measured in degrees Diastatic Power (DP°) Units. This assay is based on a 30-min hydrolysis of a starch substrate at pH 4.6 and 20 °C. The reducing sugar groups produced on hydrolysis are measured in a titrimetric procedure using alkaline ferricyanide. One unit of diastase activity, expressed as degrees DP (DP°), is defined as the amount of enzyme, contained in 0.1 ml of a 5% solution of the sample enzyme preparation, that will produce sufficient reducing sugars to reduce 5 mL of Fehling's solution when the sample is incubated with 100 mL of the substrate for 1 hour at 20 °C.

The term "starch" refers to any material comprised of the complex polysaccharide carbohydrates of plants, comprised of amylose and amylopectin with the formula $(C_6H_{10}O_5)_x$, wherein X can be any number. The term includes plant-based materials

such as grains, cereal, grasses, tubers and roots, and more specifically materials
obtained from wheat, barley, corn, rye, rice, sorghum, brans, cassava, millet, milo, potato,
sweet potato, and tapioca. The term "starch" includes granular starch. The term
"granular starch" refers to raw, *i.e.,* uncooked starch, *e.g.,* starch that has not been

5   subject to gelatinization.

The terms, "wild-type," "parental," or "reference," with respect to a polypeptide,
refer to a naturally-occurring polypeptide that does not include a man-made substitution,
insertion, or deletion at one or more amino acid positions. Similarly, the terms
"wild-type," "parental," or "reference," with respect to a polynucleotide, refer to a

10 naturally-occurring polynucleotide that does not include a man-made nucleoside change.
However, note that a polynucleotide encoding a wild-type, parental, or reference
polypeptide is not limited to a naturally-occurring polynucleotide, and encompasses any
polynucleotide encoding the wild-type, parental, or reference polypeptide.

Reference to the wild-type polypeptide is understood to include the mature form of

15 the polypeptide. A "mature" polypeptide or variant, thereof, is one in which a signal
sequence is absent, for example, cleaved from an immature form of the polypeptide
during or following expression of the polypeptide.

The term "variant," with respect to a polypeptide, refers to a polypeptide that
differs from a specified wild-type, parental, or reference polypeptide in that it includes one

20 or more naturally-occurring or man-made substitutions, insertions, or deletions of an
amino acid. Similarly, the term "variant," with respect to a polynucleotide, refers to a
polynucleotide that differs in nucleotide sequence from a specified wild-type, parental, or
reference polynucleotide. The identity of the wild-type, parental, or reference
polypeptide or polynucleotide will be apparent from context.

25 In the case of the present maltogenic amylases, "activity" refers to maltogenic
amylase activity, which can be measured as described herein.

The term "recombinant," when used in reference to a subject cell, nucleic acid,
protein or vector, indicates that the subject has been modified from its native state. Thus,
for example, recombinant cells express genes that are not found within the native

(non-recombinant) form of the cell, or express native genes at different levels or under different conditions than found in nature. Recombinant nucleic acids differ from a native sequence by one or more nucleotides and/or are operably linked to heterologous sequences, *e.g.*, a heterologous promoter in an expression vector. Recombinant

5   proteins may differ from a native sequence by one or more amino acids and/or are fused with heterologous sequences. A vector comprising a nucleic acid encoding an amylase is a recombinant vector.

The terms "recovered," "isolated," and "separated," refer to a compound, protein (polypeptides), cell, nucleic acid, amino acid, or other specified material or component

10   that is removed from at least one other material or component with which it is naturally associated as found in nature. An "isolated" polypeptides, thereof, includes, but is not limited to, a culture broth containing secreted polypeptide expressed in a heterologous host cell.

The term "purified" refers to material (*e.g.*, an isolated polypeptide or

15   polynucleotide) that is in a relatively pure state, *e.g.*, at least about 90% pure, at least about 95% pure, at least about 98% pure, or even at least about 99% pure.

The term "enriched" refers to material (*e.g.*, an isolated polypeptide or polynucleotide) that is in about 50% pure, at least about 60% pure, at least about 70% pure, or even at least about 70% pure.

20   The terms "thermostable" and "thermostability," with reference to an enzyme, refer to the ability of the enzyme to retain activity after exposure to an elevated temperature. The thermostability of an enzyme, such as a maltogenic amylase enzyme, is measured by its half-life ($t_{1/2}$) given in minutes, hours, or days, during which half the enzyme activity is lost under defined conditions. The half-life may be calculated by

25   measuring residual amylase activity following exposure to (*i.e.*, challenge by) an elevated temperature.

A "pH range," with reference to an enzyme, refers to the range of pH values under which the enzyme exhibits catalytic activity.

The terms "pH stable" and "pH stability," with reference to an enzyme, relate to the ability of the enzyme to retain activity over a wide range of pH values for a predetermined period of time (e.g., 15 min., 30 min., 1 hour).

The term "amino acid sequence" is synonymous with the terms "polypeptide,"
5   "protein," and "peptide," and are used interchangeably. Where such amino acid sequences exhibit activity, they may be referred to as an "enzyme." The conventional one-letter or three-letter codes for amino acid residues are used, with amino acid sequences being presented in the standard amino-to-carboxy terminal orientation (i.e., N→C).

10   The term "nucleic acid" encompasses DNA, RNA, heteroduplexes, and synthetic molecules capable of encoding a polypeptide. Nucleic acids may be single stranded or double stranded, and may be chemical modifications. The terms "nucleic acid" and "polynucleotide" are used interchangeably. Because the genetic code is degenerate, more than one codon may be used to encode a particular amino acid, and the present
15   compositions and methods encompass nucleotide sequences that encode a particular amino acid sequence. Unless otherwise indicated, nucleic acid sequences are presented in 5'-to-3' orientation.

"Hybridization" refers to the process by which one strand of nucleic acid forms a duplex with, i.e., base pairs with, a complementary strand, as occurs during blot
20   hybridization techniques and PCR techniques. Stringent hybridization conditions are exemplified by hybridization under the following conditions: 65°C and 0.1X SSC (where 1X SSC = 0.15 M NaCl, 0.015 M Na_3 citrate, pH 7.0). Hybridized, duplex nucleic acids are characterized by a melting temperature (T_m), where one half of the hybridized nucleic acids are unpaired with the complementary strand. Mismatched nucleotides within the
25   duplex lower the T_m. Very stringent hybridization conditions involve 68°C and 0.1X SSC

A "synthetic" molecule is produced by in vitro chemical or enzymatic synthesis rather than by an organism.

The terms "transformed," "stably transformed," and "transgenic," used with reference to a cell means that the cell contains a non-native (e.g., heterologous) nucleic

acid sequence integrated into its genome or carried as an episome that is maintained through multiple generations.

The term "introduced" in the context of inserting a nucleic acid sequence into a cell, means "transfection", "transformation" or "transduction," as known in the art.

5   A "host strain" or "host cell" is an organism into which an expression vector, phage, virus, or other DNA construct, including a polynucleotide encoding a polypeptide of interest (e.g., an amylase) has been introduced.   Exemplary host strains are microorganism cells (e.g., bacteria, filamentous fungi, and yeast) capable of expressing the polypeptide of interest and/or fermenting saccharides.   The term "host cell" includes
10   protoplasts created from cells.

The term "heterologous" with reference to a polynucleotide or protein refers to a polynucleotide or protein that does not naturally occur in a host cell.

The term "endogenous" with reference to a polynucleotide or protein refers to a polynucleotide or protein that occurs naturally in the host cell.

15   The term "expression" refers to the process by which a polypeptide is produced based on a nucleic acid sequence.   The process includes both transcription and translation.

A "selective marker" or "selectable marker" refers to a gene capable of being expressed in a host to facilitate selection of host cells carrying the gene.   Examples of
20   selectable markers include but are not limited to antimicrobials (e.g., hygromycin, bleomycin, or chloramphenicol) and/or genes that confer a metabolic advantage, such as a nutritional advantage on the host cell.

A "vector" refers to a polynucleotide sequence designed to introduce nucleic acids into one or more cell types.   Vectors include cloning vectors, expression vectors,
25   shuttle vectors, plasmids, phage particles, cassettes and the like.

An "expression vector" refers to a DNA construct comprising a DNA sequence encoding a polypeptide of interest, which coding sequence is operably linked to a suitable control sequence capable of effecting expression of the DNA in a suitable host.

Such control sequences may include a promoter to effect transcription, an optional operator sequence to control transcription, a sequence encoding suitable ribosome binding sites on the mRNA, enhancers and sequences which control termination of transcription and translation.

5   The term "operably linked" means that specified components are in a relationship (including but not limited to juxtaposition) permitting them to function in an intended manner.   For example, a regulatory sequence is operably linked to a coding sequence such that expression of the coding sequence is under control of the regulatory sequences.

10   A "signal sequence" is a sequence of amino acids attached to the N-terminal portion of a protein, which facilitates the secretion of the protein outside the cell.   The mature form of an extracellular protein lacks the signal sequence, which is cleaved off during the secretion process.

       "Biologically active" refers to a sequence having a specified biological activity,
15   such an enzymatic activity.

       The term "specific activity" refers to the number of moles of substrate that can be converted to product by an enzyme or enzyme preparation per unit time under specific conditions.   Specific activity is generally expressed as units (U)/mg of protein.

       As used herein, "water hardness" is a measure of the minerals (*e.g.*, calcium and
20   magnesium) present in water.

       A "swatch" is a piece of material such as a fabric that has a stain applied thereto. The material can be, for example, fabrics made of cotton, polyester or mixtures of natural and synthetic fibers.   The swatch can further be paper, such as filter paper or nitrocellulose, or a piece of a hard material such as ceramic, metal, or glass.   For
25   amylases, the stain is starch based, but can include blood, milk, ink, grass, tea, wine, spinach, gravy, chocolate, egg, cheese, clay, pigment, oil, or mixtures of these compounds.

       A "smaller swatch" is a section of the swatch that has been cut with a single hole punch device, or has been cut with a custom manufactured 96-hole punch device, where

the pattern of the multi-hole punch is matched to standard 96-well microtiter plates, or the

section has been otherwise removed from the swatch. The swatch can be of textile,

paper, metal, or other suitable material. The smaller swatch can have the stain affixed

either before or after it is placed into the well of a 24-, 48- or 96-well microtiter plate. The

5   smaller swatch can also be made by applying a stain to a small piece of material. For

example, the smaller swatch can be a stained piece of fabric 5/8" or 0.25" in diameter.

The custom manufactured punch is designed in such a manner that it delivers 96

swatches simultaneously to all wells of a 96-well plate. The device allows delivery of

more than one swatch per well by simply loading the same 96-well plate multiple times.

10 Multi-hole punch devices can be conceived of to deliver simultaneously swatches to any

format plate, including but not limited to 24-well, 48-well, and 96-well plates. In another

conceivable method, the soiled test platform can be a bead made of metal, plastic, glass,

ceramic, or another suitable material that is coated with the soil substrate. The one or

more coated beads are then placed into wells of 96-, 48-, or 24-well plates or larger

15 formats, containing suitable buffer and enzyme.

As used herein, "a cultured cell material comprising an amylase" or similar

language, refers to a cell lysate or supernatant (including media) that includes an

amylase as a component. The cell material may be from a heterologous host that is

grown in culture for the purpose of producing the amylase.

20 As used herein, "percent sequence identity" means that a particular sequence

has at least a certain percentage of amino acid residues identical to those in a specified

reference sequence, when aligned using the CLUSTAL W algorithm with default

parameters. *See* Thompson *et al.* (1994) *Nucleic Acids Res.* 22:4673-4680. Default

parameters for the CLUSTAL W algorithm are:

25   Gap opening penalty: 10.0
            Gap extension penalty: 0.05
            Protein weight matrix: BLOSUM series
            DNA weight matrix: IUB
            Delay divergent sequences %:   40
30   Gap separation distance: 8
            DNA transitions weight: 0.50
            List hydrophilic residues: GPSNDQEKR

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Use negative matrix:	OFF
Toggle Residue specific penalties:	ON
Toggle hydrophilic penalties:	ON
Toggle end gap separation penalty	OFF.

5   Deletions are counted as non-identical residues, compared to a reference

sequence.   Deletions occurring at either termini are included.   For example, a variant

with five amino acid deletions of the C-terminus of the mature 617 residue polypeptide

would have a percent sequence identity of 99% (612 / 617 identical residues × 100,

rounded to the nearest whole number) relative to the mature polypeptide.   Such a

10   variant would be encompassed by a variant having "at least 99% sequence identity" to a

mature polypeptide.

"Fused" polypeptide sequences are connected, *i.e.,* operably linked, via a peptide

bond between two subject polypeptide sequences.

The term "filamentous fungi" refers to all filamentous forms of the subdivision

15   Eumycotina, particularly Pezizomycotina species.

The term "degree of polymerization" (DP) refers to the number (n) of

anhydro-glucopyranose units in a given saccharide.   Examples of DP1 are the

monosaccharides glucose and fructose.   Examples of DP2 are the disaccharides

maltose and sucrose.   The term "DE," or "dextrose equivalent," is defined as the

20   percentage of reducing sugar, *i.e.,* D-glucose, as a fraction of total carbohydrate in a

syrup.

The term "dry solids content" (ds) refers to the total solids of a slurry in a dry

weight percent basis.   The term "slurry" refers to an aqueous mixture containing

insoluble solids.

25   The phrase "simultaneous saccharification and fermentation (SSF)" refers to a

process in the production of biochemicals in which a microbial organism, such as an

ethanologenic microorganism, and at least one enzyme, such as an amylase, are

present during the same process step.   SSF includes the contemporaneous hydrolysis

of starch substrates (granular, liquefied, or solubilized) to saccharides, including glucose,

and the fermentation of the saccharides into alcohol or other biochemical or biomaterial in the same reactor vessel.

An "ethanologenic microorganism" refers to a microorganism with the ability to convert a sugar or oligosaccharide to ethanol.

5   The term "fermented beverage" refers to any beverage produced by a method comprising a fermentation process, such as a microbial fermentation, *e.g.*, a bacterial and/or fungal fermentation.   "Beer" is an example of such a fermented beverage, and the term "beer" is meant to comprise any fermented wort produced by fermentation/brewing of a starch-containing plant material.   Often, beer is produced

10   exclusively from malt or adjunct, or any combination of malt and adjunct.   Examples of beers include: full malted beer, beer brewed under the "Reinheitsgebot," ale, India pale ale, lager, pilsner, bitter, Happoshu (second beer), third beer, dry beer, near beer, light beer, low alcohol beer, low calorie beer, porter, bock, dopplebock, stout, porter, malt liquor, non-alcoholic beer, non-alcoholic malt liquor and the like, but also alternative

15   cereal and malt beverages such as fruit flavored malt beverages, *e.g.*, citrus flavored, such as lemon-, orange-, lime-, or berry-flavored malt beverages, liquor flavored malt beverages, *e.g.*, vodka-, rum-, or tequila-flavored malt liquor, or coffee flavored malt beverages, such as caffeine-flavored malt liquor, and the like.

The term "malt" refers to any malted cereal grain, such as malted barley or wheat.

20   The term "adjunct" refers to any starch and/or sugar containing plant material that is not malt, such as barley or wheat malt.   Examples of adjuncts include common corn grits, refined corn grits, brewer's milled yeast, rice, sorghum, refined corn starch, barley, barley starch, dehusked barley, wheat, wheat starch, torrified cereal, cereal flakes, rye, oats, potato, tapioca, cassava and syrups, such as corn syrup, sugar cane syrup,

25   inverted sugar syrup, barley and/or wheat syrups, and the like.

The term "mash" refers to an aqueous slurry of any starch and/or sugar containing plant material, such as grist, *e.g.*, comprising crushed barley malt, crushed barley, and/or other adjunct or a combination thereof, mixed with water later to be separated into wort and spent grains.

The term "wort" refers to the unfermented liquor run-off following extracting the grist during mashing.

"Iodine-positive starch" or "IPS" refers to (1) amylose that is not hydrolyzed after liquefaction and saccharification, or (2) a retrograded starch polymer. When saccharified starch or saccharide liquor is tested with iodine, the high DPn amylose or the retrograded starch polymer binds iodine and produces a characteristic blue color. The saccharide liquor is thus termed "iodine-positive saccharide," "blue saccharide," or "blue sac."

The terms "retrograded starch" or "starch retrogradation" refer to changes that occur spontaneously in a starch paste or gel on ageing.

The term "about" refers to ± 5% to the referenced value.

Additional mutations

In some embodiments, the present maltogenic amylases further include one or more mutations that provide a further performance or stability benefit. Exemplary performance benfits include but are not limited to increased hydrolysis of a starch substrate, increased grain, cereal or other starch substrate liquifaction performance, increased cleaning performance, increased thermal stability, increased storage stability, increased solubility, an altered pH profile, decreased calcium dependence, increased specific activity, modified substrate specificity, modified substrate binding, modified pH-dependent activity, modified pH-dependent stability, increased oxidative stability, and increased expression. In some cases, the performance benefit is realized at a relatively low temperature. In some cases, the performance benefit is realized at relatively high temperature.

Furthermore, the present amylases may include any number of conservative amino acid substitutions. Exemplary conservative amino acid substitutions are listed in the following Table 1.

Table 1. Conservative amino acid substitutions

For Amino Acid	Code	Replace with any of
Alanine	A	D-Ala, Gly, beta-Ala, L-Cys, D-Cys
Arginine	R	D-Arg, Lys, D-Lys, homo-Arg, D-homo-Arg, Met, Ile, D-Met, D-Ile, Orn, D-Orn
Asparagine	N	D-Asn, Asp, D-Asp, Glu, D-Glu, Gln, D-Gln
Aspartic Acid	D	D-Asp, D-Asn, Asn, Glu, D-Glu, Gln, D-Gln
Cysteine	C	D-Cys, S-Me-Cys, Met, D-Met, Thr, D-Thr
Glutamine	Q	D-Gln, Asn, D-Asn, Glu, D-Glu, Asp, D-Asp
Glutamic Acid	E	D-Glu, D-Asp, Asp, Asn, D-Asn, Gln, D-Gln
Glycine	G	Ala, D-Ala, Pro, D-Pro, b-Ala, Acp
Isoleucine	I	D-Ile, Val, D-Val, Leu, D-Leu, Met, D-Met
Leucine	L	D-Leu, Val, D-Val, Leu, D-Leu, Met, D-Met
Lysine	K	D-Lys, Arg, D-Arg, homo-Arg, D-homo-Arg, Met, D-Met, Ile, D-Ile, Orn, D-Orn
Methionine	M	D-Met, S-Me-Cys, Ile, D-Ile, Leu, D-Leu, Val, D-Val
Phenylalanine	F	D-Phe, Tyr, D-Thr, L-Dopa, His, D-His, Trp, D-Trp, Trans-3,4, or 5-phenylproline, cis-3,4, or 5-phenylproline
Proline	P	D-Pro, L-I-thioazolidine-4- carboxylic acid, D-or L-1-oxazolidine-4-carboxylic acid
Serine	S	D-Ser, Thr, D-Thr, allo-Thr, Met, D-Met, Met(O), D-Met(O), L-Cys, D-Cys
Threonine	T	D-Thr, Ser, D-Ser, allo-Thr, Met, D-Met, Met(O), D-Met(O), Val, D-Val
Tyrosine	Y	D-Tyr, Phe, D-Phe, L-Dopa, His, D-His
Valine	V	D-Val, Leu, D-Leu, Ile, D-Ile, Met, D-Met

The reader will appreciate that some of the above mentioned conservative mutations can be produced by genetic manpulation, while others are produced by introducing synthetic amino acids into a polypeptide by genetic or other means.

The present maltogenic amylase may be "precursor," "immature," or "full-length," in which case they include a signal sequence, or "mature," in which case they lack a signal sequence.   Mature forms of the polypeptides are generally the most useful. Unless otherwise noted, the amino acid residue numbering used herein refers to the mature forms of the respective maltogenic amylase polypeptides.   The present

maltogenic amylase polypeptides may also be truncated to remove the N or C-termini, so long as the resulting polypeptides retain amylase activity.

The present maltogenic amylase may be a "chimeric" or "hybrid" polypeptide, in that it includes at least a portion of a first amylase polypeptide, and at least a portion of a second amylase polypeptide (such chimeric amylases have recently been "rediscovered" as domain-swap amylases). The present amylases may further include heterologous signal sequence, an epitope to allow tracking or purification, or the like. Exemplary heterologous signal sequences are from *B. licheniformis* amylase (LAT), *B. subtilis* (AmyE or AprE), and *Streptomyces* CelA.

Nucleotides encoding maltogenic amylase polypeptides

In another aspect, nucleic acids encoding a maltogenic amylase polypeptide are provided. The nucleic acid may encode a particular maltogenic amylase polypeptide, or a maltogenic amylase having a specified degree of amino acid sequence identity to the particular amylase.

In one example, the nucleic acid encodes a maltogenic amylase having at least 65%, at least 66%, at least 67%, at least 68%, at least 69%, at least 70%, at least 75%, at least 76%, at least 77%, at least 78%, at least 79%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98% or even at least 99% identity to SEQ ID NO: 1. It will be appreciated that due to the degeneracy of the genetic code, a plurality of nucleic acids may encode the same polypeptide.

In another example, the nucleic acid hybridizes under stringent or very stringent conditions to a nucleic acid encoding (or complementary to a nucleic acid encoding) a maltogenic amylase having at least 65%, at least 66%, at least 67%, at least 68%, at least 69%, at least 70%, at least 75%, at least 76%, at least 77%, at least 78%, at least 79%, at least 80%, at least 81%, at least 82%, at least 83%, at least 84%, at least 85%, at least 86%, at least 87%, at least 88%, at least 89%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98% or

even at least 99% identity to SEQ ID NO: 1. Such stringent and very stringent hybridization conditions are described herein.

Nucleic acids may encode a "full-length" ("fl" or "FL") maltogenic amylase, which includes a signal sequence, only the mature form of a maltogenic amylase, which lacks

5   the signal sequence, or a truncated form of a maltogenic amylase, which lacks the N or C-terminus of the mature form.

A nucleic acid that encodes a maltogenic amylase can be operably linked to various promoters and regulators in a vector suitable for expressing the maltogenic amylase in host cells.   Exemplary promoters are from *B. licheniformis* amylase (LAT), *B.*

10 *subtilis* (AmyE or AprE), and *Streptomyces* CelA.   Such a nucleic acid can also be linked to other coding sequences, *e.g.*, to encode a chimeric polypeptide.

Production of Variant Amylases

The present maltogenic amylases can be produced in host cells, for example, by secretion or intracellular expression.   A cultured cell material (*e.g.*, a whole-cell broth)

15 comprising a maltogenic amylase can be obtained following secretion of the maltogenic amylase into the cell medium.   Optionally, the maltogenic amylase can be isolated from the host cells, or even isolated from the cell broth, depending on the desired purity of the final maltogenic amylase.   A gene encoding a maltogenic amylase can be cloned and expressed according to methods well known in the art.   Suitable host cells include

20 bacterial, fungal (including yeast and filamentous fungi), and plant cells (including algae). Particularly useful host cells include *Aspergillus niger*, *Aspergillus oryzae* or *Trichoderma reesei*.   Other host cells include bacterial cells, *e.g.*, *Bacillus subtilis* or *B. licheniformis*, as well as *Streptomyces*.

The host cell further may express a nucleic acid encoding a homologous or

25 heterologous glucoamylase, *i.e.*, a glucoamylase that is not the same species as the host cell, or one or more other enzymes.   The glucoamylase may be a variant glucoamylase, such as one of the glucoamylase variants disclosed in U.S. Patent No. 8,058,033 (Danisco US Inc.), for example.   Additionally, the host may express one or more accessory enzymes, proteins, peptides.   These may benefit liquefaction,

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saccharification, fermentation, SSF, etc processes. Furthermore, the host cell may produce biochemicals in addition to enzymes used to digest the various feedstock(s). Such host cells may be useful for fermentation or simultaneous saccharification and fermentation processes to reduce or eliminate the need to add enzymes.

5   **Vectors**

A DNA construct comprising a nucleic acid encoding maltogenic amylases can be constructed to be expressed in a host cell. Representative nucleic acids that encode maltogenic amylases include SEQ ID NO: 1. Because of the well-known degeneracy in the genetic code, variant polynucleotides that encode an identical amino acid sequence

10   can be designed and made with routine skill. It is also well-known in the art to optimize codon use for a particular host cell. Nucleic acids encoding maltogenic amylases can be incorporated into a vector. Vectors can be transferred to a host cell using well-known transformation techniques, such as those disclosed below.

The vector may be any vector that can be transformed into and replicated within

15   a host cell. For example, a vector comprising a nucleic acid encoding a maltogenic amylase can be transformed and replicated in a bacterial host cell as a means of propagating and amplifying the vector. The vector also may be transformed into an expression host, so that the encoding nucleic acids can be expressed as a functional maltogenic amylase. Host cells that serve as expression hosts can include filamentous

20   fungi, for example. The Fungal Genetics Stock Center (FGSC) Catalogue of Strains lists suitable vectors for expression in fungal host cells. *See* FGSC, Catalogue of Strains, University of Missouri, *at* www.fgsc.net (last modified January 17, 2007). A representative vector is pJG153, a promoterless Cre expression vector that can be replicated in a bacterial host. *See* Harrison *et al.* (June 2011) *Applied Environ. Microbiol.*

25   77: 3916-22. pJG153can be modified with routine skill to comprise and express a nucleic acid encoding a maltogenic amylase.

A nucleic acid encoding a maltogenic amylase can be operably linked to a suitable promoter, which allows transcription in the host cell. The promoter may be any DNA sequence that shows transcriptional activity in the host cell of choice and may be

derived from genes encoding proteins either homologous or heterologous to the host cell. Exemplary promoters for directing the transcription of the DNA sequence encoding a maltogenic amylase, especially in a bacterial host, are the promoter of the lac operon of *E. coli*, the *Streptomyces coelicolor* agarase gene dagA or celA promoters, the promoters of

5   the *Bacillus licheniformis* α-amylase gene (amyL), the promoters of the *Bacillus stearothermophilus* maltogenic amylase gene (amyM), the promoters of the *Bacillus amyloliquefaciens* α-amylase (amyQ), the promoters of the *Bacillus subtilis* xylA and xylB genes *etc.* For transcription in a fungal host, examples of useful promoters are those derived from the gene encoding *Aspergillus oryzae* TAKA amylase, *Rhizomucor miehei*

10   aspartic proteinase, *Aspergillus niger* neutral α-amylase, *A. niger* acid stable α-amylase, *A. niger* glucoamylase, *Rhizomucor miehei* lipase, *A. oryzae* alkaline protease, *A. oryzae* triose phosphate isomerase, or *A. nidulans* acetamidase. When a gene encoding a maltogenic amylase is expressed in a bacterial species such as *E. coli*, a suitable promoter can be selected, for example, from a bacteriophage promoter including a T7

15   promoter and a phage lambda promoter. Examples of suitable promoters for the expression in a yeast species include but are not limited to the Gal 1 and Gal 10 promoters of *Saccharomyces cerevisiae* and the *Pichia pastoris* AOX1 or AOX2 promoters. *cbh1* is an endogenous, inducible promoter from *T. reesei*. *See* Liu *et al.* (2008) "Improved heterologous gene expression in *Trichoderma reesei* by

20   cellobiohydrolase I gene (cbh1) promoter optimization," *Acta Biochim. Biophys. Sin (Shanghai)* 40(2): 158-65.

        The coding sequence can be operably linked to a signal sequence. The DNA encoding the signal sequence may be the DNA sequence naturally associated with the maltogenic amylase gene to be expressed or from a different Genus or species. A

25   signal sequence and a promoter sequence comprising a DNA construct or vector can be introduced into a fungal host cell and can be derived from the same source. For example, the signal sequence is the *cbh1* signal sequence that is operably linked to a *cbh1* promoter.

        An expression vector may also comprise a suitable transcription terminator and,

30   in eukaryotes, polyadenylation sequences operably linked to the DNA sequence

encoding a variant amylase.   Termination and polyadenylation sequences may suitably be derived from the same sources as the promoter.

The vector may further comprise a DNA sequence enabling the vector to replicate in the host cell.   Examples of such sequences are the origins of replication of

5   plasmids pUC19, pACYC177, pUB110, pE194, pAMB1, and pIJ702.

The vector may also comprise a selectable marker, *e.g.,* a gene the product of which complements a defect in the isolated host cell, such as the *dal* genes from *B. subtilis* or *B. licheniformis*, or a gene that confers antibiotic resistance such as, *e.g.,* ampicillin, kanamycin, chloramphenicol or tetracycline resistance.   Furthermore, the

10   vector may comprise *Aspergillus* selection markers such as *amdS, argB, niaD* and *xxsC,* a marker giving rise to hygromycin resistance, or the selection may be accomplished by co-transformation, such as known in the art.   *See e.g.,* International PCT Application WO 91/17243.

Intracellular expression may be advantageous in some respects, *e.g.,* when

15   using certain bacteria or fungi as host cells to produce large amounts of maltogenic amylase for subsequent enrichment or purification.   Extracellular secretion of amylase into the culture medium can also be used to make a cultured cell material comprising the isolated maltogenic amylase.

The expression vector typically includes the components of a cloning vector,

20   such as, for example, an element that permits autonomous replication of the vector in the selected host organism and one or more phenotypically detectable markers for selection purposes.   The expression vector normally comprises control nucleotide sequences such as a promoter, operator, ribosome binding site, translation initiation signal and optionally, a repressor gene or one or more activator genes.   Additionally, the expression

25   vector may comprise a sequence coding for an amino acid sequence capable of targeting the maltogenic amylase to a host cell organelle such as a peroxisome, or to a particular host cell compartment.   Such a targeting sequence includes but is not limited to the sequence, SKL.   For expression under the direction of control sequences, the nucleic

acid sequence of the amylase is operably linked to the control sequences in proper manner with respect to expression.

The procedures used to ligate the DNA construct encoding a maltogenic amylase, the promoter, terminator and other elements, respectively, and to insert them into suitable
5   vectors containing the information necessary for replication, are well known to persons skilled in the art (see, e.g., Sambrook et al., MOLECULAR CLONING: A LABORATORY MANUAL, 2nd ed., Cold Spring Harbor, 1989, and 3rd ed., 2001).

Transformation and Culture of Host Cells

An isolated cell, either comprising a DNA construct or an expression vector, is
10   advantageously used as a host cell in the recombinant production of a maltogenic amylase.   The cell may be transformed with the DNA construct encoding the enzyme, conveniently by integrating the DNA construct (in one or more copies) in the host chromosome.   This integration is generally considered to be an advantage, as the DNA sequence is more likely to be stably maintained in the cell.   Integration of the DNA
15   constructs into the host chromosome may be performed according to conventional methods, e.g., by homologous or heterologous recombination.   Alternatively, the cell may be transformed with an expression vector as described above in connection with the different types of host cells.

Examples of suitable bacterial host organisms are Gram positive bacterial
20   species such as Bacillaceae including Bacillus subtilis, Bacillus licheniformis, Bacillus lentus, Bacillus brevis, Geobacillus (formerly Bacillus) stearothermophilus, Bacillus alkalophilus, Bacillus amyloliquefaciens, Bacillus coagulans, Bacillus lautus, Bacillus megaterium, and Bacillus thuringiensis; Streptomyces species such as Streptomyces murinus; lactic acid bacterial species including Lactococcus sp. such as Lactococcus
25   lactis; Lactobacillus sp. including Lactobacillus reuteri; Leuconostoc sp.; Pediococcus sp.; and Streptococcus sp.   Alternatively, strains of a Gram negative bacterial species belonging to Enterobacteriaceae including E. coli, or to Pseudomonadaceae can be selected as the host organism.

A suitable yeast host organism can be selected from the biotechnologically relevant yeasts species such as but not limited to yeast species such as *Pichia* sp., *Hansenula* sp., or *Kluyveromyces, Yarrowinia, Schizosaccharomyces* species or a species of *Saccharomyces,* including *Saccharomyces cerevisiae* or a species belonging to *Schizosaccharomyces* such as, for example, *S. pombe* species. A strain of the methylotrophic yeast species, *Pichia pastoris*, can be used as the host organism. Alternatively, the host organism can be a *Hansenula* species. Suitable host organisms among filamentous fungi include species of *Aspergillus, e.g., Aspergillus niger, Aspergillus oryzae, Aspergillus tubigensis, Aspergillus awamori*, or *Aspergillus nidulans.* Alternatively, strains of a *Fusarium* species, *e.g., Fusarium oxysporum* or of a *Rhizomucor* species such as *Rhizomucor miehei* can be used as the host organism. Other suitable strains include *Thermomyces* and *Mucor* species. In addition, *Trichoderma sp.* can be used as a host. A suitable procedure for transformation of *Aspergillus* host cells includes, for example, that described in EP 238023. A maltogenic amylase expressed by a fungal host cell can be glycosylated, *i.e.,* will comprise a glycosyl moiety. The glycosylation pattern can be the same or different as present in the wild-type maltogenic amylase. The type and/or degree of glycosylation may impart changes in enzymatic and/or biochemical properties.

It is advantageous to delete genes from expression hosts, where the gene deficiency can be cured by the transformed expression vector. Known methods may be used to obtain a fungal host cell having one or more inactivated genes. Gene inactivation may be accomplished by complete or partial deletion, by insertional inactivation or by any other means that renders a gene nonfunctional for its intended purpose, such that the gene is prevented from expression of a functional protein. Any gene from a *Trichoderma* sp. or other filamentous fungal host that has been cloned can be deleted, for example, *cbh1, cbh2, egl1,* and *egl2* genes. Gene deletion may be accomplished by inserting a form of the desired gene to be inactivated into a plasmid by methods known in the art.

Introduction of a DNA construct or vector into a host cell includes techniques such as transformation; electroporation; nuclear microinjection; transduction;

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transfection, *e.g.*, lipofection mediated and DEAE-Dextrin mediated transfection; incubation with calcium phosphate DNA precipitate; high velocity bombardment with DNA-coated microprojectiles; and protoplast fusion. General transformation techniques are known in the art. *See, e.g.*, Sambrook *et al.* (2001), *supra*. The expression of
5 heterologous protein in *Trichoderma* is described, for example, in U.S. Patent No. 6,022,725. Reference is also made to Cao *et al.* (2000) *Science* 9:991-1001 for transformation of *Aspergillus* strains. Genetically stable transformants can be constructed with vector systems whereby the nucleic acid encoding a maltogenic amylase is stably integrated into a host cell chromosome. Transformants are then
10 selected and purified by known techniques.

The preparation of *Trichoderma* sp. for transformation, for example, may involve the preparation of protoplasts from fungal mycelia. *See* Campbell *et al.* (1989) *Curr. Genet.* 16: 53-56. The mycelia can be obtained from germinated vegetative spores. The mycelia are treated with an enzyme that digests the cell wall, resulting in protoplasts.
15 The protoplasts are protected by the presence of an osmotic stabilizer in the suspending medium. These stabilizers include sorbitol, mannitol, potassium chloride, magnesium sulfate, and the like. Usually the concentration of these stabilizers varies between 0.8 M and 1.2 M, *e.g.*, a 1.2 M solution of sorbitol can be used in the suspension medium.

Uptake of DNA into the host *Trichoderma* sp. strain depends upon the calcium
20 ion concentration. Generally, between about 10-50 mM $CaCl_2$ is used in an uptake solution. Additional suitable compounds include a buffering system, such as TE buffer (10 mM Tris, pH 7.4; 1 mM EDTA) or 10 mM MOPS, pH 6.0 and polyethylene glycol. The polyethylene glycol is believed to fuse the cell membranes, thus permitting the contents of the medium to be delivered into the cytoplasm of the *Trichoderma* sp. strain.
25 This fusion frequently leaves multiple copies of the plasmid DNA integrated into the host chromosome.

Usually transformation of *Trichoderma* sp. uses protoplasts or cells that have been subjected to a permeability treatment, typically at a density of 10^5 to 10^7/mL, particularly 2×10^6/mL. A volume of 100 μL of these protoplasts or cells in an appropriate

solution (*e.g.*, 1.2 M sorbitol and 50 mM $CaCl_2$) may be mixed with the desired DNA. Generally, a high concentration of PEG is added to the uptake solution. From 0.1 to 1 volume of 25% PEG 4000 can be added to the protoplast suspension; however, it is useful to add about 0.25 volumes to the protoplast suspension. Additives, such as

5   dimethyl sulfoxide, heparin, spermidine, potassium chloride and the like, may also be added to the uptake solution to facilitate transformation. Similar procedures are available for other fungal host cells. *See, e.g.*, U.S. Patent No. 6,022,725.

Expression

10   A method of producing a maltogenic amylase may comprise cultivating a host cell as described above under conditions conducive to the production of the enzyme and recovering the enzyme from the cells and/or culture medium.

The medium used to cultivate the cells may be any conventional medium suitable for growing the host cell in question and obtaining expression of a maltogenic amylase.

15   Suitable media and media components are available from commercial suppliers or may be prepared according to published recipes (*e.g.*, as described in catalogues of the American Type Culture Collection).

An enzyme secreted from the host cells can be used in a whole broth preparation. In the present methods, the preparation of a spent whole fermentation broth of a

20   recombinant microorganism can be achieved using any cultivation method known in the art resulting in the expression of a maltogenic amylase. Fermentation may, therefore, be understood as comprising shake flask cultivation, small- or large-scale fermentation (including continuous, batch, fed-batch, or solid state fermentations) in laboratory or industrial fermenters performed in a suitable medium and under conditions allowing the

25   amylase to be expressed or isolated. The term "spent whole fermentation broth" is defined herein as unfractionated contents of fermentation material that includes culture medium, extracellular proteins (*e.g.*, enzymes), and cellular biomass. It is understood that the term "spent whole fermentation broth" also encompasses cellular biomass that has been lysed or permeabilized using methods well known in the art.

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An enzyme secreted from the host cells may conveniently be recovered from the culture medium by well-known procedures, including separating the cells from the medium by centrifugation or filtration, and precipitating proteinaceous components of the medium by means of a salt such as ammonium sulfate, followed by the use of

5   chromatographic procedures such as ion exchange chromatography, affinity chromatography, or the like.

The polynucleotide encoding a maltogenic amylase in a vector can be operably linked to a control sequence that is capable of providing for the expression of the coding sequence by the host cell, *i.e.* the vector is an expression vector.   The control

10   sequences may be modified, for example by the addition of further transcriptional regulatory elements to make the level of transcription directed by the control sequences more responsive to transcriptional modulators.   The control sequences may in particular comprise promoters.

Host cells may be cultured under suitable conditions that allow expression of a

15   maltogenic amylase.   Expression of the enzymes may be constitutive such that they are continually produced, or inducible, requiring a stimulus to initiate expression.   In the case of inducible expression, protein production can be initiated when required by, for example, addition of an inducer substance to the culture medium, for example dexamethasone or IPTG or Sophorose.   Polypeptides can also be produced

20   recombinantly in an *in vitro* cell-free system, such as the TNT™ (Promega) rabbit reticulocyte system.

An expression host also can be cultured in the appropriate medium for the host, under aerobic conditions.   Shaking or a combination of agitation and aeration can be provided, with production occurring at the appropriate temperature for that host, *e.g.*,

25   from about 25°C to about 75°C (*e.g.*, 30°C to 45°C), depending on the needs of the host and production of the desired maltogenic amylase.   Culturing can occur from about 12 to about 100 hours or greater (and any hour value there between, *e.g.*, from 24 to 72 hours). Typically, the culture broth is at a pH of about 4.0 to about 8.0, again depending on the culture conditions needed for the host relative to production of a maltogenic amylase.

30

Methods for Enriching and Purifying Maltogenic Amylases

Fermentation, separation, and concentration techniques are well known in the art and conventional methods can be used in order to prepare a concentrated maltogenic amylase polypeptide-containing solution.

After fermentation, a fermentation broth is obtained, the microbial cells and various suspended solids, including residual raw fermentation materials, are removed by conventional separation techniques in order to obtain a maltogenic amylase solution. Filtration, centrifugation, microfiltration, rotary vacuum drum filtration, ultrafiltration, centrifugation followed by ultra-filtration, extraction, or chromatography, or the like, are generally used.

It is desirable to concentrate a maltogenic amylase polypeptide-containing solution in order to optimize recovery.   Use of unconcentrated solutions requires increased incubation time in order to collect the enriched or purified enzyme precipitate.

The enzyme containing solution is concentrated using conventional concentration techniques until the desired enzyme level is obtained.   Concentration of the enzyme containing solution may be achieved by any of the techniques discussed herein. Exemplary methods of enrichment and purification include but are not limited to rotary vacuum filtration and/or ultrafiltration.

The enzyme solution is concentrated into a concentrated enzyme solution until the enzyme activity of the concentrated maltogenic amylase polypeptide-containing solution is at a desired level.

Concentration may be performed using, *e.g.*, a precipitation agent, such as a metal halide precipitation agent.   Metal halide precipitation agents include but are not limited to alkali metal chlorides, alkali metal bromides and blends of two or more of these metal halides.   Exemplary metal halides include sodium chloride, potassium chloride, sodium bromide, potassium bromide and blends of two or more of these metal halides.

The metal halide precipitation agent, sodium chloride, can also be used as a preservative.

The metal halide precipitation agent is used in an amount effective to precipitate a maltogenic amylase. The selection of at least an effective amount and an optimum

5   amount of metal halide effective to cause precipitation of the enzyme, as well as the conditions of the precipitation for maximum recovery including incubation time, pH, temperature and concentration of enzyme, will be readily apparent to one of ordinary skill in the art, after routine testing.

Generally, at least about 5% w/v (weight/volume) to about 25% w/v of metal halide

10   is added to the concentrated enzyme solution, and usually at least 8% w/v. Generally, no more than about 25% w/v of metal halide is added to the concentrated enzyme solution and usually no more than about 20% w/v. The optimal concentration of the metal halide precipitation agent will depend, among others, on the nature of the specific maltogenic amylase polypeptide and on its concentration in the concentrated enzyme

15   solution.

Another alternative way to precipitate the enzyme is to use organic compounds. Exemplary organic compound precipitating agents include: 4-hydroxybenzoic acid, alkali metal salts of 4-hydroxybenzoic acid, alkyl esters of 4-hydroxybenzoic acid, and blends of two or more of these organic compounds. The addition of the organic compound

20   precipitation agents can take place prior to, simultaneously with or subsequent to the addition of the metal halide precipitation agent, and the addition of both precipitation agents, organic compound and metal halide, may be carried out sequentially or simultaneously.

Generally, the organic precipitation agents are selected from the group consisting

25   of alkali metal salts of 4-hydroxybenzoic acid, such as sodium or potassium salts, and linear or branched alkyl esters of 4-hydroxybenzoic acid, wherein the alkyl group contains from 1 to 12 carbon atoms, and blends of two or more of these organic compounds. The organic compound precipitation agents can be, for example, linear or branched alkyl esters of 4-hydroxybenzoic acid, wherein the alkyl group contains from 1

to 10 carbon atoms, and blends of two or more of these organic compounds.   Exemplary

organic compounds are linear alkyl esters of 4-hydroxybenzoic acid, wherein the alkyl

group contains from 1 to 6 carbon atoms, and blends of two or more of these organic

compounds.   Methyl esters of 4-hydroxybenzoic acid, propyl esters of 4-hydroxybenzoic

5   acid, butyl ester of 4-hydroxybenzoic acid, ethyl ester of 4-hydroxybenzoic acid and

blends of two or more of these organic compounds can also be used.   Additional organic

compounds also include but are not limited to 4-hydroxybenzoic acid methyl ester

(named methyl PARABEN), 4-hydroxybenzoic acid propyl ester (named propyl

PARABEN), which also are both amylase preservative agents.   For further descriptions,

10   see, e.g., U.S. Patent No. 5,281,526.

Addition of the organic compound precipitation agent provides the advantage of

high flexibility of the precipitation conditions with respect to pH, temperature, maltogenic

amylase concentration, precipitation agent concentration, and time of incubation.

The organic compound precipitation agent is used in an amount effective to

15   improve precipitation of the enzyme by means of the metal halide precipitation agent.

The selection of at least an effective amount and an optimum amount of organic

compound precipitation agent, as well as the conditions of the precipitation for maximum

recovery including incubation time, pH, temperature and concentration of enzyme, will be

readily apparent to one of ordinary skill in the art, in light of the present disclosure, after

20   routine testing.

Generally, at least about 0.01% w/v of organic compound precipitation agent is

added to the concentrated enzyme solution and usually at least about 0.02% w/v.

Generally, no more than about 0.3% w/v of organic compound precipitation agent is

added to the concentrated enzyme solution and usually no more than about 0.2% w/v.

25   The concentrated polypeptide solution, containing the metal halide precipitation

agent, and the organic compound precipitation agent, can be adjusted to a pH, which will,

of necessity, depend on the enzyme to be enriched or purified.   Generally, the pH is

adjusted at a level near the isoelectric point of the amylase.   The pH can be adjusted at

a pH in a range from about 2.5 pH units below the isoelectric point (pI) up to about 2.5 pH units above the isoelectric point.

The incubation time necessary to obtain an enriched or purified enzyme precipitate depends on the nature of the specific enzyme, the concentration of enzyme, and the specific precipitation agent(s) and its (their) concentration. Generally, the time effective to precipitate the enzyme is between about 1 to about 30 hours; usually it does not exceed about 25 hours. In the presence of the organic compound precipitation agent, the time of incubation can still be reduced to less about 10 hours and in most cases even about 6 hours.

Generally, the temperature during incubation is between about 4°C and about 50°C. Usually, the method is carried out at a temperature between about 10°C and about 45°C (*e.g.*, between about 20°C and about 40°C). The optimal temperature for inducing precipitation varies according to the solution conditions and the enzyme or precipitation agent(s) used.

The overall recovery of enriched or purified enzyme precipitate, and the efficiency with which the process is conducted, is improved by agitating the solution comprising the enzyme, the added metal halide and the added organic compound. The agitation step is done both during addition of the metal halide and the organic compound, and during the subsequent incubation period. Suitable agitation methods include mechanical stirring or shaking, vigorous aeration, or any similar technique.

After the incubation period, the enriched or purified enzyme is then separated from the dissociated pigment and other impurities and collected by conventional separation techniques, such as filtration, centrifugation, microfiltration, rotary vacuum filtration, ultrafiltration, press filtration, cross membrane microfiltration, cross flow membrane microfiltration, or the like. Further enrichment or purification of the enzyme precipitate can be obtained by washing the precipitate with water. For example, the enriched or purified enzyme precipitate is washed with water containing the metal halide precipitation agent, or with water containing the metal halide and the organic compound precipitation agents.

During fermentation, a maltogenic amylase polypeptide accumulates in the culture broth.   For the isolation, enrichment, or purification of the desired maltogenic amylase, the culture broth is centrifuged or filtered to eliminate cells, and the resulting cell-free liquid is used for enzyme enrichment or purification.   In one embodiment, the cell-free

5   broth is subjected to salting out using ammonium sulfate at about 70% saturation; the 70% saturation-precipitation fraction is then dissolved in a buffer and applied to a column such as a Sephadex G-100 column, and eluted to recover the enzyme-active fraction.   For further enrichment or purification, a conventional procedure such as ion exchange chromatography may be used.

10   Enriched or purified enzymes are useful for laundry and cleaning applications. For example, they can be used in laundry detergents and spot removers.   They can be made into a final product that is either liquid (solution, slurry) or solid (granular, powder).

A more specific example of enrichment or purification, is described in Sumitani *et al.* (2000) "New type of starch-binding domain: the direct repeat motif in the C-terminal

15   region of *Bacillus* sp. 195 α-amylase contributes to starch binding and raw starch degrading," *Biochem. J.* 350: 477-484, and is briefly summarized here.   The enzyme obtained from 4 liters of a *Streptomyces lividans* TK24 culture supernatant is treated with $(NH_4)_2SO_4$ at 80% saturation.   The precipitate is recovered by centrifugation at $10,000 \times$ g (20 min. and 4°C) and re-dissolved in 20 mM Tris/HCl buffer (pH 7.0) containing 5 mM

20    $CaCl_2$.   The solubilized precipitate is then dialyzed against the same buffer.   The dialyzed sample is then applied to a Sephacryl S-200 column, which had previously been equilibrated with 20 mM Tris/HCl buffer, (pH 7.0), 5 mM $CaCl_2$, and eluted at a linear flow rate of 7 mL/hr with the same buffer.   Fractions from the column are collected and assessed for activity as judged by enzyme assay and SDS-PAGE.   The protein is further

25   purified as follows.   A Toyopearl HW55 column (Tosoh Bioscience, Montgomeryville, PA; Cat. No. 19812) is equilibrated with 20 mM Tris/HCl buffer (pH 7.0) containing 5 mM $CaCl_2$ and 1.5 M $(NH_4)_2SO_4$.   The enzyme is eluted with a linear gradient of 1.5 to 0 M $(NH_4)_2SO_4$ in 20 mM Tris/HCL buffer, pH 7.0 containing 5 mM $CaCl_2$.   The active fractions are collected, and the enzyme precipitated with $(NH_4)_2SO_4$ at 80% saturation.

30   The precipitate is recovered, re-dissolved, and dialyzed as described above.   The

dialyzed sample is then applied to a Mono Q HR5/5 column (Amersham Pharmacia; Cat. No. 17-5167-01) previously equilibrated with 20 mM Tris/HCl buffer (pH 7.0) containing 5 mM $CaCl_2$, at a flow rate of 60 mL/hour. The active fractions are collected and added to a 1.5 M $(NH_4)_2SO_4$ solution. The active enzyme fractions are re-chromatographed on a
5   Toyopearl HW55 column, as before, to yield a homogeneous enzyme as determined by SDS-PAGE. *See* Sumitani *et al.* (2000) *Biochem. J.* 350: 477-484, for general discussion of the method and variations thereon.

For production scale recovery, maltogenic amylase polypeptides can be enriched or partially purified as generally described above by removing cells via flocculation with
10   polymers. Alternatively, the enzyme can be enriched or purified by microfiltration followed by concentration by ultrafiltration using available membranes and equipment. However, for some applications, the enzyme does not need to be enriched or purified, and whole broth culture can be lysed and used without further treatment. The enzyme can then be processed, for example, into granules.

15   **Compositions and Uses of Maltogenic Amylases**

The maltogenic amylases provided by the present teachings are useful for a variety of industrial applications. For example, maltogenic amylases are useful in a starch conversion process, particularly in a saccharification process of a starch that has undergone liquefaction. The desired end-product may be any product that may be
20   produced by the enzymatic conversion of the starch substrate. For example, the desired product may be a syrup rich in glucose and maltose, which can be used in other processes, such as the preparation of HFCS, or which can be converted into a number of other useful products, such as ascorbic acid intermediates (*e.g.*, gluconate; 2-keto-L-gulonic acid; 5-keto-gluconate; and 2,5-diketogluconate); 1,3-propanediol;
25   aromatic amino acids (*e.g.*, tyrosine, phenylalanine and tryptophan); organic acids (*e.g.*, lactate, pyruvate, succinate, isocitrate, and oxaloacetate); amino acids (*e.g.*, serine and glycine); antibiotics; antimicrobials; enzymes; vitamins; and hormones.

The starch conversion process may be a precursor to, or simultaneous with, a fermentation process designed to produce alcohol for fuel or drinking (*i.e.*, potable

alcohol). One skilled in the art is aware of various fermentation conditions that may be used in the production of these end-products. Variant amylases are also useful in compositions and methods of food preparation. These various uses of variant amylases are described in more detail below.

5   It will be appreciated by one of ordinary skill in the art that various accessory enzymes can be used with the maltogenic enzymes of the present teachings, as will be the case in various applications and contexts.

In the field of grain processing to produce maltose syrups, the maltogenic amylases can be employed in any of a variety of applications, including those described

10   in US Provisional Application 61/616,990, filed March 28, 2012.

Preparation of Starch Substrates from Plants

Those of general skill in the art are well aware of available methods that may be used to prepare starch substrates for use in the processes disclosed herein. For

15   example, a useful starch substrate may be obtained from tubers, roots, stems, legumes, cereals or whole grain. More specifically, the granular starch may be obtained from corn, cobs, wheat, barley, rye, triticale, milo, sago, millet, cassava, tapioca, sorghum, rice, peas, bean, banana, or potatoes. Corn contains about 60-68% starch; barley contains about 55-65% starch; millet contains about 75-80% starch; wheat contains about 60-65%

20   starch; and polished rice contains 70-72% starch. Specifically contemplated starch substrates are corn starch and wheat starch. The starch from a grain may be ground or whole and includes corn solids, such as kernels, bran and/or cobs. The starch may also be highly refined raw starch or feedstock from starch refinery processes. Various starches also are commercially available. For example, corn starch is available from

25   Cerestar, Sigma, and Katayama Chemical Industry Co. (Japan); wheat starch is available from Sigma; sweet potato starch is available from Wako Pure Chemical Industry Co. (Japan); and potato starch is available from Nakaari Chemical Pharmaceutical Co. (Japan).

The starch substrate can be a crude starch from milled whole grain, which contains non-starch fractions, *e.g.*, germ residues and fibers.   Milling may comprise either wet milling or dry milling or grinding.   In wet milling, whole grain is soaked in water or dilute acid to separate the grain into its component parts, *e.g.*, starch, protein, germ, oil,

5   kernel fibers.   Wet milling efficiently separates the germ and meal (*i.e.*, starch granules and protein) and is especially suitable for production of syrups.   In dry milling or grinding, whole kernels are ground into a fine powder and often processed without fractionating the grain into its component parts.   In some cases, oils from the kernels are recovered. Dry ground grain thus will comprise significant amounts of non-starch carbohydrate

10   compounds, in addition to starch.   Dry grinding of the starch substrate can be used for production of ethanol and other biochemicals.   The starch to be processed may be a highly refined starch quality, for example, at least 90%, at least 95%, at least 97%, or at least 99.5% pure.

All references cited herein are herein incorporated by reference in their entirety for

15   all purposes.   In order to further illustrate the compositions and methods, and advantages thereof, the following specific examples are given with the understanding that they are illustrative rather than limiting.

Fermentation

20   The soluble starch hydrolysate, particularly a glucose rich syrup, can be fermented by contacting the starch hydrolysate with a fermenting organism typically at a temperature around 32°C, such as from 30°C to 35°C for alcohol-producing yeast.   The temperature and pH of the fermentation will depend upon the fermenting organism. EOF products include metabolites, such as citric acid, lactic acid, succinic acid,

25   monosodium glutamate, gluconic acid, sodium gluconate, calcium gluconate, potassium gluconate, itaconic acid and other carboxylic acids, glucono delta-lactone, sodium erythorbate, lysine and other amino acids, omega 3 fatty acid, butanol, isoprene, 1,3-propanediol and other biomaterials.

Ethanologenic microorganisms include yeast, such as *Saccharomyces cerevisiae* and bacteria, *e.g.*, *Zymomonas mobilis*, expressing alcohol dehydrogenase and pyruvate decarboxylase. The ethanologenic microorganism can express xylose reductase and xylitol dehydrogenase, which convert xylose to xylulose. Improved strains of

5   ethanologenic microorganisms, which can withstand higher temperatures, for example, are known in the art and can be used. *See* Liu *et al.* (2011) *Sheng Wu Gong Cheng Xue Bao* 27(7): 1049-56. Commercial sources of yeast include ETHANOL RED® (LeSaffre); Thermosacc® (Lallemand); RED STAR® (Red Star); FERMIOL® (DSM Specialties); and SUPERSTART® (Alltech). Microorganisms that produce other metabolites, such

10   as citric acid and lactic acid, by fermentation are also known in the art. *See, e.g.*, Papagianni (2007) "Advances in citric acid fermentation by *Aspergillus niger*: biochemical aspects, membrane transport and modeling," *Biotechnol. Adv.* 25(3): 244-63; John *et al.* (2009) "Direct lactic acid fermentation: focus on simultaneous saccharification and lactic acid production," *Biotechnol. Adv.* 27(2): 145-52.

15   The saccharification and fermentation processes may be carried out as an SSF process. Fermentation may comprise subsequent enrichment, purification, and recovery of ethanol, for example. During the fermentation, the ethanol content of the broth or "beer" may reach about 8-18% v/v, *e.g.*, 14-15% v/v. The broth may be distilled to produce enriched, *e.g.*, 96% pure, solutions of ethanol. Further, CO_2 generated by

20   fermentation may be collected with a CO_2 scrubber, compressed, and marketed for other uses, *e.g.*, carbonating beverage or dry ice production. Solid waste from the fermentation process may be used as protein-rich products, *e.g.*, livestock feed.

As mentioned above, an SSF process can be conducted with fungal cells that express and secrete amylase continuously throughout SSF. The fungal cells expressing

25   amylase also can be the fermenting microorganism, *e.g.*, an ethanologenic microorganism. Ethanol production thus can be carried out using a fungal cell that expresses sufficient amylase so that less or no enzyme has to be added exogenously. The fungal host cell can be from an appropriately engineered fungal strain. Fungal host cells that express and secrete other enzymes, in addition to amylase, also can be used.

30   Such cells may express glucoamylase and/or a pullulanase, phytase, *alpha*-glucosidase,

isoamylase, beta-amylase cellulase, xylanase, other hemicellulases, protease, *beta*-glucosidase, pectinase, esterase, redox enzymes, transferase, or other enzyme.

A variation on this process is a "fed-batch fermentation" system, where the substrate is added in increments as the fermentation progresses. Fed-batch systems are useful when catabolite repression may inhibit the metabolism of the cells and where it is desirable to have limited amounts of substrate in the medium. The actual substrate concentration in fed-batch systems is estimated by the changes of measurable factors such as pH, dissolved oxygen and the partial pressure of waste gases, such as CO_2. Batch and fed-batch fermentations are common and well known in the art.

Continuous fermentation is an open system where a defined fermentation medium is added continuously to a bioreactor, and an equal amount of conditioned medium is removed simultaneously for processing. Continuous fermentation generally maintains the cultures at a constant high density where cells are primarily in log phase growth. Continuous fermentation permits modulation of cell growth and/or product concentration. For example, a limiting nutrient such as the carbon source or nitrogen source is maintained at a fixed rate and all other parameters are allowed to moderate. Because growth is maintained at a steady state, cell loss due to medium being drawn off should be balanced against the cell growth rate in the fermentation. Methods of optimizing continuous fermentation processes and maximizing the rate of product formation are well known in the art of industrial microbiology.

Compositions Comprising Maltogenic Amylases

The maltogenic amylases of the present teachings may be combined with a glucoamylase (EC 3.2.1.3), *e.g.*, a *Trichoderma* glucoamylase or variant thereof. An exemplary glucoamylase is *Trichoderma reesei* glucoamylase (TrGA) and variants thereof that possess superior specific activity and thermal stability. *See* U.S. Published Applications Nos. 2006/0094080, 2007/0004018, and 2007/0015266 (Danisco US Inc.). Suitable variants of TrGA include those with glucoamylase activity and at least 80%, at least 90%, or at least 95% sequence identity to wild-type TrGA. Maltogenic amylases

may advantageously increase the yield of glucose produced in a saccharification process catalyzed by TrGA.

Alternatively, the glucoamylase may be another glucoamylase derived from plants (including algae), fungi, or bacteria. For example, the glucoamylases may be

5   *Aspergillus niger* G1 or G2 glucoamylase or its variants (*e.g.*, Boel *et al.* (1984) *EMBO J.* 3: 1097-1102; WO 92/00381; WO 00/04136 (Novo Nordisk A/S)); and *A. awamori* glucoamylase (*e.g.*, WO 84/02921 (Cetus Corp.)). Other contemplated *Aspergillus* glucoamylase include variants with enhanced thermal stability, *e.g.*, G137A and G139A (Chen *et al.* (1996) *Prot. Eng.* 9: 499-505); D257E and D293E/Q (Chen *et al.* (1995) *Prot.*

10   *Eng.* 8: 575-582); N182 (Chen *et al.* (1994) *Biochem. J.* 301: 275-281); A246C (Fierobe *et al.* (1996) *Biochemistry*, 35: 8698-8704); and variants with Pro residues in positions A435 and S436 (Li *et al.* (1997) *Protein Eng.* 10: 1199-1204). Other contemplated glucoamylases include *Talaromyces* glucoamylases, in particular derived from *T. emersonii* (*e.g.*, WO 99/28448 (Novo Nordisk A/S), *T. leycettanus* (*e.g.*, U.S. Patent No.

15   RE 32,153 (CPC International, Inc.)), *T. duponti*, or *T. thermophilus* (*e.g.*, U.S. Patent No. 4,587,215). Contemplated bacterial glucoamylases include glucoamylases from the genus *Clostridium*, in particular *C. thermoamylolyticum* (*e.g.*, EP 135,138 (CPC International, Inc.) and *C. thermohydrosulfuricum* (*e.g.*, WO 86/01831 (Michigan Biotechnology Institute)). Suitable glucoamylases include the glucoamylases derived

20   from *Aspergillus oryzae*, such as a glucoamylase shown in SEQ ID NO:2 in WO 00/04136 (Novo Nordisk A/S). Also suitable are commercial glucoamylases, such as AMG 200L; AMG 300 L; SAN™ SUPER and AMG™ E (Novozymes); OPTIDEX® 300 and OPTIDEX L-400 (Danisco US Inc.); AMIGASE™ and AMIGASE™ PLUS (DSM); G-ZYME® G900 (Enzyme Bio-Systems); and G-ZYME® G990 ZR (*A. niger*

25   glucoamylase with a low protease content). Still other suitable glucoamylases include *Aspergillus fumigatus* glucoamylase, *Talaromyces* glucoamylase, *Thielavia* glucoamylase, *Trametes* glucoamylase, *Thermomyces* glucoamylase, *Athelia* glucoamylase, or *Humicola* glucoamylase (*e.g.*, HgGA). Glucoamylases typically are added in an amount of about 0.1 – 2 glucoamylase units (GAU)/g ds, *e.g.*, about 0.16

30   GAU/g ds, 0.23 GAU/g ds, or 0.33 GAU/g ds.

Other suitable enzymes that can be used with the maltogenic amylase of the present teachings include a phytase, protease, pullulanase, β-amylase, isoamylase, a different α-amylase, alpha-glucosidase, cellulase, xylanase, other hemicellulases, beta-glucosidase, transferase, pectinase, lipase, cutinase, esterase, redox enzymes, or

5 a combination thereof.   For example, a debranching enzyme, such as an isoamylase (EC 3.2.1.68), may be added in effective amounts well known to the person skilled in the art.   A pullulanase (EC 3.2.1.41), e.g., Promozyme®, is also suitable.   Pullulanase typically is added at 100 U/kg ds.   Further suitable enzymes include proteases, such as fungal and bacterial proteases.   Fungal proteases include those obtained from

10 Aspergillus, such as A. niger, A. awamori, A. oryzae; Mucor (e.g., M. miehei); Rhizopus; and Trichoderma.

β-Amylases (EC 3.2.1.2) are exo-acting maltogenic amylases, which catalyze the hydrolysis of 1,4-α-glucosidic linkages into amylopectin and related glucose polymers, thereby releasing maltose.   β-Amylases have been isolated from various plants and

15 microorganisms.   See Fogarty et al. (1979) in PROGRESS IN INDUSTRIAL MICROBIOLOGY, Vol. 15, pp. 112-115.   These β-Amylases have optimum temperatures in the range from 40°C to 65°C and optimum pH in the range from about 4.5 to about 7.0.   Contemplated β-amylases include, but are not limited to, β-amylases from barley Spezyme® BBA 1500, Spezyme® DBA, Optimalt ™ ME, Optimalt ™ BBA (Danisco US Inc.); and Novozym ™

20 WBA (Novozymes A/S) .

Compositions comprising the present maltogenic amylases may be aqueous or non-aqueous formulations, granules, powders, gels, slurries, pastes, etc., which may further comprise any one or more of the additional enzymes listed, herein, along with buffers, salts, preservatives, water, co-solvents, surfactants, and the like.   Such

25 compositions may work in combination with endogenous enzymes or other ingredients already present in a slurry, water bath, washing machine, food or drink product, etc, for example, endogenous plant (including algal) enzymes, residual enzymes from a prior processing step, and the like.

Compositions and Methods for Baking and Food Preparation

The present teachings also relate to a "food composition," including but not limited to a food product, animal feed and/or food/feed additives, comprising a maltogenic amylase, and methods for preparing such a food composition comprising

5   mixing the maltogenic amylase with one or more food ingredients, or uses thereof.

Furthermore, the present teachings relate to the use of a maltogenic amylase in the preparation of a food composition, wherein the food composition is baked subsequent to the addition of the polypeptide of the present invention. As used herein the term "baking composition" means any composition and/or additive prepared in the

10   process of providing a baked food product, including but not limited to bakers flour, a dough, a baking additive and/or a baked product. The food composition or additive may be liquid or solid.

As used herein, the term "flour" means milled or ground cereal grain. The term "flour" also may mean Sago or tuber products that have been ground or mashed. In

15   some embodiments, flour may also contain components in addition to the milled or mashed cereal or plant matter. An example of an additional component, although not intended to be limiting, is a leavening agent. Cereal grains include wheat, oat, rye, and barley. Tuber products include tapioca flour, cassava flour, and custard powder. The term "flour" also includes ground corn flour, maize-meal, rice flour, whole-meal flour,

20   self-rising flour, tapioca flour, cassava flour, ground rice, enriched flower, and custard powder.

For the commercial and home use of flour for baking and food production, it is important to maintain an appropriate level of α-amylase activity in the flour. A level of activity that is too high may result in a product that is sticky and/or doughy and therefore

25   unmarketable. Flour with insufficient α-amylase activity may not contain enough sugar for proper yeast function, resulting in dry, crumbly bread, or baked products. Accordingly, a maltogenic amylase, by itself or in combination with an α-amylase(s), may be added to the flour to augment the level of endogenous α-amylase activity in flour.

A maltogenic amylase can further be added alone or in a combination with other amylases to prevent or retard staling, *i.e.*, crumb firming of baked products. The amount of anti-staling amylase will typically be in the range of 0.01-10 mg of enzyme protein per kg of flour, *e.g.*, 0.5 mg/kg ds. Additional anti-staling amylases that can be used in combination with an amylase include an endo-amylase, *e.g.*, a bacterial endo-amylase from *Bacillus*. The additional amylase can be another maltogenic α-amylase (EC 3.2.1.133), *e.g.*, from *Bacillus*. Novamyl® is an exemplary maltogenic α-amylase from *B. stearothermophilus* strain NCIB 11837 and is described in Christophersen *et al.* (1997) *Starch* 50: 39-45. Other examples of anti-staling endo-amylases include bacterial α-amylases derived from *Bacillus*, such as *B. licheniformis* or *B. amyloliquefaciens*. The anti-staling amylase may be an exo-amylase, such as β-amylase, *e.g.*, from plant sources, such as soy bean, or from microbial sources, such as *Bacillus*.

The baking composition comprising a maltogenic amylase further can comprise a phospholipase or enzyme with phospholipase activity. An enzyme with phospholipase activity has an activity that can be measured in Lipase Units (LU). The phospholipase may have A_1 or A_2 activity to remove fatty acid from the phospholipids, forming a lysophospholipid. It may or may not have lipase activity, *i.e.*, activity on triglyceride substrates. The phospholipase typically has a temperature optimum in the range of 30-90 °C., *e.g.*, 30-70 °C. The added phospholipases can be of animal origin, for example, from pancreas, *e.g.*, bovine or porcine pancreas, snake venom or bee venom. Alternatively, the phospholipase may be of microbial origin, *e.g.*, from filamentous fungi, yeast or bacteria, for example.

The phospholipase is added in an amount that improves the softness of the bread during the initial period after baking, particularly the first 24 hours. The amount of phospholipase will typically be in the range of 0.01-10 mg of enzyme protein per kg of flour, *e.g.*, 0.1-5 mg/kg. That is, phospholipase activity generally will be in the range of 20-1000 LU/kg of flour, where a Lipase Unit is defined as the amount of enzyme required to release 1 μmol butyric acid per minute at 30 °C, pH 7.0, with gum arabic as emulsifier and tributyrin as substrate.

Compositions of dough generally comprise wheat meal or wheat flour and/or
other types of meal, flour or starch such as corn flour, cornstarch, rye meal, rye flour, oat
flour, oatmeal, soy flour, sorghum meal, sorghum flour, potato meal, potato flour or potato
starch.   The dough may be fresh, frozen or par-baked.   The dough can be a leavened
5   dough or a dough to be subjected to leavening.   The dough may be leavened in various
ways, such as by adding chemical leavening agents, *e.g.*, sodium bicarbonate or by
adding a leaven, *i.e.*, fermenting dough.   Dough also may   be leavened by adding a
suitable yeast culture, such as a culture of *Saccharomyces cerevisiae* (baker's yeast),
e.g., a commercially available strain of *S. cerevisiae*.

10   The dough may also comprise other conventional dough ingredients, *e.g.*,
proteins, such as milk powder, gluten, and soy; eggs (*e.g.*, whole eggs, egg yolks or egg
whites); an oxidant, such as ascorbic acid, potassium bromate, potassium iodate,
azodicarbonamide (ADA) or ammonium persulfate; an amino acid such as L-cysteine; a
sugar; or a salt, such as sodium chloride, calcium acetate, sodium sulfate or calcium
15   sulfate.   The dough further may comprise fat, *e.g.*, triglyceride, such as granulated fat or
shortening.   The dough further may comprise an emulsifier such as mono- or
diglycerides, diacetyl tartaric acid esters of mono- or diglycerides, sugar esters of fatty
acids, polyglycerol esters of fatty acids, lactic acid esters of monoglycerides, acetic acid
esters of monoglycerides, polyoxyethylene stearates, or lysolecithin.   In particular, the
20   dough can be made without addition of emulsifiers.

The dough product may be any processed dough product, including fried, deep
fried, roasted, baked, steamed and boiled doughs, such as steamed bread and rice
cakes.   In one embodiment, the food product is a bakery product.   Typical bakery
(baked) products include bread - such as loaves, rolls, buns, bagels, pizza bases etc.
25   pastry, pretzels, tortillas, cakes, cookies, biscuits, crackers etc.

Optionally, an additional enzyme may be used together with the anti-staling
amylase and the phospholipase.   The additional enzyme may be a second amylase,
such as an amyloglucosidase, a β-amylase, a cyclodextrin glucanotransferase, or the
additional enzyme may be a peptidase, in particular an exopeptidase, a transglutaminase,

a lipase, a cellulase, a xylanase, a protease, a protein disulfide isomerase, *e.g.*, a protein disulfide isomerase as disclosed in WO 95/00636, for example, a glycosyltransferase, a branching enzyme (1,4-α-glucan branching enzyme), a 4-α-glucanotransferase (dextrin glycosyltransferase) or an oxidoreductase, *e.g.*, a peroxidase, a laccase, a glucose

5   oxidase, a pyranose oxidase, a lipooxygenase, an L-amino acid oxidase or a carbohydrate oxidase.   The additional enzyme(s) may be of any origin, including mammalian and plant, and particularly of microbial (bacterial, yeast or fungal) origin and may be obtained by techniques conventionally used in the art.

The xylanase is typically of microbial origin, *e.g.*, derived from a bacterium or

10   fungus, such as a strain of *Aspergillus*.   Xylanases include Pentopan® and Novozym 384®, for example, which are commercially available xylanase preparations produced from *Trichoderma reesei*.   The amyloglucosidase may be an *A. niger* amyloglucosidase (such as AMG®). Other useful amylase products include Grindamyl® A 1000 or A 5000 (Grindsted Products, Denmark) and Amylase® H or Amylase® P (DSM).   The glucose

15   oxidase may be a fungal glucose oxidase, in particular an *Aspergillus niger* glucose oxidase (such as Gluzyme®).   An exemplary protease is Neutrase®.

The process may be used for any kind of baked product prepared from dough, either of a soft or a crisp character, either of a white, light or dark type.   Examples are bread, particularly white, whole-meal or rye bread, typically in the form of loaves or rolls,

20   such as, but not limited to, French baguette-type bread, pita bread, tortillas, cakes, pancakes, biscuits, cookies, pie crusts, crisp bread, steamed bread, pizza and the like.

A maltogenic amylase may be used in a pre-mix, comprising flour together with an anti-staling amylase, a phospholipase, and/or a phospholipid.   The pre-mix may contain other dough-improving and/or bread-improving additives, *e.g.*, any of the

25   additives, including enzymes, mentioned above.   A maltogenic amylase can be a component of an enzyme preparation comprising an anti-staling amylase and a phospholipase, for use as a baking additive.

The enzyme preparation is optionally in the form of a granulate or agglomerated powder.   The preparation can have a narrow particle size distribution with

more than 95% (by weight) of the particles in the range from 25 to 500 µm. Granulates and agglomerated powders may be prepared by conventional methods, *e.g.*, by spraying an amylase onto a carrier in a fluid-bed granulator. The carrier may consist of particulate cores having a suitable particle size. The carrier may be soluble or insoluble,

5   *e.g.*, a salt (such as NaCl or sodium sulfate), a sugar (such as sucrose or lactose), a sugar alcohol (such as sorbitol), starch, rice, corn grits, or soy.

Enveloped particles, *i.e.*, maltogenic amylase particles, can comprise a maltogenic amylase. To prepare enveloped maltogenic amylase particles, the enzyme is contacted with a food grade lipid in sufficient quantity to suspend all of the maltogenic

10   amylase particles. Food grade lipids, as used herein, may be any naturally organic compound that is insoluble in water but is soluble in non-polar organic solvents such as hydrocarbon or diethyl ether. Suitable food grade lipids include, but are not limited to, triglycerides either in the form of fats or oils that are either saturated or unsaturated. Examples of fatty acids and combinations thereof which make up the saturated

15   triglycerides include, but are not limited to, butyric (derived from milk fat), palmitic (derived from animal and plant fat), and/or stearic (derived from animal and plant fat). Examples of fatty acids and combinations thereof which make up the unsaturated triglycerides include, but are not limited to, palmitoleic (derived from animal and plant fat), oleic (derived from animal and plant fat), linoleic (derived from plant oils), and/or linolenic

20   (derived from linseed oil). Other suitable food grade lipids include, but are not limited to, monoglycerides and diglycerides derived from the triglycerides discussed above, phospholipids and glycolipids.

The food grade lipid, particularly in the liquid form, is contacted with a powdered form of the maltogenic amylase particles in such a fashion that the lipid material covers at

25   least a portion of the surface of at least a majority, *e.g.*, 100% of the maltogenic amylase particles. Thus, each maltogenic amylase particle is individually enveloped in a lipid. For example, all or substantially all of the maltogenic amylase particles are provided with a thin, continuous, enveloping film of lipid. This can be accomplished by first pouring a quantity of lipid into a container, and then slurrying the maltogenic amylase particles so

30   that the lipid thoroughly wets the surface of each maltogenic amylase particle. After a

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short period of stirring, the enveloped maltogenic amylase particles, carrying a substantial amount of the lipids on their surfaces, are recovered. The thickness of the coating so applied to the particles of maltogenic amylase can be controlled by selection of the type of lipid used and by repeating the operation in order to build up a thicker film,

5   when desired.

The storing, handling and incorporation of the loaded delivery vehicle can be accomplished by means of a packaged mix. The packaged mix can comprise the enveloped maltogenic amylase. However, the packaged mix may further contain additional ingredients as required by the manufacturer or baker. After the enveloped

10   maltogenic amylase has been incorporated into the dough, the baker continues through the normal production process for that product.

The advantages of enveloping the maltogenic amylase particles are two-fold. First, the food grade lipid protects the enzyme from thermal denaturation during the baking process for those enzymes that are heat labile. Consequently, while the

15   maltogenic amylase is stabilized and protected during the proving and baking stages, it is released from the protective coating in the final baked good product, where it hydrolyzes the glucosidic linkages in polyglucans. The loaded delivery vehicle also provides a sustained release of the active enzyme into the baked good. That is, following the baking process, active maltogenic amylase is continually released from the protective

20   coating at a rate that counteracts, and therefore reduces the rate of, staling mechanisms.

In general, the amount of lipid applied to the maltogenic amylase particles can vary from a few percent of the total weight of the maltogenic amylase to many times that weight, depending upon the nature of the lipid, the manner in which it is applied to the maltogenic amylase particles, the composition of the dough mixture to be treated, and

25   the severity of the dough-mixing operation involved.

The loaded delivery vehicle, *i.e.*, the lipid-enveloped enzyme, is added to the ingredients used to prepare a baked good in an effective amount to extend the shelf-life of the baked good. The baker computes the amount of enveloped maltogenic amylase, prepared as discussed above, that will be required to achieve the desired anti-staling

effect. The amount of the enveloped maltogenic amylase required is calculated based on the concentration of enzyme enveloped and on the proportion of maltogenic amylase to flour specified. A wide range of concentrations has been found to be effective, although, as has been discussed, observable improvements in anti-staling do not

5   correspond linearly with the maltogenic amylase concentration, but above certain minimal levels, large increases in maltogenic amylase concentration produce little additional improvement. The maltogenic amylase concentration actually used in a particular bakery production could be much higher than the minimum necessary to provide the baker with some insurance against inadvertent under-measurement errors by

10   the baker. The lower limit of enzyme concentration is determined by the minimum anti-staling effect the baker wishes to achieve.

A method of preparing a baked good may comprise: a) preparing lipid-coated maltogenic amylase particles, where substantially all of the maltogenic amylase particles are coated; b) mixing a dough containing flour; c) adding the lipid-coated maltogenic

15   amylase to the dough before the mixing is complete and terminating the mixing before the lipid coating is removed from the maltogenic amylase; d) proofing the dough; and e) baking the dough to provide the baked good, where the maltogenic amylase is inactive during the mixing, proofing and baking stages and is active in the baked good.

The enveloped maltogenic amylase can be added to the dough during the mix

20   cycle, e.g., near the end of the mix cycle. The enveloped maltogenic amylase is added at a point in the mixing stage that allows sufficient distribution of the enveloped maltogenic amylase throughout the dough; however, the mixing stage is terminated before the protective coating becomes stripped from the maltogenic amylase particle(s). Depending on the type and volume of dough, and mixer action and speed, anywhere

25   from one to six minutes or more might be required to mix the enveloped maltogenic amylase into the dough, but two to four minutes is average. Thus, several variables may determine the precise procedure. First, the quantity of enveloped maltogenic amylase should have a total volume sufficient to allow the enveloped maltogenic amylase to be spread throughout the dough mix. If the preparation of enveloped maltogenic amylase

30   is highly concentrated, additional oil may need to be added to the pre-mix before the

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enveloped maltogenic amylase is added to the dough.   Recipes and production

processes may require specific modifications; however, good results generally can be

achieved when 25% of the oil specified in a bread dough formula is held out of the dough

and is used as a carrier for a concentrated enveloped α-amylase when added near the

5   end of the mix cycle.   In bread or other baked goods, particularly those having a low fat

content, *e.g.*, French-style breads, an enveloped maltogenic amylase mixture of

approximately 1% of the dry flour weight is sufficient to admix the enveloped α-amylase

properly with the dough.   The range of suitable percentages is wide and depends on the

formula, finished product, and production methodology requirements of the individual

10   baker.   Second, the enveloped maltogenic amylase suspension should be added to the

mix with sufficient time for complete mixture into the dough, but not for such a time that

excessive mechanical action strips the protective lipid coating from the enveloped

maltogenic amylase particles.

In a further aspect of the invention, the food composition is an oil, meat, lard,

15   composition comprising a maltogenic amylase.   In this context the term "oil/meat/lard"

composition" means any composition, based on, made from and/or containing oil, meat

or lard, respectively.   Another aspect the invention relates to a method of preparing an

oil or meat or lard composition and/or additive comprising a maltogenic amylase,

comprising mixing the polypeptide of the invention with a oil/meat/lard composition

20   and/or additive ingredients.

In a further aspect of the invention, the food composition is an animal feed

composition, animal feed additive and/or pet food comprising a maltogenic amylase and

variants thereof.   The present invention further relates to a method for preparing such an

animal feed composition, animal feed additive composition and/or pet food comprising

25   mixing a maltogenic amylase and variants thereof with one or more animal feed

ingredients and/or animal feed additive ingredients and/or pet food ingredients.

Furthermore, the present invention relates to the use of a maltogenic amylase in the

preparation of an animal feed composition and/or animal feed additive composition

and/or pet food.

The term "animal" includes all non-ruminant and ruminant animals. In a particular embodiment, the animal is a non-ruminant animal, such as a horse and a mono-gastric animal. Examples of mono-gastric animals include, but are not limited to, pigs and swine, such as piglets, growing pigs, sows; poultry such as turkeys, ducks, chicken, broiler

5   chicks, layers; fish such as salmon, trout, tilapia, catfish and carps; and crustaceans such as shrimps and prawns. In a further embodiment the animal is a ruminant animal including, but not limited to, cattle, young calves, goats, sheep, giraffes, bison, moose, elk, yaks, water buffalo, deer, camels, alpacas, llamas, antelope, pronghorn and nilgai.

In the present context, it is intended that the term "pet food" is understood to

10   mean a food for a household animal such as, but not limited to dogs, cats, gerbils, hamsters, chinchillas, fancy rats, guinea pigs; avian pets, such as canaries, parakeets, and parrots; reptile pets, such as turtles, lizards and snakes; and aquatic pets, such as tropical fish and frogs.

The terms "animal feed composition," "feedstuff" and "fodder" are used

15   interchangeably and may comprise one or more feed materials selected from the group comprising a) cereals, such as small grains (e.g., wheat, barley, rye, oats and combinations thereof) and/or large grains such as maize or sorghum; b) by products from cereals, such as corn gluten meal, Distillers Dried Grain Solubles (DDGS) (particularly corn based Distillers Dried Grain Solubles (cDDGS), wheat bran, wheat middlings, wheat

20   shorts, rice bran, rice hulls, oat hulls, palm kernel, and citrus pulp; c) protein obtained from sources such as soya, sunflower, peanut, lupin, peas, fava beans, cotton, canola, fish meal, dried plasma protein, meat and bone meal, potato protein, whey, copra, sesame; d) oils and fats obtained from vegetable and animal sources; e) minerals and vitamins.

25   **Textile Desizing Compositions and Use**

Also contemplated are compositions and methods of treating fabrics (e.g., to desize a textile) using a maltogenic amylase. Fabric-treating methods are well known in the art (see, e.g., U.S. Patent No. 6,077,316). For example, the feel and appearance of

a fabric can be improved by a method comprising contacting the fabric with a maltogenic amylase in a solution.   The fabric can be treated with the solution under pressure.

A maltogenic amylase can be applied during or after the weaving of a textile, or during the desizing stage, or one or more additional fabric processing steps.   During the

5   weaving of textiles, the threads are exposed to considerable mechanical strain.   Prior to weaving on mechanical looms, warp yarns are often coated with sizing starch or starch derivatives to increase their tensile strength and to prevent breaking.   A maltogenic amylase can be applied during or after the weaving to remove these sizing starch or starch derivatives.   After weaving, a maltogenic amylase can be used to remove the size

10   coating before further processing the fabric to ensure a homogeneous and wash-proof result.

A maltogenic amylase can be used alone or with other desizing chemical reagents and/or desizing enzymes to desize fabrics, including cotton-containing fabrics, as detergent additives, e.g., in aqueous compositions.   A maltogenic amylase also can

15   be used in compositions and methods for producing a stonewashed look on indigo-dyed denim fabric and garments.   For the manufacture of clothes, the fabric can be cut and sewn into clothes or garments, which are afterwards finished.   In particular, for the manufacture of denim jeans, different enzymatic finishing methods have been developed. The finishing of denim garment normally is initiated with an enzymatic desizing step,

20   during which garments are subjected to the action of amylolytic enzymes to provide softness to the fabric and make the cotton more accessible to the subsequent enzymatic finishing steps.   A maltogenic amylase can be used in methods of finishing denim garments (e.g., a "bio-stoning process"), enzymatic desizing and providing softness to fabrics, and/or finishing process.

25   **Cleaning Compositions**

An aspect of the present compositions and methods is a cleaning composition that includes a maltogenic amylase as a component.   A maltogenic amylase polypeptide can be used as a component in detergent compositions for hand washing, laundry washing, dishwashing, and other hard-surface cleaning.

Overview of Cleaning Compositions

Preferably, a maltogenic amylase is incorporated into detergents at or near a concentration conventionally used for amylase in detergents. For example, a maltogenic amylase polypeptide may be added in amount corresponding to 0.00001 – 1

5   mg (calculated as pure enzyme protein) of maltogenic amylase per liter of wash/dishwash liquor. Exemplary formulations are provided herein, as exemplified by the following:

A maltogenic amylase polypeptide may be a component of a detergent composition, as the only enzyme or with other enzymes including other amylolytic

10   enzymes. As such, it may be included in the detergent composition in the form of a non-dusting granulate, a stabilized liquid, or a protected enzyme. Non-dusting granulates may be produced, e.g., as disclosed in U.S. Patent Nos. 4,106,991 and 4,661,452 and may optionally be coated by methods known in the art. Examples of waxy coating materials are poly(ethylene oxide) products (polyethyleneglycol, PEG) with

15   mean molar weights of 1,000 to 20,000; ethoxylated nonylphenols having from 16 to 50 ethylene oxide units; ethoxylated fatty alcohols in which the alcohol contains from 12 to 20 carbon atoms and in which there are 15 to 80 ethylene oxide units; fatty alcohols; fatty acids; and mono- and di- and triglycerides of fatty acids. Examples of film-forming coating materials suitable for application by fluid bed techniques are given in, for example,

20   GB 1483591. Liquid enzyme preparations may, for instance, be stabilized by adding a polyol such as propylene glycol, a sugar or sugar alcohol, lactic acid or boric acid according to established methods. Other enzyme stabilizers are known in the art. Protected enzymes may be prepared according to the method disclosed in for example EP 238 216. Polyols have long been recognized as stabilizers of proteins, as well as

25   improving protein solubility.

The detergent composition may be in any useful form, e.g., as powders, granules, pastes, or liquid. A liquid detergent may be aqueous, typically containing up to about 70% of water and 0% to about 30% of organic solvent. It may also be in the form of a compact gel type containing only about 30% water.

The detergent composition comprises one or more surfactants, each of which may be anionic, nonionic, cationic, or zwitterionic. The detergent will usually contain 0% to about 50% of anionic surfactant, such as linear alkylbenzenesulfonate (LAS); α-olefinsulfonate (AOS); alkyl sulfate (fatty alcohol sulfate) (AS); alcohol ethoxysulfate (AEOS or AES); secondary alkanesulfonates (SAS); α-sulfo fatty acid methyl esters; alkyl- or alkenylsuccinic acid; or soap. The composition may also contain 0% to about 40% of nonionic surfactant such as alcohol ethoxylate (AEO or AE), carboxylated alcohol ethoxylates, nonylphenol ethoxylate, alkylpolyglycoside, alkyldimethylamineoxide, ethoxylated fatty acid monoethanolamide, fatty acid monoethanolamide, or polyhydroxy alkyl fatty acid amide (as described for example in WO 92/06154).

The detergent composition may additionally comprise one or more other enzymes, such as proteases, another amylolytic enzyme, cutinase, lipase, cellulase, pectate lyase, perhydrolase, xylanase, peroxidase, and/or laccase in any combination.

The detergent may contain about 1% to about 65% of a detergent builder or complexing agent such as zeolite, diphosphate, triphosphate, phosphonate, citrate, nitrilotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), diethylenetriaminepentaacetic acid (DTMPA), alkyl- or alkenylsuccinic acid, soluble silicates or layered silicates (*e.g.,* SKS-6 from Hoechst). The detergent may also be unbuilt, *i.e.* essentially free of detergent builder. The enzymes can be used in any composition compatible with the stability of the enzyme. Enzymes generally can be protected against deleterious components by known forms of encapsulation, for example, by granulation or sequestration in hydro gels. Enzymes, and specifically maltoogenic amylases, either with or without starch binding domains, can be used in a variety of compositions including laundry and dishwashing applications, surface cleaners, as well as in compositions for ethanol production from starch or biomass.

The detergent may comprise one or more polymers. Examples include carboxymethylcellulose (CMC), poly(vinylpyrrolidone) (PVP), polyethyleneglycol (PEG), poly(vinyl alcohol) (PVA), polycarboxylates such as polyacrylates, maleic/acrylic acid copolymers and lauryl methacrylate/acrylic acid copolymers.

The detergent may contain a bleaching system, which may comprise a H_2O_2 source such as perborate or percarbonate, which may be combined with a peracid-forming bleach activator such as tetraacetylethylenediamine (TAED) or nonanoyloxybenzenesulfonate (NOBS). Alternatively, the bleaching system may

5   comprise peroxyacids (e.g., the amide, imide, or sulfone type peroxyacids). The bleaching system can also be an enzymatic bleaching system, for example, perhydrolase, such as that described in International PCT Application WO 2005/056783.

The enzymes of the detergent composition may be stabilized using conventional stabilizing agents, e.g., a polyol such as propylene glycol or glycerol; a sugar or sugar

10   alcohol; lactic acid; boric acid or a boric acid derivative such as, e.g., an aromatic borate ester; and the composition may be formulated as described in, e.g., WO 92/19709 and WO 92/19708.

The detergent may also contain other conventional detergent ingredients such as e.g., fabric conditioners including clays, foam boosters, suds suppressors, anti-corrosion

15   agents, soil-suspending agents, anti-soil redeposition agents, dyes, bactericides, tarnish inhibiters, optical brighteners, or perfumes.

The pH (measured in aqueous solution at use concentration) is usually neutral or alkaline, e.g., pH about 7.0 to about 11.0.

Particular forms of detergent compositions for inclusion of the present α-amylase

20   are described, below.

Heavy Duty Liquid (HDL) laundry detergent composition

Exemplary HDL laundry detergent compositions includes a detersive surfactant (10%-40% wt/wt), including an anionic detersive surfactant (selected from a group of linear or branched or random chain, substituted or unsubstituted alkyl sulphates, alkyl

25   sulphonates, alkyl alkoxylated sulphate, alkyl phosphates, alkyl phosphonates, alkyl carboxylates, and/or mixtures thereof), and optionally non-ionic surfactant (selected from a group of linear or branched or random chain, substituted or unsubstituted alkyl alkoxylated alcohol, for example a C_8-C_{18} alkyl ethoxylated alcohol and/or C_6-C_{12} alkyl phenol alkoxylates), wherein the weight ratio of anionic detersive surfactant (with a

hydrophilic index (HIc) of from 6.0 to 9) to non-ionic detersive surfactant is greater than 1:
1. Suitable detersive surfactants also include cationic detersive surfactants (selected from a group of alkyl pyridinium compounds, alkyl quarternary ammonium compounds, alkyl quarternary phosphonium compounds, alkyl ternary sulphonium compounds,

5   and/or mixtures thereof); zwitterionic and/or amphoteric detersive surfactants (selected from a group of alkanolamine sulpho-betaines); ampholytic surfactants; semi-polar non-ionic surfactants and mixtures thereof.

The composition may optionally include, a surfactancy boosting polymer consisting of amphiphilic alkoxylated grease cleaning polymers (selected from a group of

10   alkoxylated polymers having branched hydrophilic and hydrophobic properties, such as alkoxylated polyalkylenimines in the range of 0.05wt%-10wt%) and/or random graft polymers (typically comprising of hydrophilic backbone comprising monomers selected from the group consisting of: unsaturated C_1-C_6 carboxylic acids, ethers, alcohols, aldehydes, ketones, esters, sugar units, alkoxy units, maleic anhydride, saturated

15   polyalcohols such as glycerol, and mixtures thereof; and hydrophobic side chain(s) selected from the group consisting of: C_4-C_{25} alkyl group, polypropylene, polybutylene, vinyl ester of a saturated C_1-C_6 mono-carboxylic acid, C_1-C_6 alkyl ester of acrylic or methacrylic acid, and mixtures thereof.

The composition may include additional polymers such as soil release polymers

20   (include anionically end-capped polyesters, for example SRP1, polymers comprising at least one monomer unit selected from saccharide, dicarboxylic acid, polyol and combinations thereof, in random or block configuration, ethylene terephthalate-based polymers and co-polymers thereof in random or block configuration, for example Repel-o-tex SF, SF-2 and SRP6, Texcare SRA100, SRA300, SRN100, SRN170,

25   SRN240, SRN300 and SRN325, Marloquest SL), anti-redeposition polymers (0.1 wt% to 10wt%, include carboxylate polymers, such as polymers comprising at least one monomer selected from acrylic acid, maleic acid (or maleic anhydride), fumaric acid, itaconic acid, aconitic acid, mesaconic acid, citraconic acid, methylenemalonic acid, and any mixture thereof, vinylpyrrolidone homopolymer, and/or polyethylene glycol,

30   molecular weight in the range of from 500 to 100,000 Da); cellulosic polymer (including

those selected from alkyl cellulose, alkyl alkoxyalkyl cellulose, carboxyalkyl cellulose, alkyl carboxyalkyl cellulose examples of which include carboxymethyl cellulose, methyl cellulose, methyl hydroxyethyl cellulose, methyl carboxymethyl cellulose, and mixures thereof) and polymeric carboxylate (such as maleate/acrylate random copolymer or

5   polyacrylate homopolymer).

The composition may further include saturated or unsaturated fatty acid, preferably saturated or unsaturated C_{12}-C_{24} fatty acid (0 wt% to 10 wt%); deposition aids (examples for which include polysaccharides, preferably cellulosic polymers, poly diallyl dimethyl ammonium halides (DADMAC), and co-polymers of DAD MAC with vinyl

10   pyrrolidone, acrylamides, imidazoles, imidazolinium halides, and mixtures thereof, in random or block configuration, cationic guar gum, cationic cellulose such as cationic hydoxyethyl cellulose, cationic starch, cationic polyacylamides, and mixtures thereof.

The composition may further include dye transfer inhibiting agents, examples of which include manganese phthalocyanine, peroxidases, polyvinylpyrrolidone polymers,

15   polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, polyvinyloxazolidones and polyvinylimidazoles and/or mixtures thereof; chelating agents, examples of which include ethylene-diamine-tetraacetic acid (EDTA), diethylene triamine penta methylene phosphonic acid (DTPMP), hydroxy-ethane diphosphonic acid (HEDP), ethylenediamine N,N'-disuccinic acid (EDDS), methyl glycine diacetic acid (MGDA),

20   diethylene triamine penta acetic acid (DTPA), propylene diamine tetracetic acid (PDT A), 2-hydroxypyridine-N-oxide (HPNO), or methyl glycine diacetic acid (MGDA), glutamic acid N,N-diacetic acid (N,N-dicarboxymethyl glutamic acid tetrasodium salt (GLDA), nitrilotriacetic acid (NTA), 4,5-dihydroxy-m-benzenedisulfonic acid, citric acid and any salts thereof, N-hydroxyethylethylenediaminetri-acetic acid (HEDTA),

25   triethylenetetraaminehexaacetic acid (TTHA), N-hydroxyethyliminodiacetic acid (HEIDA), dihydroxyethylglycine (DHEG), ethylenediaminetetrapropionic acid (EDTP), and derivatives thereof.

The composition preferably includes enzymes (generally about 0.01 wt% active enzyme to 0.03wt% active enzyme) selected from proteases, amylases, lipases,

cellulases, choline oxidases, peroxidases/oxidases, pectate lyases, mannanases, cutinases, laccases, phospholipases, lysophospholipases, acyltransferases, perhydrolases, arylesterases, and any mixture thereof. The composition may include an enzyme stabilizer (examples of which include polyols such as propylene glycol or

5   glycerol, sugar or sugar alcohol, lactic acid, reversible protease inhibitor, boric acid, or a boric acid derivative, $e.g.$, an aromatic borate ester, or a phenyl boronic acid derivative such as 4-formylphenyl boronic acid).

The composition optionally includes silicone or fatty-acid based suds suppressors; hueing dyes, calcium and magnesium cations, visual signaling ingredients,

10   anti-foam (0.001 wt% to about 4.0wt%), and/or structurant/thickener (0.01 wt% to 5wt%, selected from the group consisting of diglycerides and triglycerides, ethylene glycol distearate, microcrystalline cellulose, cellulose based materials, microfiber cellulose, biopolymers, xanthan gum, gellan gum, and mixtures thereof).

The composition can be any liquid form, for example a liquid or gel form, or any

15   combination thereof. The composition may be in any unit dose form, for example a pouch.

Heavy Duty Dry/Solid (HDD) laundry detergent composition

Exemplary HDD laundry detergent compositions includes a detersive surfactant, including anionic detersive surfactants ($e.g.$, linear or branched or random chain,

20   substituted or unsubstituted alkyl sulphates, alkyl sulphonates, alkyl alkoxylated sulphate, alkyl phosphates, alkyl phosphonates, alkyl carboxylates and/or mixtures thereof), non-ionic detersive surfactant ($e.g.$, linear or branched or random chain, substituted or unsubstituted C_8-C_{18} alkyl ethoxylates, and/or C_6-C_{12} alkyl phenol alkoxylates), cationic detersive surfactants ($e.g.$, alkyl pyridinium compounds, alkyl quaternary ammonium

25   compounds, alkyl quaternary phosphonium compounds, alkyl ternary sulphonium compounds, and mixtures thereof), zwitterionic and/or amphoteric detersive surfactants ($e.g.$, alkanolamine sulpho-betaines), ampholytic surfactants, semi-polar non-ionic surfactants, and mixtures thereof; builders including phosphate free builders (for example zeolite builders examples which include zeolite A, zeolite X, zeolite P and

zeolite MAP in the range of 0wt% to less than 10wt%), phosphate builders (for example sodium tri-polyphosphate in the range of 0wt% to less than 10wt%), citric acid, citrate salts and nitrilotriacetic acid, silicate salt (*e.g.*, sodium or potassium silicate or sodium meta-silicate in the range of 0wt% to less than 10wt%, or layered silicate (SKS-6));

5   carbonate salt (*e.g.*, sodium carbonate and/or sodium bicarbonate in the range of 0 wt% to less than 80 wt%); and bleaching agents including photobleaches (*e.g.*, sulfonated zinc phthalocyanines, sulfonated aluminum phthalocyanines, xanthenes dyes, and mixtures thereof) hydrophobic or hydrophilic bleach activators (*e.g.*, dodecanoyl oxybenzene sulfonate, decanoyl oxybenzene sulfonate, decanoyl oxybenzoic acid or

10   salts thereof, 3,5,5-trimethy hexanoyl oxybenzene sulfonate, tetraacetyl ethylene diamine-TAED, nonanoyloxybenzene sulfonate-NOBS, nitrile quats, and mixtures thereof), sources of hydrogen peroxide (*e.g.*, inorganic perhydrate salts examples of which include mono or tetra hydrate sodium salt of perborate, percarbonate, persulfate, perphosphate, or persilicate), preformed hydrophilic and/or hydrophobic peracids (*e.g.*,

15   percarboxylic acids and salts, percarbonic acids and salts, perimidic acids and salts, peroxymonosulfuric acids and salts, and mixtures thereof), and/or bleach catalysts (*e.g.*, imine bleach boosters (examples of which include iminium cations and polyions), iminium zwitterions, modified amines, modified amine oxides, N-sulphonyl imines, N-phosphonyl imines, N-acyl imines, thiadiazole dioxides, perfluoroimines, cyclic sugar ketones, and

20   mixtures thereof, and metal-containing bleach catalysts (*e.g.*, copper, iron, titanium, ruthenium, tungsten, molybdenum, or manganese cations along with an auxiliary metal cations such as zinc or aluminum and a sequestrate such as ethylenediaminetetraacetic acid, ethylenediaminetetra(methylenephosphonic acid), and water-soluble salts thereof).

The composition preferably includes enzymes, *e.g.*, proteases, amylases,

25   lipases, cellulases, choline oxidases, peroxidases/oxidases, pectate lyases, mannanases, cutinases, laccases, phospholipases, lysophospholipases, acyltransferase, perhydrolase, arylesterase, and any mixture thereof.

The composition may optionally include additional detergent ingredients including perfume microcapsules, starch encapsulated perfume accord, hueing agents,

30   additional polymers, including fabric integrity and cationic polymers, dye-lock ingredients,

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fabric-softening agents, brighteners (for example C.I. Fluorescent brighteners), flocculating agents, chelating agents, alkoxylated polyamines, fabric deposition aids, and/or cyclodextrin.

Automatic dishwashing (ADW) detergent composition

Exemplary ADW detergent composition includes non-ionic surfactants, including ethoxylated non-ionic surfactants, alcohol alkoxylated surfactants, epoxy-capped poly(oxyalkylated) alcohols, or amine oxide surfactants present in amounts from 0 to 10% by weight; builders in the range of 5-60% including phosphate builders (e.g., mono-phosphates, di-phosphates, tri-polyphosphates, other oligomeric-poylphosphates, sodium tripolyphosphate-STPP) and phosphate-free builders (e.g., amino acid-based compounds including methyl-glycine-diacetic acid (MGDA) and salts and derivatives thereof, glutamic-N,N-diacetic acid (GLDA) and salts and derivatives thereof, iminodisuccinic acid (IDS) and salts and derivatives thereof, carboxy methyl inulin and salts and derivatives thereof, nitrilotriacetic acid (NTA), diethylene triamine penta acetic acid (DTPA), B-alaninediacetic acid (B-ADA) and their salts, homopolymers and copolymers of poly-carboxylic acids and their partially or completely neutralized salts, monomeric   polycarboxylic acids and hydroxycarboxylic acids and their salts in the range of 0.5% to 50% by weight; sulfonated/carboxylated polymers in the range of about 0.1 % to about 50% by weight to provide dimensional stability; drying aids in the range of about 0.1 % to about 10% by weight (e.g., polyesters, especially anionic polyesters, optionally together with further monomers with 3 to 6 functionalities - typically acid, alcohol or ester functionalities which are conducive to polycondensation, polycarbonate-, polyurethane- and/or polyurea-polyorganosiloxane compounds or precursor compounds, thereof, particularly of the reactive cyclic carbonate and urea type); silicates in the range from about 1 % to about 20% by weight (including sodium or potassium silicates for example sodium disilicate, sodium meta-silicate and crystalline phyllosilicates); inorganic bleach (e.g., perhydrate salts such as perborate, percarbonate, perphosphate, persulfate and persilicate salts) and organic bleach (e.g., organic peroxyacids, including diacyl and tetraacylperoxides, especially diperoxydodecanedioc acid, diperoxytetradecanedioc acid, and diperoxyhexadecanedioc acid); bleach activators (i.e., organic peracid precursors in

the range from about 0.1 % to about 10% by weight); bleach catalysts (*e.g.*, manganese triazacyclononane and related complexes, Co, Cu, Mn, and Fe bispyridylamine and related complexes, and pentamine acetate cobalt(III) and related complexes); metal care agents in the range from about 0.1% to 5% by weight (*e.g.*, benzatriazoles, metal salts

5   and complexes, and/or silicates); enzymes in the range from about 0.01 to 5.0 mg of active enzyme per gram of automatic dishwashing detergent composition (*e.g.*, proteases, amylases, lipases, cellulases, choline oxidases, peroxidases/oxidases, pectate lyases, mannanases, cutinases, laccases, phospholipases, lysophospholipases, acyltransferase, perhydrolase, arylesterase, and mixtures thereof); and enzyme

10   stabilizer components (*e.g.*, oligosaccharides, polysaccharides, and inorganic divalent metal salts).

The present maltogenic amylase polypeptide may be incorporated at a concentration conventionally employed in detergents.   It is at present contemplated that, in the detergent composition, the enzyme may be added in an amount corresponding to

15   0.00001-1.0 mg (calculated as pure enzyme protein) of amylase polypeptide per liter of wash liquor.

The detergent composition may also contain other conventional detergent ingredients, *e.g.*, deflocculant material, filler material, foam depressors, anti-corrosion agents, soil-suspending agents, sequestering agents, anti-soil redeposition agents,

20   dehydrating agents, dyes, bactericides, fluorescers, thickeners, and perfumes.

The detergent composition may be formulated as a hand (manual) or machine (automatic) laundry detergent composition, including a laundry additive composition suitable for pre-treatment of stained fabrics and a rinse added fabric softener composition, or be formulated as a detergent composition for use in general household

25   hard surface cleaning operations, or be formulated for manual or automatic dishwashing operations.

Any of the cleaning compositions described, herein, may include any number of additional enzymes.   In general the enzyme(s) should be compatible with the selected detergent, (*e.g.*, with respect to pH-optimum, compatibility with other enzymatic and

non-enzymatic ingredients, and the like), and the enzyme(s) should be present in effective amounts.   The following enzymes are provided as examples.

Proteases: Suitable proteases include those of animal, vegetable or microbial origin. Chemically modified or protein engineered mutants are included, as well

5   as naturally processed proteins.   The protease may be a serine protease or a metalloprotease, an alkaline microbial protease, a trypsin-like protease, or a chymotrypsin-like protease.   Examples of alkaline proteases are subtilisins, especially those derived from *Bacillus, e.g.,* subtilisin Novo, subtilisin Carlsberg, subtilisin 309, subtilisin 147, and subtilisin 168 (*see, e.g.,* WO 89/06279).   Examples of trypsin-like

10   proteases are trypsin (*e.g.,* of porcine or bovine origin), and *Fusarium* proteases (*see, e.g.,* WO 89/06270 and WO 94/25583).   Examples of useful proteases also include but are not limited to the variants described in WO 92/19729, WO 98/20115, WO 98/20116, and WO 98/34946.   Commercially available protease enzymes include but are not limited to: ALCALASE®, SAVINASE®, PRIMASE™, DURALASE™, ESPERASE®,

15   KANNASE™, and BLAZE™ (Novo Nordisk A/S and Novozymes A/S); MAXATASE®, MAXACAL™, MAXAPEM™, PROPERASE®, PURAFECT®, PURAFECT OXP™, FN2™, and FN3™ (Danisco US Inc.).   Other exemplary proteases include NprE from *Bacillus amyloliquifaciens* and ASP from *Cellulomonas* sp. strain 69B4.

Lipases: Suitable lipases include those of bacterial or fungal origin.

20   Chemically modified, proteolytically modified, or protein engineered mutants are included. Examples of useful lipases include but are not limited to lipases from *Humicola* (synonym *Thermomyces*), *e.g.,* from *H. lanuginosa* (*T. lanuginosus*) (*see e.g.,* EP 258068 and EP 305216), from *H. insolens* (*see e.g.,* WO 96/13580); a *Pseudomonas* lipase (*e.g.,* from *P. alcaligenes* or *P. pseudoalcaligenes; see, e.g.,* EP 218 272), *P. cepacia* (*see e.g.,* EP 331

25   376), *P. stutzeri* (*see e.g.,* GB 1,372,034), *P. fluorescens, Pseudomonas* sp. strain SD 705 (*see e.g.,* WO 95/06720 and WO 96/27002), *P. wisconsinensis* (*see e.g.,* WO 96/12012); a *Bacillus* lipase (*e.g.,* from *B. subtilis; see e.g.,* Dartois *et al.   Biochemica et Biophysica Acta,* 1131:   253-360 (1993)), *B. stearothermophilus* (*see e.g.,* JP 64/744992), or *B. pumilus* (*see e.g.,* WO 91/16422).   Additional lipase variants

30   contemplated for use in the formulations include those described for example in: WO

92/05249, WO 94/01541, WO 95/35381, WO 96/00292, WO 95/30744, WO 94/25578, WO 95/14783, WO 95/22615, WO 97/04079, WO 97/07202, EP 407225, and EP 260105. Some commercially available lipase enzymes include LIPOLASE® and LIPOLASE ULTRA™ (Novo Nordisk A/S and Novozymes A/S).

Polyesterases: Suitable polyesterases can be included in the composition, such as those described in, for example, WO 01/34899, WO 01/14629, and US6933140.

Amylases: The compositions can be combined with other amylases, such as non-production enhanced amylase. These can include commercially available amylases, such as but not limited to STAINZYME®, NATALASE®, DURAMYL®, TERMAMYL®, FUNGAMYL® and BAN™ (Novo Nordisk A/S and Novozymes A/S); RAPIDASE®, POWERASE®, and PURASTAR® (from Danisco US Inc.).

Cellulases: Cellulases can be added to the compositions. Suitable cellulases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Suitable cellulases include cellulases from the genera *Bacillus*, *Pseudomonas*, *Humicola*, *Fusarium*, *Thielavia*, *Acremonium*, e.g., the fungal cellulases produced from *Humicola insolens*, *Myceliophthora thermophila* and *Fusarium oxysporum* disclosed for example in U.S. Patent Nos. 4,435,307; 5,648,263; 5,691,178; 5,776,757; and WO 89/09259. Exemplary cellulases contemplated for use are those having color care benefit for the textile. Examples of such cellulases are cellulases described in for example EP 0495257, EP 0531372, WO 96/11262, WO 96/29397, and WO 98/08940. Other examples are cellulase variants, such as those described in WO 94/07998; WO 98/12307; WO 95/24471; PCT/DK98/00299; EP 531315; U.S. Patent Nos. 5,457,046; 5,686,593; and 5,763,254. Commercially available cellulases include CELLUZYME® and CAREZYME® (Novo Nordisk A/S and Novozymes A/S); CLAZINASE® and PURADAX HA® (Danisco US Inc.); and KAC-500(B)™ (Kao Corporation).

Peroxidases/Oxidases: Suitable peroxidases/oxidases contemplated for use in the compositions include those of plant, bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful peroxidases

include peroxidases from *Coprinus*, *e.g.*, from *C. cinereus*, and variants thereof as those described in WO 93/24618, WO 95/10602, and WO 98/15257. Commercially available peroxidases include for example GUARDZYME ™ (Novo Nordisk A/S and Novozymes A/S).

5   The detergent composition can also comprise 2,6-β-D-fructan hydrolase, which is effective for removal/cleaning of biofilm present on household and/or industrial textile/laundry.

The detergent enzyme(s) may be included in a detergent composition by adding separate additives containing one or more enzymes, or by adding a combined

10   additive comprising all of these enzymes. A detergent additive, *i.e.* a separate additive or a combined additive, can be formulated *e.g.*, as a granulate, a liquid, a slurry, and the like. Exemplary detergent additive formulations include but are not limited to granulates, in particular non-dusting granulates, liquids, in particular stabilized liquids or slurries.

Non-dusting granulates may be produced, *e.g.*, as disclosed in U.S. Patent

15   Nos. 4,106,991 and 4,661,452 and may optionally be coated by methods known in the art. Examples of waxy coating materials are poly(ethylene oxide) products (*e.g.*, polyethyleneglycol, PEG) with mean molar weights of 1,000 to 20,000; ethoxylated nonylphenols having from 16 to 50 ethylene oxide units; ethoxylated fatty alcohols in which the alcohol contains from 12 to 20 carbon atoms and in which there are 15 to 80

20   ethylene oxide units; fatty alcohols; fatty acids; and mono- and di- and triglycerides of fatty acids. Examples of film-forming coating materials suitable for application by fluid bed techniques are given in, for example, GB 1483591. Liquid enzyme preparations may, for instance, be stabilized by adding a polyol such as propylene glycol, a sugar or sugar alcohol, lactic acid or boric acid according to established methods. Protected

25   enzymes may be prepared according to the method disclosed in EP 238,216.

The detergent composition may be in any convenient form, *e.g.*, a bar, a tablet, a powder, a granule, a paste, or a liquid. A liquid detergent may be aqueous, typically containing up to about 70% water, and 0% to about 30% organic solvent. Compact detergent gels containing about 30% or less water are also contemplated. The

detergent composition can optionally comprise one or more surfactants, which may be non-ionic, including semi-polar and/or anionic and/or cationic and/or zwitterionic. The surfactants can be present in a wide range, from about 0.1% to about 60% by weight.

When included therein the detergent will typically contain from about 1% to

5   about 40% of an anionic surfactant, such as linear alkylbenzenesulfonate, α-olefinsulfonate, alkyl sulfate (fatty alcohol sulfate), alcohol ethoxysulfate, secondary alkanesulfonate, α-sulfo fatty acid methyl ester, alkyl- or alkenylsuccinic acid, or soap.

When included therein, the detergent will usually contain from about 0.2% to about 40% of a non-ionic surfactant such as alcohol ethoxylate, nonylphenol ethoxylate,

10   alkylpolyglycoside, alkyldimethylamineoxide, ethoxylated fatty acid monoethanolamide, fatty acid monoethanolamide, polyhydroxy alkyl fatty acid amide, or N-acyl-N-alkyl derivatives of glucosamine ("glucamides").

The detergent may contain 0% to about 65% of a detergent builder or complexing agent such as zeolite, diphosphate, triphosphate, phosphonate, carbonate,

15   citrate, nitrilotriacetic acid, ethylenediaminetetraacetic acid (EDTA), diethylenetriaminepentaacetic acid, alkyl- or alkenylsuccinic acid, soluble silicates or layered silicates (e.g.,SKS-6 from Hoechst).

The detergent may comprise one or more polymers. Exemplary polymers include carboxymethylcellulose (CMC), poly(vinylpyrrolidone) (PVP), poly(ethylene

20   glycol) (PEG), poly(vinyl alcohol) (PVA), poly(vinylpyridine-N-oxide), poly(vinylimidazole), polycarboxylates e.g., polyacrylates, maleic/acrylic acid copolymers), and lauryl methacrylate/acrylic acid copolymers.

The enzyme(s) of the detergent composition may be stabilized using conventional stabilizing agents, e.g., as polyol (e.g., propylene glycol or glycerol), a sugar

25   or sugar alcohol, lactic acid, boric acid, or a boric acid derivative (e.g., an aromatic borate ester), or a phenyl boronic acid derivative (e.g., 4-formylphenyl boronic acid). The composition may be formulated as described in WO 92/19709 and WO 92/19708.

It is contemplated that in the detergent compositions, in particular the maltogenic amylase of the present teachings, may be added in an amount corresponding

65

to about 0.01 to about 100 mg of enzyme protein per liter of wash liquor (*e.g.*, about 0.05 to about 5.0 mg of enzyme protein per liter of wash liquor or 0.1 to about 1.0 mg of enzyme protein per liter of wash liquor).

5   **Methods of Assessing Amylase Activity in Detergent Compositions**

Numerous α-amylase cleaning assays are known in the art, including swatch and micro-swatch assays.

Brewing Compositions

The present maltogenic amylase may be a component of a brewing composition

10   used in a process of brewing, *i.e.*, making a fermented malt beverage.   Non-fermentable carbohydrates form the majority of the dissolved solids in the final beer.   This residue remains because of the inability of malt amylases to hydrolyze the alpha-1,6-linkages of the starch.   The non-fermentable carbohydrates contribute about 50 calories per 12 ounces of beer.   An amylase, in combination with a glucoamylase and optionally a

15   pullulanase and/or isoamylase, assist in converting the starch into dextrins and fermentable sugars, lowering the residual non-fermentable carbohydrates in the final beer.

The principal raw materials used in making these beverages are water, hops and malt.   In addition, adjuncts such as common corn grits, refined corn grits, brewer's milled

20   yeast, rice, sorghum, refined corn starch, barley, barley starch, dehusked barley, wheat, wheat starch, torrified cereal, cereal flakes, rye, oats, potato, tapioca, and syrups, such as corn syrup, sugar cane syrup, inverted sugar syrup, barley and/or wheat syrups, and the like may be used as a source of starch.

For a number of reasons, the malt, which is produced principally from selected

25   varieties of barley, has the greatest effect on the overall character and quality of the beer.   First, the malt is the primary flavoring agent in beer.   Second, the malt provides the major portion of the fermentable sugar.   Third, the malt provides the proteins, which will contribute to the body and foam character of the beer.   Fourth, the malt provides the

necessary enzymatic activity during mashing.   Hops also contribute significantly to beer quality, including flavoring.   In particular, hops (or hops constituents) add desirable bittering substances to the beer.   In addition, the hops act as protein precipitants, establish preservative agents and aid in foam formation and stabilization.

5   Grains, such as barley, oats, wheat, as well as plant components, such as corn, hops, and rice, also are used for brewing, both in industry and for home brewing.   The components used in brewing may be unmalted or may be malted, i.e., partially germinated, resulting in an increase in the levels of enzymes, including α-amylase.   For successful brewing, adequate levels of α-amylase enzyme activity are necessary to

10   ensure the appropriate levels of sugars for fermentation.   An amylase, by itself or in combination with another α-amylase(s), accordingly may be added to the components used for brewing.

As used herein, the term "stock" means grains and plant components that are crushed or broken.   For example, barley used in beer production is a grain that has been

15   coarsely ground or crushed to yield a consistency appropriate for producing a mash for fermentation.   As used herein, the term "stock" includes any of the aforementioned types of plants and grains in crushed or coarsely ground forms.   The methods described herein may be used to determine maltogenic amylase activity levels in both flours and stock.

20   Processes for making beer are well known in the art.   See, e.g., Wolfgang Kunze (2004) "Technology Brewing and Malting," Research and Teaching Institute of Brewing, Berlin (VLB), 3rd edition.   Briefly, the process involves: (a) preparing a mash, (b) filtering the mash to prepare a wort, and (c) fermenting the wort to obtain a fermented beverage, such as beer.   Typically, milled or crushed malt is mixed with water and held

25   for a period of time under controlled temperatures to permit the enzymes present in the malt to convert the starch present in the malt into fermentable sugars.   The mash is then transferred to a mash filter where the liquid is separated from the grain residue.   This sweet liquid is called "wort," and the left over grain residue is called "spent grain."   The mash is typically subjected to an extraction, which involves adding water to the mash in

order to recover the residual soluble extract from the spent grain. The wort is then boiled vigorously to sterilize the wort and help develop the color, flavor and odor. Hops are added at some point during the boiling. The wort is cooled and transferred to a fermentor.

5   The wort is then contacted in a fermentor with yeast. The fermentor may be chilled to stop fermentation. The yeast flocculates and is removed. Finally, the beer is cooled and stored for a period of time, during which the beer clarifies and its flavor develops, and any material that might impair the appearance, flavor and shelf life of the beer settles out. The beer usually contains from about 2% to about 10% v/v alcohol,

10   although beer with a higher alcohol content, e.g., 18% v/v, may be obtained. Prior to packaging, the beer is carbonated and, optionally, filtered and pasteurized.

The brewing composition comprising a maltogenic amylase, in combination with a glucoamylase and optionally a pullulanase and/or isoamylase, may be added to the mash of step (a) above, i.e., during the preparation of the mash. Alternatively, or in

15   addition, the brewing composition may be added to the mash of step (b) above, i.e., during the filtration of the mash. Alternatively, or in addition, the brewing composition may be added to the wort of step (c) above, i.e., during the fermenting of the wort.

A fermented beverage, such as a beer, can be produced by one of the methods above. The fermented beverage can be a beer, such as full malted beer, beer brewed

20   under the "Reinheitsgebot," ale, IPA, lager, bitter, Happoshu (second beer), third beer, dry beer, near beer, light beer, low alcohol beer, low calorie beer, porter, bock beer, stout, malt liquor, non-alcoholic beer, non-alcoholic malt liquor and the like, but also alternative cereal and malt beverages such as fruit flavored malt beverages, e.g., citrus flavored, such as lemon-, orange-, lime-, or berry-flavored malt beverages, liquor flavored malt

25   beverages, e.g., vodka-, rum-, or tequila-flavored malt liquor, or coffee flavored malt beverages, such as caffeine-flavored malt liquor, and the like.

Reduction of Iodine-Positive Starch

The maltogenic amylases of the present teachings may reduce the iodine-positive starch (IPS), when used in a method of liquefaction and/or

saccharification.   One source of IPS is from amylose that escapes hydrolysis and/or from retrograded starch polymer.   Starch retrogradation occurs spontaneously in a starch paste, or gel on aging, because of the tendency of starch molecules to bind to one another followed by an increase in crystallinity.   Solutions of low concentration become

5   increasingly cloudy due to the progressive association of starch molecules into larger articles.   Spontaneous precipitation takes place and the precipitated starch appears to be reverting to its original condition of cold-water insolubility.   Pastes of higher concentration on cooling set to a gel, which on aging becomes steadily firmer due to the increasing association of the starch molecules.   This arises because of the strong

10   tendency for hydrogen bond formation between hydroxy groups on adjacent starch molecules.   *See* J.A. Radley, ed., STARCH AND ITS DERIVATIVES 194-201 (Chapman and Hall, London (1968)).

The presence of IPS in saccharide liquor negatively affects final product quality and represents a major issue with downstream processing.   IPS plugs or slows filtration

15   system, and fouls the carbon columns used for purification.   When IPS reaches sufficiently high levels, it may leak through the carbon columns and decrease production efficiency.   Additionally, it may results in hazy final product upon storage, which is unacceptable for final product quality.   The amount of IPS can be reduced by isolating the saccharification tank and blending the contents back.   IPS nevertheless will

20   accumulate in carbon columns and filter systems, among other things.   The use of the maltogenic amylases of the present teachings is expected to improve overall process performance by reducing the amount of IPS.

25   **Examples**

A putative novel amylase was identified from a metagenomic library constructed by conventional cloning techniques.   Protein sequence analysis indicates that the amylase belongs to the glycosyl hydrolase family 13 (GH13), and shows less than 66% sequence identity to known proteins in the public NCBI database.

Following identification of the putative amylase in silico, the gene was cloned

using conventional molecular biology PCR techniques and expressed in *Bacillus subtilis*.

The plasmid cloning map is shown in Figure 9.

5   **Cloning and expression of AmyMG**

The full gene sequence is SEQ ID NO:1.

CACACCCCGACGACCCGGCAGGCCGATTACTACGGCACGCTGGAGCCGTTTGCG
10   CGTGAAGCGGTGTACTTCGTGATGACCGATCGCTTCGTCAACGGCGACCCCGGCA
ACGACCACCGCGACCAAGGCGGCGCCCTGGGCACGTTCGACATCCCGCTGCCGC
CATGCAATGGCGTGTCCGGCAACATCGGCTACCTGGGTGGCGACTTCAAGGGCCT
GGCCGATCATCTGGATTACATCCGCGAAATGGGCTTCACCGCGGTGTGGATCACG
CCGATCGTGGACAATCCGGACCAGCGCTTCACTGGCGGCAGCGCACCAACCTGC
15   GGCGGCATTCTGGCTGACCAGGGCAAAGCCGGCTATCACGGCTACTGGGGCGTG
AATTTCTACCAAGTGGACGAGCACCTGCCCAGCCCAGGCATGGACTTCCGCGACC
TGGCGGCGGCGATGCATCGCAAGGGCATGAAGCTGGTGCTGGACATCGTGGGGA
ACCACGGCTCGCCGGCCTGGGGCATGGCCTTCGACCAGCCCAAGTTCGGCAAGA
TCTACGACAAGGACGGCACGCTGATTGCCGATCACCAGAACCTGCCGCCGCAGCA
20   GCTGGATCCCGAGCACAACCCGCTGCACCGCTTCTACAACACGGTCGGCCCGGT
GGACGGGGCCAAGGGATCGATCTTCGACGGCAATCTGGCCCAGCTGTCGGATCT
CAATGAACGCAACCCGGACGTGCTGGACTATCTGGTCGGGGCCTATCTGCAATGG
ATCGACCAGGGTGCCGATGCGTTTCGCATCGACACCATCGCCTGGATGCCGGACA
GCTTCTGGCAGGCCTTCACCACCCGCATCCGGGCAAAGCACCCCGGCTTTTTCAT
25   GTTCGGCGAGGCCTTCGACTACGACGCCGCCAGGATTGCCACCCACACCCTGCC
CGGCCACGGCGAAACCAGCGTGCTGGACTTCCCGATGAAACAGGCGATGGAAGA
GGTCTTCGGGCGCAAGCAGGCCGGTTTTGAACGGATGATACCGGCGCTGCATCTG
ACTGGCGGCCCGTATGCCAACCCCTACGAGCTGGCCACCTTCTACGACAATCACG
ACATGCCGCGGCTGGATGCCAGCGATGAAGGCTTCATTGATGCACACAACTGGCT
30   GTTCACCGCGCGTGGCATTCCGGTGGTCTATTACGGCTCGGAAATGGGCTTCATG
CGCGGCCGACCCGAGCACGGCGGCAACCGCAACTACTTCGGCACCGAAGGCATT
GCCGCCGCCAAGGCAAGCCCGATCCGGGCAGCGCTGACCCGCATTGCGCAGGT
GCGTGCCGCTTCACCAGCGCTGCAGCgCGGGCTGCAACTCAATCTGGAGCTGCA
AGGCAACCGCGCCGCGTTCTATCGGGTGTACCAGCACGACGGTGTGCACCAGATC
35   GCGCTGGTCCTGCTCAACAAGGGCGACGCCCCGGAACACTTTGCCGTCCAGACG
ATGCTGCAACCCGGCcGCTGGCATGACGCGATTGGCGGTGAGACGCTGACCATAC
AGGCTGGCGAGGCGCTGCACGCCGAGGTTCCGGCGCATGGCGTGCGGGTCTTT
CTGCTCGACGCCCAGGTGACTGAGCCGACGCTGGCGGCTGCGCTGGATGCCGC
CATGGCCGATGCACGCCGGTCACGGTAA
40

The nucleic acid fragment encoding the native signal peptide is SEQ ID NO: 2.

ATGATCACCATGCCCCTGCGTTCTGCCCGCCTCGGCCTGAGTTTGCTTTGCGCGC

5   TTGCCTCGACGGCCTGTGCA

The full protein sequence is SEQ ID NO:3.
HTPTTRQADYYGTLEPFAREAVYFVMTDRFVNGDPGNDHRDQGGALGTFDIPLPPCN
GVSGNIGYLGGDFKGLADHLDYIREMGFTAVWITPIVDNPDQRFTGGSAPTCGGILAD

10   QGKAGYHGYWGVNFYQVDEHLPSPGMDFRDLAAAMHRKGMKLVLDIVGNHGSPAW
GMAFDQPKFGKIYDKDGTLIADHQNLPPQQLDPEHNPLHRFYNTVGPVDGAKGSIFD
GNLAQLSDLNERNPDVLDYLVGAYLQWIDQGADAFRIDTIAWMPDSFWQAFTTRIRAK
HPGFFMFGEAFDYDAARIATHTLPGHGETSVLDFPMKQAMEEVFGRKQAGFERMIPA
LHLTGGPYANPYELATFYDNHDMPRLDASDEGFIDAHNWLFTARGIPVVYYGSEMGF

15   MRGRPEHGGNRNYFGTEGIAAAKASPIRAALTRIAQVRAASPALQRGLQLNLELQGNR
AAFYRVYQHDGVHQIALVLLNKGDAPEHFAVQTMLQPGRWHDAIGGETLTIQAGEALH
AEVPAHGVRVFLLDAQVTEPTLAAALDAAMADARRSR

The native signal peptide is SEQ ID NO: 4.

20

MITMPLRSARLGLSLLCALASTACA

The mature gene sequence was identified by conventional procedures, PCR
amplified, digested by BssHii/XhoI, and ligated into the p2JM plasmid digested with same

25   restriction enzymes. As shown in the plasmid map of Figure 9, the AmyMG gene was put
under the control of the aprE promoter. The aprE signal sequence was used to direct
protein secretion. In addition, nucleotides coding for three additional amino acids (AGK)
were placed between the aprE signal sequence and the mature AmyMG gene to facilitate
secretion of the target protein.   The resulting plasmid was used to transform competent

30   *Bacillus subtilis* cells. Expression evaluation of AmyMG showed that the enzyme
expresses very well in both strains.

The aprE signal nucleic acid sequence (underlined) + AGK nucleic acid sequence (italics)
is SEQ ID NO: 5.

35

gtgagaagcaaaaaattgtggatcagcttgttgtttgcgttaacgttaatctttacgatggcgttcagcaacatgagcgcgca
ggca*gctggtaaa*

The aprE signal amino acid sequence (underlined) + AGK amino acid sequence (italics) is SEQ ID NO: 6.

5   MRSKKLWISLLFALALIFTMAFGSTSSAQA*AGK*

Product profile analysis and biochemical characterization of AmyMG

Preliminary product profile analysis showed that AmyMG exhibited DP2 as its major product, with the composition (%) higher than 90% (if one only considered the
10   product profile from DP1 to DP7) (Figure 1 and Table 1).

Figure 1 shows the typical chromatograms of oligosaccharide product profile analysis of A) AmyMG (10 ppm) incubated with Maltodextrin (DE10) (0.5%, w/v) under pH 5.3 at 50°C for 2 h and B) the mixture of standard compounds of DP1 to DP 7 (0.0125%, w/v). HPLC separation was done using an Agilent 1200 series HPLC system
15   with an Aminex HPX-42A column (300 mm x 7.8 mm) at 85 °C. The sample (10 µL) was subjected to the HPLC column and separated with an isocratic gradient of Milli-Q water as the mobile phase at a flow rate of 0.6 mL/min. The oligosaccharide products were detected using a refractive index detector.

20   Table 2. The oligosaccharide product compositions (%) of AmyMG

Substrate	Na-Citrate (pH 5.3)							HEPES (pH 8.2)						
	Product composition (%)							Product composition (%)						
	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP1	DP2	DP3	DP4	DP5	DP6	DP7
DP7	17	83	0	0	0	0	-	18	82	0	0	0	0	-
Amylopectin	3	96	0	1	0	0	0	3	97	0	0	0	0	0
Maltodextrin (DE10)	6	94	0	0	0	0	0	11	89	0	0	0	0	0

Ion exchange chromatography results confirmed that AmyMG showed maltogenic activity with maltose as its major product (Figure 2). The typical chromatograms of oligosaccharide product profile analysis of AmyMG (10 ppm) incubated with Maltodextrin

5   (DE10) (15%, w/v) under pH 5.3 at 50°C for 24h. The separation was done using a Dionex ICS-5000 ion exchange chromatography with a CarboPac PA 200 column at 30 °C. The sample (25 μL) was subjected to the column and separated with the gradient: 0-10 min, 50mM NaOH; 10-15 min, 50-100mM NaOH; 15-35min, 100mM NaOH, 0-200mM NaAc; 35-45min, 50mM NaOH, at a flow rate of 0.5 mL/min. The

10 oligosaccharide products were detected using a pulsed amperometric detector.

More detailed product profile analysis (Figure 3) with different incubation time points showed the peak area of DP2 increased while the peak area of DP10+ decreased with the extension of incubation time from 0 h up to 48 h, indicating that maltose is the major product of AmyMG by hydrolyzing Maltrin040. As shown, the typical

15 chromatograms of oligosaccharide product profile analysis of AmyMG (25 ppm) incubated with Maltrin040 (30%, w/v) under pH 5.3 at 50°C. HPLC separation was done using an Agilent 1200 series HPLC system with an Aminex HPX-42A column (300 mm x 7.8 mm) at 85°C. The sample (10 μL) was subjected to the HPLC column and separated with an isocratic gradient of Milli-Q water as the mobile phase at a flow rate of 0.6 mL/min.

20 The oligosaccharide products were detected using a refractive index detector.

In order to figure out the exact anomeric form of maltose produced from maltodextrin catalyzed by AmyMG, the real time NMR assay was done by analyzing the enzyme product at different reaction times (Figure 4). The results suggested that the product is alpha-maltose and AmyMG is a maltogenic alpha-amylase. As shown,

25 ^{1}H-NMR of the product from Maltrin040 incubated with AmyMG. The reaction was done by incubating the mixture of 10 mg Maltrin040 that was dissolved into 1 mL of D2O and 33 ppm of AmyMG at 25 °C. The NMR assay was done by a Bruker NMR spectrometer that operated at 500MHz in D2O.

30 AmyMG was tested for alpha-amylase characterization (Amylopectin/PAHBAH method), including dose dependent assay (Figure 5, a dose-dependant assay for

AmyMG using amylopectin as the substrate), pH (Figure 6, showing a normalized pH profile), temperature profile (Figure 7, showing a normalized temperature profile), and, a thermostability assay (Figure 8, showing the thermostability of AmyMG). The specific activity of this enzyme towards amylopectin is 218.4 U/mg, with optimum pH at 7 and

5   optimum temperature at 63°C.

Thus, in some embodiments, the present teachings provide a polypeptide with maltogenic acitivity wherein at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, or at least 95% of the maximum enzyme activity is present in the pH range of 6-8, as assessed by DP° Units.

10   Additionally, in some embodiments, the present teachings provide a polypeptide with maximum activity, as assessed by DP° Units, at 60°C-70°C, or 62°C-64°C.

Additionally, in some embodiments, the present teachings provide a polypeptide that produces at least 80%, at least 85%, at least 90%, or at least 95% DP2 of the DP1 to DP7 products resulting from a hydrolysis reaction performed according to the procedures

15   depicted in Figure 3.

Finally, in some embodiments, the polypeptides of the present teachings can be engineered to provide various improved properties. Such engineering efforts can be guided by the atomic coordinate structural information provided in Table 3.

Table 3

	ATOM	1	N	GLN	A	8	114.737	81.675	18.562	1.00	37.71	N
	ATOM	2	CA	GLN	A	8	114.425	83.092	18.184	1.00	34.91	C
5	ATOM	3	CB	GLN	A	8	115.667	83.800	17.610	1.00	42.85	C
	ATOM	4	CG	GLN	A	8	115.634	85.314	17.761	1.00	49.20	C
	ATOM	5	CD	GLN	A	8	115.695	85.734	19.218	1.00	59.92	C
	ATOM	6	OE1	GLN	A	8	114.734	85.547	19.968	1.00	58.08	O
	ATOM	7	NE2	GLN	A	8	116.832	86.289	19.633	1.00	55.51	N
10	ATOM	8	C	GLN	A	8	113.216	83.263	17.240	1.00	26.15	C
	ATOM	9	O	GLN	A	8	112.182	83.767	17.675	1.00	24.80	O
	ATOM	10	N	ALA	A	9	113.343	82.897	15.960	1.00	21.01	N
	ATOM	11	CA	ALA	A	9	112.213	82.903	15.027	1.00	18.94	C
	ATOM	12	CB	ALA	A	9	112.613	82.251	13.712	1.00	19.85	C
15	ATOM	13	C	ALA	A	9	111.041	82.146	15.671	1.00	15.96	C
	ATOM	14	O	ALA	A	9	111.263	81.146	16.368	1.00	16.65	O
	ATOM	15	N	ASP	A	10	109.823	82.651	15.494	1.00	13.87	N
	ATOM	16	CA	ASP	A	10	108.612	81.920	15.913	1.00	15.61	C
	ATOM	17	CB	ASP	A	10	107.434	82.870	16.119	1.00	19.46	C
20	ATOM	18	CG	ASP	A	10	107.469	83.592	17.448	1.00	23.75	C
	ATOM	19	OD1	ASP	A	10	107.906	83.023	18.466	1.00	20.82	O
	ATOM	20	OD2	ASP	A	10	107.009	84.743	17.468	1.00	32.09	O
	ATOM	21	C	ASP	A	10	108.159	80.918	14.856	1.00	12.27	C
	ATOM	22	O	ASP	A	10	107.934	81.294	13.725	1.00	12.47	O
25	ATOM	23	N	TYR	A	11	107.976	79.664	15.244	1.00	11.78	N
	ATOM	24	CA	TYR	A	11	107.418	78.635	14.367	1.00	10.00	C
	ATOM	25	CB	TYR	A	11	108.508	77.669	13.941	1.00	10.62	C
	ATOM	26	CG	TYR	A	11	109.637	78.276	13.132	1.00	10.60	C
	ATOM	27	CD1	TYR	A	11	109.376	79.006	11.986	1.00	12.14	C
30	ATOM	28	CE1	TYR	A	11	110.393	79.548	11.225	1.00	11.89	C
	ATOM	29	CZ	TYR	A	11	111.713	79.360	11.601	1.00	13.20	C
	ATOM	30	OH	TYR	A	11	112.721	79.895	10.822	1.00	13.22	O
	ATOM	31	CE2	TYR	A	11	112.008	78.630	12.736	1.00	12.02	C
	ATOM	32	CD2	TYR	A	11	110.962	78.079	13.485	1.00	12.17	C
35	ATOM	33	C	TYR	A	11	106.294	77.907	15.116	1.00	10.63	C
	ATOM	34	O	TYR	A	11	106.515	77.293	16.167	1.00	10.75	O
	ATOM	35	N	TYR	A	12	105.067	78.040	14.612	1.00	10.78	N
	ATOM	36	CA	TYR	A	12	103.913	77.379	15.195	1.00	10.87	C
	ATOM	37	CB	TYR	A	12	103.411	78.087	16.449	1.00	11.39	C
40	ATOM	38	CG	TYR	A	12	103.189	79.570	16.322	1.00	12.09	C
	ATOM	39	CD1	TYR	A	12	102.050	80.066	15.729	1.00	13.04	C
	ATOM	40	CE1	TYR	A	12	101.834	81.424	15.603	1.00	13.98	C
	ATOM	41	CZ	TYR	A	12	102.771	82.298	16.120	1.00	14.07	C
	ATOM	42	OH	TYR	A	12	102.570	83.635	16.006	1.00	19.59	O
45	ATOM	43	CE2	TYR	A	12	103.906	81.846	16.726	1.00	13.46	C

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	ATOM	44	CD2	TYR A	12	104.110	80.476	16.841	1.00	14.72	C
	ATOM	45	C	TYR A	12	102.783	77.285	14.178	1.00	10.60	C
	ATOM	46	O	TYR A	12	102.615	78.167	13.319	1.00	8.70	O
	ATOM	47	N	GLY A	13	102.040	76.190	14.257	1.00	9.04	N
5	ATOM	48	CA	GLY A	13	100.830	76.045	13.454	1.00	9.97	C
	ATOM	49	C	GLY A	13	99.734	76.942	13.991	1.00	9.94	C
	ATOM	50	O	GLY A	13	99.001	77.567	13.229	1.00	9.84	O
	ATOM	51	N	THR A	14	99.632	76.993	15.312	1.00	9.70	N
	ATOM	52	CA	THR A	14	98.663	77.856	15.980	1.00	10.20	C
10	ATOM	53	CB	THR A	14	97.245	77.241	15.994	1.00	10.01	C
	ATOM	54	OG1	THR A	14	96.360	78.172	16.611	1.00	10.36	O
	ATOM	55	CG2	THR A	14	97.189	75.925	16.776	1.00	8.48	C
	ATOM	56	C	THR A	14	99.067	78.090	17.419	1.00	10.24	C
	ATOM	57	O	THR A	14	99.709	77.220	18.020	1.00	9.49	O
15	ATOM	58	N	LEU A	15	98.661	79.244	17.964	1.00	10.52	N
	ATOM	59	CA	LEU A	15	98.798	79.553	19.390	1.00	11.07	C
	ATOM	60	CB	LEU A	15	99.342	80.990	19.605	1.00	12.17	C
	ATOM	61	CG	LEU A	15	100.793	81.221	19.135	1.00	14.65	C
	ATOM	62	CD1	LEU A	15	101.260	82.655	19.445	1.00	13.18	C
20	ATOM	63	CD2	LEU A	15	101.724	80.178	19.758	1.00	13.48	C
	ATOM	64	C	LEU A	15	97.459	79.397	20.128	1.00	12.49	C
	ATOM	65	O	LEU A	15	97.373	79.717	21.299	1.00	12.03	O
	ATOM	66	N	GLU A	16	96.411	78.891	19.462	1.00	12.24	N
	ATOM	67	CA	GLU A	16	95.139	78.627	20.163	1.00	11.45	C
25	ATOM	68	CB	GLU A	16	94.117	78.040	19.189	1.00	12.06	C
	ATOM	69	CG	GLU A	16	92.920	77.366	19.815	1.00	13.55	C
	ATOM	70	CD	GLU A	16	92.156	78.277	20.763	1.00	15.28	C
	ATOM	71	OE1	GLU A	16	91.845	79.402	20.326	1.00	14.11	O
	ATOM	72	OE2	GLU A	16	91.851	77.844	21.918	1.00	12.98	O
30	ATOM	73	C	GLU A	16	95.392	77.679	21.343	1.00	10.66	C
	ATOM	74	O	GLU A	16	95.931	76.586	21.153	1.00	10.99	O
	ATOM	75	N	PRO A	17	95.031	78.099	22.573	1.00	12.38	N
	ATOM	76	CA	PRO A	17	95.229	77.237	23.730	1.00	11.70	C
	ATOM	77	CB	PRO A	17	94.522	78.016	24.857	1.00	15.92	C
35	ATOM	78	CG	PRO A	17	94.750	79.456	24.485	1.00	15.36	C
	ATOM	79	CD	PRO A	17	94.605	79.467	22.979	1.00	13.18	C
	ATOM	80	C	PRO A	17	94.617	75.842	23.584	1.00	12.59	C
	ATOM	81	O	PRO A	17	95.176	74.874	24.084	1.00	10.90	O
	ATOM	82	N	PHE A	18	93.473	75.723	22.911	1.00	10.98	N
40	ATOM	83	CA	PHE A	18	92.771	74.431	22.893	1.00	10.65	C
	ATOM	84	CB	PHE A	18	91.300	74.592	22.466	1.00	11.32	C
	ATOM	85	CG	PHE A	18	90.399	73.608	23.124	1.00	11.42	C
	ATOM	86	CD1	PHE A	18	89.862	73.884	24.366	1.00	12.54	C
	ATOM	87	CE1	PHE A	18	89.031	72.960	24.998	1.00	14.32	C
45	ATOM	88	CZ	PHE A	18	88.755	71.758	24.381	1.00	12.10	C

	ATOM	89	CE2	PHE A	18	89.291	71.476	23.144	1.00	12.87	C
	ATOM	90	CD2	PHE A	18	90.118	72.399	22.524	1.00	11.38	C
	ATOM	91	C	PHE A	18	93.467	73.352	22.046	1.00	10.19	C
	ATOM	92	O	PHE A	18	93.154	72.163	22.153	1.00	9.58	O
5	ATOM	93	N	ALA A	19	94.467	73.744	21.266	1.00	11.62	N
	ATOM	94	CA	ALA A	19	95.189	72.795	20.451	1.00	12.01	C
	ATOM	95	CB	ALA A	19	96.140	73.525	19.489	1.00	12.82	C
	ATOM	96	C	ALA A	19	95.939	71.753	21.275	1.00	11.44	C
	ATOM	97	O	ALA A	19	96.264	70.661	20.767	1.00	12.23	O
10	ATOM	98	N	ARG A	20	96.239	72.063	22.524	1.00	10.20	N
	ATOM	99	CA	ARG A	20	96.929	71.113	23.389	1.00	12.13	C
	ATOM	100	CB	ARG A	20	97.459	71.771	24.681	1.00	14.90	C
	ATOM	101	CG	ARG A	20	96.379	72.227	25.683	1.00	22.99	C
	ATOM	102	CD	ARG A	20	96.968	72.828	26.976	1.00	26.81	C
15	ATOM	103	NE	ARG A	20	97.421	71.776	27.886	1.00	36.93	N
	ATOM	104	CZ	ARG A	20	96.644	71.115	28.753	1.00	43.46	C
	ATOM	105	NH1	ARG A	20	95.347	71.380	28.870	1.00	39.73	N
	ATOM	106	NH2	ARG A	20	97.172	70.172	29.519	1.00	44.22	N
	ATOM	107	C	ARG A	20	96.045	69.954	23.780	1.00	11.42	C
20	ATOM	108	O	ARG A	20	96.552	68.960	24.302	1.00	9.84	O
	ATOM	109	N	GLU A	21	94.730	70.098	23.574	1.00	10.02	N
	ATOM	110	CA	GLU A	21	93.772	69.145	24.120	1.00	10.20	C
	ATOM	111	CB	GLU A	21	92.403	69.807	24.361	1.00	10.61	C
	ATOM	112	CG	GLU A	21	92.428	71.104	25.167	1.00	11.29	C
25	ATOM	113	CD	GLU A	21	92.854	70.952	26.607	1.00	13.95	C
	ATOM	114	OE1	GLU A	21	92.766	69.823	27.154	1.00	16.27	O
	ATOM	115	OE2	GLU A	21	93.226	71.998	27.215	1.00	14.14	O
	ATOM	116	C	GLU A	21	93.579	67.955	23.172	1.00	9.85	C
	ATOM	117	O	GLU A	21	93.870	68.044	21.988	1.00	9.19	O
30	ATOM	118	N	ALA A	22	93.096	66.848	23.730	1.00	8.78	N
	ATOM	119	CA	ALA A	22	92.593	65.712	22.987	1.00	8.73	C
	ATOM	120	CB	ALA A	22	93.543	64.520	23.099	1.00	7.76	C
	ATOM	121	C	ALA A	22	91.244	65.378	23.595	1.00	9.11	C
	ATOM	122	O	ALA A	22	91.118	65.264	24.825	1.00	8.96	O
35	ATOM	123	N	VAL A	23	90.250	65.196	22.726	1.00	9.91	N
	ATOM	124	CA	VAL A	23	88.816	65.108	23.110	1.00	9.02	C
	ATOM	125	CB	VAL A	23	87.955	66.035	22.243	1.00	7.58	C
	ATOM	126	CG1	VAL A	23	86.471	65.954	22.657	1.00	8.23	C
	ATOM	127	CG2	VAL A	23	88.484	67.474	22.301	1.00	7.05	C
40	ATOM	128	C	VAL A	23	88.236	63.700	22.987	1.00	9.21	C
	ATOM	129	O	VAL A	23	88.382	63.056	21.958	1.00	9.50	O
	ATOM	130	N	TYR A	24	87.580	63.238	24.052	1.00	9.44	N
	ATOM	131	CA	TYR A	24	86.818	61.989	24.058	1.00	8.12	C
	ATOM	132	CB	TYR A	24	87.082	61.245	25.356	1.00	7.57	C
45	ATOM	133	CG	TYR A	24	86.537	59.849	25.446	1.00	8.57	C

	ATOM	134	CD1	TYR	A	24	87.149	58.797	24.783	1.00	8.16	C
	ATOM	135	CE1	TYR	A	24	86.678	57.505	24.909	1.00	8.46	C
	ATOM	136	CZ	TYR	A	24	85.583	57.244	25.703	1.00	9.22	C
	ATOM	137	OH	TYR	A	24	85.107	55.949	25.829	1.00	9.23	O
5	ATOM	138	CE2	TYR	A	24	84.939	58.275	26.352	1.00	8.75	C
	ATOM	139	CD2	TYR	A	24	85.420	59.569	26.231	1.00	7.98	C
	ATOM	140	C	TYR	A	24	85.353	62.400	23.990	1.00	7.92	C
	ATOM	141	O	TYR	A	24	84.898	63.193	24.803	1.00	8.03	O
	ATOM	142	N	PHE	A	25	84.641	61.900	22.991	1.00	8.21	N
10	ATOM	143	CA	PHE	A	25	83.280	62.320	22.721	1.00	8.18	C
	ATOM	144	CB	PHE	A	25	83.144	62.689	21.242	1.00	8.40	C
	ATOM	145	CG	PHE	A	25	81.709	62.743	20.739	1.00	8.66	C
	ATOM	146	CD1	PHE	A	25	80.696	63.328	21.500	1.00	9.58	C
	ATOM	147	CE1	PHE	A	25	79.383	63.358	21.027	1.00	9.05	C
15	ATOM	148	CZ	PHE	A	25	79.088	62.816	19.801	1.00	8.26	C
	ATOM	149	CE2	PHE	A	25	80.084	62.252	19.045	1.00	8.37	C
	ATOM	150	CD2	PHE	A	25	81.381	62.208	19.518	1.00	8.39	C
	ATOM	151	C	PHE	A	25	82.311	61.213	23.151	1.00	8.63	C
	ATOM	152	O	PHE	A	25	82.355	60.090	22.636	1.00	8.21	O
20	ATOM	153	N	VAL	A	26	81.459	61.555	24.113	1.00	9.31	N
	ATOM	154	CA	VAL	A	26	80.425	60.653	24.615	1.00	9.72	C
	ATOM	155	CB	VAL	A	26	80.466	60.446	26.154	1.00	8.23	C
	ATOM	156	CG1	VAL	A	26	81.757	59.776	26.598	1.00	7.98	C
	ATOM	157	CG2	VAL	A	26	80.294	61.762	26.914	1.00	7.37	C
25	ATOM	158	C	VAL	A	26	79.036	61.152	24.255	1.00	11.35	C
	ATOM	159	O	VAL	A	26	78.736	62.349	24.348	1.00	10.46	O
	ATOM	160	N	MET	A	27	78.173	60.214	23.856	1.00	11.76	N
	ATOM	161	CA	MET	A	27	76.753	60.442	23.995	1.00	10.64	C
	ATOM	162	CB	MET	A	27	75.931	59.590	23.020	1.00	10.86	C
30	ATOM	163	CG	MET	A	27	76.252	59.893	21.569	1.00	11.29	C
	ATOM	164	SD	MET	A	27	74.897	59.499	20.447	1.00	15.44	S
	ATOM	165	CE	MET	A	27	73.641	60.680	20.974	1.00	12.17	C
	ATOM	166	C	MET	A	27	76.471	60.071	25.434	1.00	9.42	C
	ATOM	167	O	MET	A	27	76.507	58.884	25.808	1.00	9.40	O
35	ATOM	168	N	THR	A	28	76.180	61.084	26.247	1.00	8.45	N
	ATOM	169	CA	THR	A	28	76.110	60.889	27.690	1.00	7.76	C
	ATOM	170	CB	THR	A	28	75.717	62.188	28.370	1.00	6.89	C
	ATOM	171	OG1	THR	A	28	76.648	63.190	27.968	1.00	7.28	O
	ATOM	172	CG2	THR	A	28	75.745	62.030	29.895	1.00	6.66	C
40	ATOM	173	C	THR	A	28	75.150	59.759	28.107	1.00	7.56	C
	ATOM	174	O	THR	A	28	75.475	58.929	28.976	1.00	7.08	O
	ATOM	175	N	ASP	A	29	74.007	59.685	27.433	1.00	7.84	N
	ATOM	176	CA	ASP	A	29	72.986	58.674	27.754	1.00	7.69	C
	ATOM	177	CB	ASP	A	29	71.700	58.919	26.974	1.00	8.29	C
45	ATOM	178	CG	ASP	A	29	70.632	57.883	27.301	1.00	10.64	C

	ATOM	179	OD1	ASP	A	29	70.103	57.872	28.458	1.00	12.48	O
	ATOM	180	OD2	ASP	A	29	70.353	57.039	26.419	1.00	11.07	O
	ATOM	181	C	ASP	A	29	73.468	57.249	27.485	1.00	7.72	C
	ATOM	182	O	ASP	A	29	72.907	56.278	28.012	1.00	7.59	O
5	ATOM	183	N	ARG	A	30	74.480	57.125	26.641	1.00	7.20	N
	ATOM	184	CA	ARG	A	30	74.952	55.837	26.162	1.00	7.50	C
	ATOM	185	CB	ARG	A	30	74.920	55.807	24.630	1.00	7.56	C
	ATOM	186	CG	ARG	A	30	73.550	56.253	24.070	1.00	9.17	C
	ATOM	187	CD	ARG	A	30	72.466	55.295	24.557	1.00	8.86	C
10	ATOM	188	NE	ARG	A	30	71.119	55.514	24.018	1.00	8.92	N
	ATOM	189	CZ	ARG	A	30	70.680	55.058	22.842	1.00	9.72	C
	ATOM	190	NH1	ARG	A	30	71.499	54.428	21.991	1.00	9.20	N
	ATOM	191	NH2	ARG	A	30	69.425	55.273	22.493	1.00	9.24	N
	ATOM	192	C	ARG	A	30	76.346	55.501	26.675	1.00	7.67	C
15	ATOM	193	O	ARG	A	30	76.925	54.501	26.243	1.00	8.07	O
	ATOM	194	N	PHE	A	31	76.872	56.288	27.611	1.00	7.18	N
	ATOM	195	CA	PHE	A	31	78.207	55.982	28.186	1.00	7.41	C
	ATOM	196	CB	PHE	A	31	79.034	57.257	28.374	1.00	7.88	C
	ATOM	197	CG	PHE	A	31	80.440	57.012	28.842	1.00	6.80	C
20	ATOM	198	CD1	PHE	A	31	81.313	56.267	28.073	1.00	6.81	C
	ATOM	199	CE1	PHE	A	31	82.598	56.001	28.500	1.00	7.26	C
	ATOM	200	CZ	PHE	A	31	83.041	56.504	29.708	1.00	8.10	C
	ATOM	201	CE2	PHE	A	31	82.179	57.260	30.494	1.00	8.20	C
	ATOM	202	CD2	PHE	A	31	80.881	57.524	30.041	1.00	6.85	C
25	ATOM	203	C	PHE	A	31	78.088	55.141	29.467	1.00	7.98	C
	ATOM	204	O	PHE	A	31	78.222	53.923	29.398	1.00	8.68	O
	ATOM	205	N	VAL	A	32	77.808	55.739	30.626	1.00	8.35	N
	ATOM	206	CA	VAL	A	32	77.642	54.953	31.861	1.00	7.55	C
	ATOM	207	CB	VAL	A	32	78.937	54.908	32.728	1.00	7.27	C
30	ATOM	208	CG1	VAL	A	32	78.729	54.076	34.014	1.00	6.36	C
	ATOM	209	CG2	VAL	A	32	80.103	54.351	31.905	1.00	7.01	C
	ATOM	210	C	VAL	A	32	76.499	55.491	32.714	1.00	8.33	C
	ATOM	211	O	VAL	A	32	76.424	56.699	33.016	1.00	7.21	O
	ATOM	212	N	ASN	A	33	75.576	54.595	33.054	1.00	8.65	N
35	ATOM	213	CA	ASN	A	33	74.448	54.927	33.919	1.00	8.72	C
	ATOM	214	CB	ASN	A	33	73.284	53.940	33.699	1.00	9.37	C
	ATOM	215	CG	ASN	A	33	72.068	54.236	34.577	1.00	10.57	C
	ATOM	216	OD1	ASN	A	33	72.071	55.169	35.402	1.00	11.90	O
	ATOM	217	ND2	ASN	A	33	71.015	53.471	34.380	1.00	8.33	N
40	ATOM	218	C	ASN	A	33	74.994	54.804	35.329	1.00	9.69	C
	ATOM	219	O	ASN	A	33	75.061	53.712	35.860	1.00	7.47	O
	ATOM	220	N	GLY	A	34	75.395	55.918	35.931	1.00	9.95	N
	ATOM	221	CA	GLY	A	34	75.913	55.884	37.292	1.00	12.12	C
	ATOM	222	C	GLY	A	34	74.819	55.969	38.343	1.00	12.68	C
45	ATOM	223	O	GLY	A	34	75.054	55.654	39.478	1.00	10.41	O

	ATOM	224	N	ASP	A	35	73.620	56.380	37.960	1.00	11.76	N
	ATOM	225	CA	ASP	A	35	72.556	56.583	38.916	1.00	10.54	C
	ATOM	226	CB	ASP	A	35	72.474	58.078	39.257	1.00	11.10	C
	ATOM	227	CG	ASP	A	35	71.409	58.396	40.311	1.00	14.76	C
5	ATOM	228	OD1	ASP	A	35	70.843	57.458	40.896	1.00	13.11	O
	ATOM	229	OD2	ASP	A	35	71.154	59.593	40.547	1.00	15.92	O
	ATOM	230	C	ASP	A	35	71.232	56.072	38.323	1.00	10.65	C
	ATOM	231	O	ASP	A	35	70.640	56.733	37.500	1.00	8.08	O
	ATOM	232	N	PRO	A	36	70.756	54.890	38.748	1.00	12.71	N
10	ATOM	233	CA	PRO	A	36	69.449	54.454	38.202	1.00	12.84	C
	ATOM	234	CB	PRO	A	36	69.282	53.022	38.723	1.00	16.77	C
	ATOM	235	CG	PRO	A	36	70.570	52.639	39.374	1.00	17.55	C
	ATOM	236	CD	PRO	A	36	71.444	53.846	39.530	1.00	14.77	C
	ATOM	237	C	PRO	A	36	68.282	55.318	38.641	1.00	10.21	C
15	ATOM	238	O	PRO	A	36	67.231	55.293	38.015	1.00	11.01	O
	ATOM	239	N	GLY	A	37	68.469	56.107	39.684	1.00	9.71	N
	ATOM	240	CA	GLY	A	37	67.371	56.865	40.274	1.00	9.82	C
	ATOM	241	C	GLY	A	37	66.935	58.041	39.421	1.00	10.34	C
	ATOM	242	O	GLY	A	37	65.861	58.577	39.623	1.00	9.92	O
20	ATOM	243	N	ASN	A	38	67.738	58.444	38.436	1.00	10.06	N
	ATOM	244	CA	ASN	A	38	67.296	59.500	37.503	1.00	9.39	C
	ATOM	245	CB	ASN	A	38	68.383	60.581	37.382	1.00	8.58	C
	ATOM	246	CG	ASN	A	38	69.672	60.042	36.769	1.00	8.41	C
	ATOM	247	OD1	ASN	A	38	69.678	58.989	36.141	1.00	8.21	O
25	ATOM	248	ND2	ASN	A	38	70.773	60.744	36.986	1.00	8.14	N
	ATOM	249	C	ASN	A	38	66.887	58.982	36.090	1.00	10.78	C
	ATOM	250	O	ASN	A	38	66.684	59.784	35.143	1.00	9.29	O
	ATOM	251	N	ASP	A	39	66.742	57.667	35.940	1.00	9.62	N
	ATOM	252	CA	ASP	A	39	66.450	57.084	34.619	1.00	9.27	C
30	ATOM	253	CB	ASP	A	39	66.578	55.568	34.681	1.00	10.46	C
	ATOM	254	CG	ASP	A	39	68.017	55.098	34.786	1.00	10.85	C
	ATOM	255	OD1	ASP	A	39	68.998	55.898	34.764	1.00	10.52	O
	ATOM	256	OD2	ASP	A	39	68.157	53.880	34.883	1.00	12.39	O
	ATOM	257	C	ASP	A	39	65.060	57.445	34.072	1.00	9.97	C
35	ATOM	258	O	ASP	A	39	64.848	57.441	32.873	1.00	8.89	O
	ATOM	259	N	HIS	A	40	64.102	57.714	34.963	1.00	11.07	N
	ATOM	260	CA	HIS	A	40	62.726	58.040	34.569	1.00	9.48	C
	ATOM	261	CB	HIS	A	40	62.674	59.424	33.915	1.00	9.93	C
	ATOM	262	CG	HIS	A	40	62.912	60.562	34.887	1.00	10.71	C
40	ATOM	263	ND1	HIS	A	40	64.149	60.898	35.329	1.00	10.36	N
	ATOM	264	CE1	HIS	A	40	64.046	61.924	36.211	1.00	9.83	C
	ATOM	265	NE2	HIS	A	40	62.757	62.248	36.321	1.00	11.22	N
	ATOM	266	CD2	HIS	A	40	62.023	61.440	35.508	1.00	10.32	C
	ATOM	267	C	HIS	A	40	62.167	56.971	33.674	1.00	10.33	C
45	ATOM	268	O	HIS	A	40	61.626	57.254	32.609	1.00	8.28	O

	ATOM	269	N	ARG	A	41	62.288	55.710	34.093	1.00	10.34		N
	ATOM	270	CA	ARG	A	41	61.934	54.575	33.212	1.00	12.39		C
	ATOM	271	CB	ARG	A	41	62.300	53.217	33.861	1.00	16.40		C
	ATOM	272	CG	ARG	A	41	63.811	53.020	33.956	1.00	23.60		C
5	ATOM	273	CD	ARG	A	41	64.263	51.753	34.702	1.00	25.64		C
	ATOM	274	NE	ARG	A	41	65.733	51.754	34.724	1.00	30.83		N
	ATOM	275	CZ	ARG	A	41	66.530	50.916	34.052	1.00	39.84		C
	ATOM	276	NH1	ARG	A	41	66.027	49.918	33.323	1.00	35.55		N
	ATOM	277	NH2	ARG	A	41	67.858	51.068	34.119	1.00	31.93		N
10	ATOM	278	C	ARG	A	41	60.477	54.561	32.763	1.00	11.82		C
	ATOM	279	O	ARG	A	41	60.201	54.121	31.680	1.00	13.51		O
	ATOM	280	N	ASP	A	42	59.542	55.067	33.555	1.00	11.44		N
	ATOM	281	CA	ASP	A	42	58.147	55.034	33.123	1.00	13.15		C
	ATOM	282	CB	ASP	A	42	57.222	54.616	34.279	1.00	17.56		C
15	ATOM	283	CG	ASP	A	42	57.116	55.666	35.367	1.00	24.61		C
	ATOM	284	OD1	ASP	A	42	57.542	56.815	35.146	1.00	34.56		O
	ATOM	285	OD2	ASP	A	42	56.594	55.351	36.461	1.00	34.16		O
	ATOM	286	C	ASP	A	42	57.673	56.351	32.473	1.00	11.61		C
	ATOM	287	O	ASP	A	42	56.514	56.487	32.134	1.00	10.98		O
20	ATOM	288	N	GLN	A	43	58.574	57.301	32.280	1.00	11.71		N
	ATOM	289	CA	GLN	A	43	58.196	58.624	31.763	1.00	11.62		C
	ATOM	290	CB	GLN	A	43	59.440	59.508	31.675	1.00	12.35		C
	ATOM	291	CG	GLN	A	43	59.251	60.838	30.952	1.00	11.65		C
	ATOM	292	CD	GLN	A	43	60.564	61.586	30.802	1.00	8.67		C
25	ATOM	293	OE1	GLN	A	43	61.348	61.308	29.880	1.00	8.21		O
	ATOM	294	NE2	GLN	A	43	60.802	62.545	31.689	1.00	6.92		N
	ATOM	295	C	GLN	A	43	57.516	58.486	30.397	1.00	12.63		C
	ATOM	296	O	GLN	A	43	58.061	57.837	29.496	1.00	10.97		O
	ATOM	297	N	GLY	A	44	56.318	59.075	30.268	1.00	12.17		N
30	ATOM	298	CA	GLY	A	44	55.587	59.090	29.005	1.00	11.64		C
	ATOM	299	C	GLY	A	44	54.684	57.890	28.717	1.00	12.56		C
	ATOM	300	O	GLY	A	44	53.997	57.886	27.708	1.00	11.13		O
	ATOM	301	N	GLY	A	45	54.715	56.854	29.551	1.00	12.20		N
	ATOM	302	CA	GLY	A	45	53.802	55.703	29.382	1.00	13.62		C
35	ATOM	303	C	GLY	A	45	54.015	54.996	28.038	1.00	14.01		C
	ATOM	304	O	GLY	A	45	55.151	54.639	27.681	1.00	12.57		O
	ATOM	305	N	ALA	A	46	52.926	54.811	27.288	1.00	11.00		N
	ATOM	306	CA	ALA	A	46	52.977	54.192	25.952	1.00	11.74		C
	ATOM	307	CB	ALA	A	46	51.547	53.981	25.439	1.00	10.90		C
40	ATOM	308	C	ALA	A	46	53.770	55.097	24.988	1.00	11.26		C
	ATOM	309	O	ALA	A	46	54.331	54.640	24.005	1.00	11.81		O
	ATOM	310	N	LEU	A	47	53.824	56.392	25.272	1.00	10.12		N
	ATOM	311	CA	LEU	A	47	54.630	57.313	24.452	1.00	12.21		C
	ATOM	312	CB	LEU	A	47	53.886	58.641	24.261	1.00	12.67		C
45	ATOM	313	CG	LEU	A	47	52.528	58.507	23.558	1.00	13.74		C

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	ATOM	314	CD1	LEU	A	47	51.905	59.883	23.411	1.00 13.95	C
	ATOM	315	CD2	LEU	A	47	52.682	57.807	22.212	1.00 12.69	C
	ATOM	316	C	LEU	A	47	55.969	57.543	25.174	1.00 10.46	C
	ATOM	317	O	LEU	A	47	56.521	58.632	25.164	1.00 11.30	O
5	ATOM	318	N	GLY	A	48	56.486	56.483	25.768	1.00 9.33	N
	ATOM	319	CA	GLY	A	48	57.547	56.588	26.747	1.00 11.14	C
	ATOM	320	C	GLY	A	48	58.881	56.922	26.102	1.00 10.67	C
	ATOM	321	O	GLY	A	48	59.114	56.625	24.932	1.00 11.69	O
	ATOM	322	N	THR	A	49	59.762	57.496	26.897	1.00 10.50	N
10	ATOM	323	CA	THR	A	49	61.084	57.895	26.435	1.00 9.90	C
	ATOM	324	CB	THR	A	49	61.455	59.229	27.095	1.00 10.00	C
	ATOM	325	OG1	THR	A	49	61.221	59.107	28.511	1.00 8.33	O
	ATOM	326	CG2	THR	A	49	60.615	60.392	26.512	1.00 8.41	C
	ATOM	327	C	THR	A	49	62.195	56.905	26.755	1.00 9.60	C
15	ATOM	328	O	THR	A	49	63.308	57.005	26.175	1.00 8.74	O
	ATOM	329	N	PHE	A	50	61.928	55.943	27.648	1.00 10.00	N
	ATOM	330	CA	PHE	A	50	62.978	55.023	28.067	1.00 9.04	C
	ATOM	331	CB	PHE	A	50	62.885	54.707	29.539	1.00 9.49	C
	ATOM	332	CG	PHE	A	50	64.168	54.168	30.125	1.00 9.26	C
20	ATOM	333	CD1	PHE	A	50	65.170	55.033	30.544	1.00 9.95	C
	ATOM	334	CE1	PHE	A	50	66.358	54.539	31.079	1.00 11.12	C
	ATOM	335	CZ	PHE	A	50	66.560	53.171	31.188	1.00 11.10	C
	ATOM	336	CE2	PHE	A	50	65.555	52.291	30.788	1.00 10.93	C
	ATOM	337	CD2	PHE	A	50	64.365	52.799	30.262	1.00 9.67	C
25	ATOM	338	C	PHE	A	50	62.988	53.733	27.267	1.00 10.78	C
	ATOM	339	O	PHE	A	50	61.946	53.116	27.105	1.00 11.80	O
	ATOM	340	N	ASP	A	51	64.188	53.345	26.794	1.00 11.49	N
	ATOM	341	CA	ASP	A	51	64.482	52.029	26.166	1.00 9.54	C
	ATOM	342	CB	ASP	A	51	64.505	50.962	27.220	1.00 10.45	C
30	ATOM	343	CG	ASP	A	51	65.172	49.689	26.753	1.00 11.12	C
	ATOM	344	OD1	ASP	A	51	65.426	49.481	25.545	1.00 9.80	O
	ATOM	345	OD2	ASP	A	51	65.442	48.873	27.633	1.00 15.31	O
	ATOM	346	C	ASP	A	51	63.502	51.637	25.083	1.00 9.86	C
	ATOM	347	O	ASP	A	51	62.473	50.997	25.354	1.00 8.71	O
35	ATOM	348	N	ILE	A	52	63.813	52.053	23.857	1.00 9.39	N
	ATOM	349	CA	ILE	A	52	62.968	51.829	22.697	1.00 8.39	C
	ATOM	350	CB	ILE	A	52	62.484	53.158	22.073	1.00 8.12	C
	ATOM	351	CG1	ILE	A	52	61.810	54.041	23.133	1.00 7.93	C
	ATOM	352	CD1	ILE	A	52	61.567	55.486	22.695	1.00 7.27	C
40	ATOM	353	CG2	ILE	A	52	61.508	52.888	20.905	1.00 6.95	C
	ATOM	354	C	ILE	A	52	63.794	51.030	21.687	1.00 9.20	C
	ATOM	355	O	ILE	A	52	64.460	51.606	20.843	1.00 9.82	O
	ATOM	356	N	PRO	A	53	63.784	49.695	21.798	1.00 10.75	N
	ATOM	357	CA	PRO	A	53	64.610	48.880	20.916	1.00 10.80	C
45	ATOM	358	CB	PRO	A	53	64.512	47.459	21.507	1.00 12.29	C

	ATOM	359	CG	PRO	A	53	63.856	47.608	22.821	1.00	13.76	C
	ATOM	360	CD	PRO	A	53	63.093	48.894	22.826	1.00	12.07	C
	ATOM	361	C	PRO	A	53	64.082	48.862	19.505	1.00	11.93	C
	ATOM	362	O	PRO	A	53	62.878	48.866	19.303	1.00	11.09	O
5	ATOM	363	N	LEU	A	54	64.994	48.848	18.547	1.00	12.47	N
	ATOM	364	CA	LEU	A	54	64.671	48.619	17.170	1.00	12.45	C
	ATOM	365	CB	LEU	A	54	65.573	49.462	16.269	1.00	12.54	C
	ATOM	366	CG	LEU	A	54	65.460	50.972	16.440	1.00	13.96	C
	ATOM	367	CD1	LEU	A	54	66.534	51.671	15.601	1.00	14.06	C
10	ATOM	368	CD2	LEU	A	54	64.060	51.454	16.088	1.00	13.08	C
	ATOM	369	C	LEU	A	54	64.845	47.136	16.800	1.00	12.65	C
	ATOM	370	O	LEU	A	54	65.644	46.391	17.425	1.00	11.14	O
	ATOM	371	N	PRO	A	55	64.127	46.705	15.759	1.00	12.63	N
	ATOM	372	CA	PRO	A	55	64.404	45.388	15.169	1.00	14.57	C
15	ATOM	373	CB	PRO	A	55	63.486	45.354	13.942	1.00	15.45	C
	ATOM	374	CG	PRO	A	55	62.385	46.338	14.259	1.00	14.72	C
	ATOM	375	CD	PRO	A	55	63.024	47.410	15.082	1.00	12.19	C
	ATOM	376	C	PRO	A	55	65.885	45.260	14.757	1.00	14.76	C
	ATOM	377	O	PRO	A	55	66.444	46.208	14.243	1.00	12.76	O
20	ATOM	378	N	PRO	A	56	66.517	44.102	15.003	1.00	15.11	N
	ATOM	379	CA	PRO	A	56	67.954	44.066	14.773	1.00	16.52	C
	ATOM	380	CB	PRO	A	56	68.372	42.661	15.226	1.00	17.32	C
	ATOM	381	CG	PRO	A	56	67.112	41.852	15.270	1.00	18.80	C
	ATOM	382	CD	PRO	A	56	66.007	42.830	15.546	1.00	16.27	C
25	ATOM	383	C	PRO	A	56	68.319	44.262	13.325	1.00	17.80	C
	ATOM	384	O	PRO	A	56	67.532	43.962	12.439	1.00	14.03	O
	ATOM	385	N	CYS	A	57	69.523	44.766	13.115	1.00	19.16	N
	ATOM	386	CA	CYS	A	57	70.044	45.023	11.791	1.00	22.01	C
	ATOM	387	CB	CYS	A	57	70.167	46.535	11.580	1.00	34.43	C
30	ATOM	388	SG	CYS	A	57	71.206	46.936	10.171	1.00	49.84	S
	ATOM	389	C	CYS	A	57	71.403	44.343	11.723	1.00	17.97	C
	ATOM	390	O	CYS	A	57	72.285	44.641	12.518	1.00	13.58	O
	ATOM	391	N	ASN	A	58	71.550	43.373	10.827	1.00	17.43	N
	ATOM	392	CA	ASN	A	58	72.755	42.529	10.790	1.00	18.31	C
35	ATOM	393	CB	ASN	A	58	73.898	43.266	10.086	1.00	22.78	C
	ATOM	394	CG	ASN	A	58	73.557	43.599	8.649	1.00	25.97	C
	ATOM	395	OD1	ASN	A	58	73.669	44.746	8.215	1.00	30.21	O
	ATOM	396	ND2	ASN	A	58	73.099	42.603	7.918	1.00	26.44	N
	ATOM	397	C	ASN	A	58	73.215	42.063	12.158	1.00	16.62	C
40	ATOM	398	O	ASN	A	58	74.391	42.180	12.515	1.00	13.20	O
	ATOM	399	N	GLY	A	59	72.272	41.559	12.939	1.00	16.73	N
	ATOM	400	CA	GLY	A	59	72.592	40.921	14.213	1.00	16.76	C
	ATOM	401	C	GLY	A	59	72.719	41.825	15.429	1.00	15.94	C
	ATOM	402	O	GLY	A	59	72.911	41.331	16.529	1.00	15.63	O
45	ATOM	403	N	VAL	A	60	72.580	43.136	15.258	1.00	15.07	N

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     ATOM    404  CA   VAL A  60       72.674  44.055  16.381  1.00 14.25           C
     ATOM    405  CB   VAL A  60       73.967  44.916  16.310  1.00 16.22           C
     ATOM    406  CG1  VAL A  60       73.908  46.018  17.356  1.00 14.41           C
     ATOM    407  CG2  VAL A  60       75.210  44.056  16.532  1.00 13.03           C
  5  ATOM    408  C    VAL A  60       71.445  44.963  16.403  1.00 14.55           C
     ATOM    409  O    VAL A  60       71.011  45.468  15.372  1.00 15.71           O
     ATOM    410  N    SER A  61       70.875  45.149  17.580  1.00 13.04           N
     ATOM    411  CA   SER A  61       69.716  46.022  17.760  1.00 13.92           C
     ATOM    412  CB   SER A  61       68.715  45.358  18.735  1.00 16.79           C
 10  ATOM    413  OG   SER A  61       67.721  46.284  19.166  1.00 22.16           O
     ATOM    414  C    SER A  61       70.151  47.382  18.292  1.00 12.07           C
     ATOM    415  O    SER A  61       70.854  47.471  19.298  1.00 13.14           O
     ATOM    416  N    GLY A  62       69.776  48.442  17.593  1.00 11.47           N
     ATOM    417  CA   GLY A  62       69.943  49.791  18.112  1.00 11.67           C
 15  ATOM    418  C    GLY A  62       68.742  50.194  18.946  1.00 10.60           C
     ATOM    419  O    GLY A  62       67.814  49.418  19.111  1.00  9.27           O
     ATOM    420  N    ASN A  63       68.758  51.426  19.444  1.00  9.89           N
     ATOM    421  CA   ASN A  63       67.763  51.889  20.416  1.00 10.25           C
     ATOM    422  CB   ASN A  63       68.261  51.617  21.847  1.00  9.76           C
 20  ATOM    423  CG   ASN A  63       67.137  51.549  22.862  1.00  9.92           C
     ATOM    424  OD1  ASN A  63       66.575  52.579  23.252  1.00  8.35           O
     ATOM    425  ND2  ASN A  63       66.820  50.336  23.321  1.00  9.25           N
     ATOM    426  C    ASN A  63       67.569  53.377  20.166  1.00  9.97           C
     ATOM    427  O    ASN A  63       68.551  54.092  19.875  1.00 10.00           O
 25  ATOM    428  N    ILE A  64       66.319  53.827  20.236  1.00  8.58           N
     ATOM    429  CA   ILE A  64       65.974  55.225  20.019  1.00  8.85           C
     ATOM    430  CB   ILE A  64       65.096  55.422  18.747  1.00  9.33           C
     ATOM    431  CG1  ILE A  64       63.729  54.746  18.825  1.00 10.39           C
     ATOM    432  CD1  ILE A  64       62.865  54.975  17.570  1.00  9.04           C
 30  ATOM    433  CG2  ILE A  64       65.862  54.919  17.522  1.00  8.98           C
     ATOM    434  C    ILE A  64       65.391  55.904  21.267  1.00  9.04           C
     ATOM    435  O    ILE A  64       64.819  56.989  21.184  1.00 10.11           O
     ATOM    436  N    GLY A  65       65.573  55.292  22.432  1.00  8.54           N
     ATOM    437  CA   GLY A  65       65.170  55.915  23.699  1.00  7.46           C
 35  ATOM    438  C    GLY A  65       66.325  56.136  24.643  1.00  7.13           C
     ATOM    439  O    GLY A  65       67.495  55.830  24.319  1.00  7.21           O
     ATOM    440  N    TYR A  66       66.021  56.671  25.821  1.00  6.49           N
     ATOM    441  CA   TYR A  66       67.043  56.821  26.835  1.00  7.42           C
     ATOM    442  CB   TYR A  66       66.581  57.694  28.007  1.00  7.97           C
 40  ATOM    443  CG   TYR A  66       66.436  59.182  27.744  1.00  6.94           C
     ATOM    444  CD1  TYR A  66       65.335  59.679  27.102  1.00  6.70           C
     ATOM    445  CE1  TYR A  66       65.178  61.059  26.898  1.00  7.52           C
     ATOM    446  CZ   TYR A  66       66.122  61.950  27.381  1.00  6.30           C
     ATOM    447  OH   TYR A  66       65.950  63.298  27.236  1.00  6.38           O
 45  ATOM    448  CE2  TYR A  66       67.223  61.456  28.041  1.00  7.41           C
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	ATOM	449	CD2	TYR	A	66	67.368	60.086	28.234	1.00	6.55	C
	ATOM	450	C	TYR	A	66	67.399	55.426	27.379	1.00	8.28	C
	ATOM	451	O	TYR	A	66	66.519	54.538	27.553	1.00	7.15	O
	ATOM	452	N	LEU	A	67	68.694	55.243	27.633	1.00	8.66	N
5	ATOM	453	CA	LEU	A	67	69.190	54.027	28.261	1.00	8.10	C
	ATOM	454	CB	LEU	A	67	70.163	53.308	27.319	1.00	8.12	C
	ATOM	455	CG	LEU	A	67	69.433	52.587	26.158	1.00	7.40	C
	ATOM	456	CD1	LEU	A	67	70.429	51.912	25.188	1.00	7.21	C
	ATOM	457	CD2	LEU	A	67	68.402	51.600	26.727	1.00	7.16	C
10	ATOM	458	C	LEU	A	67	69.798	54.262	29.648	1.00	8.35	C
	ATOM	459	O	LEU	A	67	70.173	53.306	30.298	1.00	7.99	O
	ATOM	460	N	GLY	A	68	69.866	55.523	30.100	1.00	8.46	N
	ATOM	461	CA	GLY	A	68	70.217	55.844	31.489	1.00	7.95	C
	ATOM	462	C	GLY	A	68	71.595	56.416	31.776	1.00	7.86	C
15	ATOM	463	O	GLY	A	68	71.880	56.765	32.907	1.00	8.36	O
	ATOM	464	N	GLY	A	69	72.449	56.556	30.762	1.00	8.50	N
	ATOM	465	CA	GLY	A	69	73.783	57.136	30.956	1.00	7.95	C
	ATOM	466	C	GLY	A	69	73.696	58.565	31.448	1.00	7.55	C
	ATOM	467	O	GLY	A	69	72.831	59.314	31.024	1.00	6.85	O
20	ATOM	468	N	ASP	A	70	74.560	58.951	32.381	1.00	8.04	N
	ATOM	469	CA	ASP	A	70	74.328	60.212	33.078	1.00	8.48	C
	ATOM	470	CB	ASP	A	70	73.298	59.999	34.195	1.00	8.88	C
	ATOM	471	CG	ASP	A	70	73.687	58.869	35.150	1.00	9.84	C
	ATOM	472	OD1	ASP	A	70	74.914	58.609	35.274	1.00	10.67	O
25	ATOM	473	OD2	ASP	A	70	72.767	58.255	35.746	1.00	10.62	O
	ATOM	474	C	ASP	A	70	75.608	60.877	33.573	1.00	8.59	C
	ATOM	475	O	ASP	A	70	76.697	60.358	33.358	1.00	9.98	O
	ATOM	476	N	PHE	A	71	75.468	62.048	34.196	1.00	9.01	N
	ATOM	477	CA	PHE	A	71	76.618	62.807	34.697	1.00	8.64	C
30	ATOM	478	CB	PHE	A	71	76.196	64.118	35.348	1.00	9.16	C
	ATOM	479	CG	PHE	A	71	75.640	65.159	34.390	1.00	9.25	C
	ATOM	480	CD1	PHE	A	71	75.812	65.069	33.015	1.00	9.79	C
	ATOM	481	CE1	PHE	A	71	75.301	66.058	32.177	1.00	9.12	C
	ATOM	482	CZ	PHE	A	71	74.639	67.157	32.703	1.00	8.06	C
35	ATOM	483	CE2	PHE	A	71	74.461	67.253	34.052	1.00	9.63	C
	ATOM	484	CD2	PHE	A	71	74.976	66.272	34.892	1.00	9.71	C
	ATOM	485	C	PHE	A	71	77.398	62.007	35.712	1.00	9.92	C
	ATOM	486	O	PHE	A	71	78.632	61.988	35.653	1.00	10.26	O
	ATOM	487	N	LYS	A	72	76.689	61.323	36.626	1.00	9.44	N
40	ATOM	488	CA	LYS	A	72	77.370	60.524	37.645	1.00	10.90	C
	ATOM	489	CB	LYS	A	72	76.330	59.961	38.599	1.00	15.21	C
	ATOM	490	CG	LYS	A	72	76.803	58.855	39.519	1.00	20.58	C
	ATOM	491	CD	LYS	A	72	77.341	59.372	40.807	1.00	24.80	C
	ATOM	492	CE	LYS	A	72	77.427	58.245	41.827	1.00	27.45	C
45	ATOM	493	NZ	LYS	A	72	78.820	58.284	42.294	1.00	25.67	N

	ATOM	494	C	LYS	A	72	78.238	59.404	37.059	1.00 10.76	C
	ATOM	495	O	LYS	A	72	79.369	59.207	37.494	1.00 9.54	O
	ATOM	496	N	GLY	A	73	77.691	58.657	36.106	1.00 9.89	N
	ATOM	497	CA	GLY	A	73	78.440	57.596	35.443	1.00 9.50	C
5	ATOM	498	C	GLY	A	73	79.681	58.114	34.737	1.00 9.49	C
	ATOM	499	O	GLY	A	73	80.728	57.472	34.757	1.00 8.42	O
	ATOM	500	N	LEU	A	74	79.564	59.289	34.124	1.00 10.36	N
	ATOM	501	CA	LEU	A	74	80.691	59.910	33.426	1.00 9.14	C
	ATOM	502	CB	LEU	A	74	80.226	61.090	32.554	1.00 8.52	C
10	ATOM	503	CG	LEU	A	74	81.304	61.914	31.834	1.00 8.84	C
	ATOM	504	CD1	LEU	A	74	82.273	61.059	30.977	1.00 10.65	C
	ATOM	505	CD2	LEU	A	74	80.677	63.028	31.000	1.00 7.62	C
	ATOM	506	C	LEU	A	74	81.753	60.353	34.452	1.00 9.81	C
	ATOM	507	O	LEU	A	74	82.950	60.059	34.283	1.00 8.81	O
15	ATOM	508	N	ALA	A	75	81.315	61.047	35.501	1.00 8.68	N
	ATOM	509	CA	ALA	A	75	82.230	61.568	36.539	1.00 9.78	C
	ATOM	510	CB	ALA	A	75	81.462	62.294	37.655	1.00 8.66	C
	ATOM	511	C	ALA	A	75	83.005	60.398	37.138	1.00 10.79	C
	ATOM	512	O	ALA	A	75	84.224	60.477	37.292	1.00 12.06	O
20	ATOM	513	N	ASP	A	76	82.295	59.319	37.460	1.00 9.31	N
	ATOM	514	CA	ASP	A	76	82.917	58.134	38.053	1.00 11.46	C
	ATOM	515	CB	ASP	A	76	81.867	57.057	38.344	1.00 12.69	C
	ATOM	516	CG	ASP	A	76	80.948	57.397	39.502	1.00 15.11	C
	ATOM	517	OD1	ASP	A	76	81.246	58.296	40.316	1.00 15.40	O
25	ATOM	518	OD2	ASP	A	76	79.902	56.730	39.565	1.00 19.57	O
	ATOM	519	C	ASP	A	76	83.932	57.471	37.139	1.00 10.81	C
	ATOM	520	O	ASP	A	76	84.696	56.641	37.581	1.00 10.99	O
	ATOM	521	N	HIS	A	77	83.950	57.785	35.852	1.00 10.46	N
	ATOM	522	CA	HIS	A	77	84.919	57.111	34.953	1.00 10.51	C
30	ATOM	523	CB	HIS	A	77	84.161	56.175	34.016	1.00 10.91	C
	ATOM	524	CG	HIS	A	77	83.519	55.052	34.756	1.00 12.17	C
	ATOM	525	ND1	HIS	A	77	82.228	55.079	35.129	1.00 13.06	N
	ATOM	526	CE1	HIS	A	77	81.952	53.975	35.854	1.00 14.09	C
	ATOM	527	NE2	HIS	A	77	83.088	53.264	35.982	1.00 15.67	N
35	ATOM	528	CD2	HIS	A	77	84.074	53.902	35.333	1.00 12.48	C
	ATOM	529	C	HIS	A	77	85.838	58.059	34.234	1.00 11.61	C
	ATOM	530	O	HIS	A	77	86.426	57.730	33.199	1.00 12.44	O
	ATOM	531	N	LEU	A	78	86.016	59.246	34.799	1.00 10.69	N
	ATOM	532	CA	LEU	A	78	86.935	60.197	34.188	1.00 9.80	C
40	ATOM	533	CB	LEU	A	78	86.851	61.569	34.859	1.00 9.78	C
	ATOM	534	CG	LEU	A	78	85.520	62.289	34.728	1.00 10.17	C
	ATOM	535	CD1	LEU	A	78	85.455	63.491	35.658	1.00 9.98	C
	ATOM	536	CD2	LEU	A	78	85.365	62.704	33.278	1.00 8.35	C
	ATOM	537	C	LEU	A	78	88.364	59.670	34.247	1.00 10.80	C
45	ATOM	538	O	LEU	A	78	89.158	59.972	33.350	1.00 10.68	O

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	ATOM	539	N	ASP A	79	88.713	58.887	35.270	1.00	10.17	N
	ATOM	540	CA	ASP A	79	90.067	58.320	35.338	1.00	12.18	C
	ATOM	541	CB	ASP A	79	90.345	57.628	36.685	1.00	14.77	C
	ATOM	542	CG	ASP A	79	90.595	58.635	37.808	1.00	22.62	C
5	ATOM	543	OD1	ASP A	79	90.902	59.821	37.522	1.00	28.51	O
	ATOM	544	OD2	ASP A	79	90.482	58.245	38.983	1.00	32.76	O
	ATOM	545	C	ASP A	79	90.340	57.361	34.192	1.00	10.54	C
	ATOM	546	O	ASP A	79	91.427	57.349	33.605	1.00	10.10	O
	ATOM	547	N	TYR A	80	89.347	56.575	33.855	1.00	10.50	N
10	ATOM	548	CA	TYR A	80	89.452	55.668	32.692	1.00	11.17	C
	ATOM	549	CB	TYR A	80	88.166	54.852	32.567	1.00	10.47	C
	ATOM	550	CG	TYR A	80	87.945	54.222	31.208	1.00	11.09	C
	ATOM	551	CD1	TYR A	80	88.549	53.031	30.883	1.00	11.31	C
	ATOM	552	CE1	TYR A	80	88.364	52.447	29.656	1.00	12.06	C
15	ATOM	553	CZ	TYR A	80	87.562	53.035	28.731	1.00	11.32	C
	ATOM	554	OH	TYR A	80	87.380	52.400	27.529	1.00	11.71	O
	ATOM	555	CE2	TYR A	80	86.925	54.228	29.017	1.00	10.47	C
	ATOM	556	CD2	TYR A	80	87.129	54.818	30.258	1.00	11.11	C
	ATOM	557	C	TYR A	80	89.710	56.437	31.378	1.00	11.71	C
20	ATOM	558	O	TYR A	80	90.493	55.992	30.521	1.00	10.23	O
	ATOM	559	N	ILE A	81	89.050	57.591	31.239	1.00	10.10	N
	ATOM	560	CA	ILE A	81	89.204	58.453	30.060	1.00	9.52	C
	ATOM	561	CB	ILE A	81	88.086	59.520	30.024	1.00	9.50	C
	ATOM	562	CG1	ILE A	81	86.723	58.866	29.806	1.00	9.90	C
25	ATOM	563	CD1	ILE A	81	85.527	59.795	29.987	1.00	9.62	C
	ATOM	564	CG2	ILE A	81	88.340	60.546	28.933	1.00	8.47	C
	ATOM	565	C	ILE A	81	90.590	59.136	30.063	1.00	10.89	C
	ATOM	566	O	ILE A	81	91.333	59.084	29.088	1.00	10.33	O
	ATOM	567	N	ARG A	82	90.929	59.776	31.173	1.00	11.96	N
30	ATOM	568	CA	ARG A	82	92.170	60.502	31.289	1.00	13.12	C
	ATOM	569	CB	ARG A	82	92.257	61.192	32.643	1.00	17.16	C
	ATOM	570	CG	ARG A	82	93.471	62.089	32.809	1.00	24.97	C
	ATOM	571	CD	ARG A	82	93.534	62.787	34.154	1.00	33.12	C
	ATOM	572	NE	ARG A	82	93.284	61.889	35.292	1.00	40.22	N
35	ATOM	573	CZ	ARG A	82	93.544	62.195	36.564	1.00	40.67	C
	ATOM	574	NH1	ARG A	82	94.097	63.360	36.887	1.00	36.36	N
	ATOM	575	NH2	ARG A	82	93.271	61.314	37.516	1.00	41.45	N
	ATOM	576	C	ARG A	82	93.379	59.596	31.105	1.00	13.92	C
	ATOM	577	O	ARG A	82	94.382	60.037	30.557	1.00	11.59	O
40	ATOM	578	N	GLU A	83	93.318	58.352	31.576	1.00	13.09	N
	ATOM	579	CA	GLU A	83	94.507	57.495	31.470	1.00	16.54	C
	ATOM	580	CB	GLU A	83	94.453	56.324	32.449	1.00	21.64	C
	ATOM	581	CG	GLU A	83	93.624	55.146	32.035	1.00	28.98	C
	ATOM	582	CD	GLU A	83	93.406	54.136	33.176	1.00	34.23	C
45	ATOM	583	OE1	GLU A	83	93.801	54.398	34.331	1.00	36.99	O

	ATOM	584	OE2	GLU	A	83	92.799	53.078	32.914	1.00	31.15	O
	ATOM	585	C	GLU	A	83	94.801	57.059	30.028	1.00	14.04	C
	ATOM	586	O	GLU	A	83	95.934	56.677	29.720	1.00	11.54	O
	ATOM	587	N	MET	A	84	93.812	57.172	29.129	1.00	11.61	N
5	ATOM	588	CA	MET	A	84	94.061	56.954	27.693	1.00	12.16	C
	ATOM	589	CB	MET	A	84	92.760	56.693	26.932	1.00	10.60	C
	ATOM	590	CG	MET	A	84	92.128	55.398	27.359	1.00	10.96	C
	ATOM	591	SD	MET	A	84	90.704	54.942	26.397	1.00	11.99	S
	ATOM	592	CE	MET	A	84	89.468	55.997	27.179	1.00	10.41	C
10	ATOM	593	C	MET	A	84	94.789	58.118	27.030	1.00	11.00	C
	ATOM	594	O	MET	A	84	95.168	58.008	25.879	1.00	13.79	O
	ATOM	595	N	GLY	A	85	94.904	59.242	27.730	1.00	11.45	N
	ATOM	596	CA	GLY	A	85	95.580	60.440	27.215	1.00	11.01	C
	ATOM	597	C	GLY	A	85	94.653	61.562	26.751	1.00	10.97	C
15	ATOM	598	O	GLY	A	85	95.111	62.560	26.179	1.00	11.10	O
	ATOM	599	N	PHE	A	86	93.355	61.435	27.030	1.00	10.66	N
	ATOM	600	CA	PHE	A	86	92.405	62.508	26.710	1.00	9.23	C
	ATOM	601	CB	PHE	A	86	90.986	61.931	26.577	1.00	8.82	C
	ATOM	602	CG	PHE	A	86	90.857	60.984	25.427	1.00	9.20	C
20	ATOM	603	CD1	PHE	A	86	90.776	61.471	24.121	1.00	9.07	C
	ATOM	604	CE1	PHE	A	86	90.694	60.598	23.042	1.00	8.92	C
	ATOM	605	CZ	PHE	A	86	90.703	59.220	23.257	1.00	9.67	C
	ATOM	606	CE2	PHE	A	86	90.795	58.730	24.557	1.00	9.45	C
	ATOM	607	CD2	PHE	A	86	90.877	59.611	25.623	1.00	9.13	C
25	ATOM	608	C	PHE	A	86	92.467	63.572	27.788	1.00	9.38	C
	ATOM	609	O	PHE	A	86	92.593	63.243	28.951	1.00	9.10	O
	ATOM	610	N	THR	A	87	92.330	64.838	27.403	1.00	9.49	N
	ATOM	611	CA	THR	A	87	92.333	65.935	28.353	1.00	10.37	C
	ATOM	612	CB	THR	A	87	93.479	66.888	28.012	1.00	13.23	C
30	ATOM	613	OG1	THR	A	87	93.245	67.376	26.696	1.00	13.80	O
	ATOM	614	CG2	THR	A	87	94.867	66.153	28.076	1.00	12.69	C
	ATOM	615	C	THR	A	87	91.037	66.734	28.362	1.00	10.11	C
	ATOM	616	O	THR	A	87	90.935	67.713	29.096	1.00	11.86	O
	ATOM	617	N	ALA	A	88	90.056	66.326	27.547	1.00	9.26	N
35	ATOM	618	CA	ALA	A	88	88.782	67.001	27.412	1.00	8.97	C
	ATOM	619	CB	ALA	A	88	88.832	68.081	26.331	1.00	7.85	C
	ATOM	620	C	ALA	A	88	87.713	65.981	27.064	1.00	8.38	C
	ATOM	621	O	ALA	A	88	87.999	65.001	26.402	1.00	7.89	O
	ATOM	622	N	VAL	A	89	86.484	66.250	27.488	1.00	7.77	N
40	ATOM	623	CA	VAL	A	89	85.333	65.430	27.150	1.00	7.88	C
	ATOM	624	CB	VAL	A	89	84.742	64.750	28.369	1.00	7.81	C
	ATOM	625	CG1	VAL	A	89	83.621	63.809	27.937	1.00	7.23	C
	ATOM	626	CG2	VAL	A	89	85.835	63.992	29.131	1.00	8.30	C
	ATOM	627	C	VAL	A	89	84.237	66.271	26.505	1.00	8.68	C
45	ATOM	628	O	VAL	A	89	83.821	67.297	27.047	1.00	10.69	O

	ATOM	629	N	TRP	A	90	83.795	65.827	25.345	1.00	8.80	N
	ATOM	630	CA	TRP	A	90	82.647	66.432	24.645	1.00	9.05	C
	ATOM	631	CB	TRP	A	90	82.965	66.553	23.141	1.00	8.66	C
	ATOM	632	CG	TRP	A	90	81.820	66.563	22.143	1.00	8.98	C
5	ATOM	633	CD1	TRP	A	90	80.475	66.749	22.391	1.00	8.53	C
	ATOM	634	NE1	TRP	A	90	79.755	66.666	21.233	1.00	10.03	N
	ATOM	635	CE2	TRP	A	90	80.572	66.463	20.168	1.00	9.10	C
	ATOM	636	CD2	TRP	A	90	81.926	66.417	20.676	1.00	8.23	C
	ATOM	637	CE3	TRP	A	90	82.984	66.178	19.776	1.00	8.44	C
10	ATOM	638	CZ3	TRP	A	90	82.699	66.058	18.416	1.00	8.17	C
	ATOM	639	CH2	TRP	A	90	81.373	66.109	17.943	1.00	9.05	C
	ATOM	640	CZ2	TRP	A	90	80.286	66.285	18.819	1.00	9.11	C
	ATOM	641	C	TRP	A	90	81.440	65.590	25.015	1.00	7.90	C
	ATOM	642	O	TRP	A	90	81.422	64.348	24.841	1.00	8.27	O
15	ATOM	643	N	ILE	A	91	80.485	66.256	25.649	1.00	7.66	N
	ATOM	644	CA	ILE	A	91	79.228	65.659	26.041	1.00	7.40	C
	ATOM	645	CB	ILE	A	91	78.918	65.864	27.546	1.00	7.67	C
	ATOM	646	CG1	ILE	A	91	78.493	67.323	27.834	1.00	7.56	C
	ATOM	647	CD1	ILE	A	91	78.135	67.600	29.300	1.00	6.81	C
20	ATOM	648	CG2	ILE	A	91	80.108	65.406	28.419	1.00	7.40	C
	ATOM	649	C	ILE	A	91	78.099	66.224	25.165	1.00	7.63	C
	ATOM	650	O	ILE	A	91	78.171	67.372	24.682	1.00	6.31	O
	ATOM	651	N	THR	A	92	77.074	65.394	24.950	1.00	7.17	N
	ATOM	652	CA	THR	A	92	75.894	65.784	24.184	1.00	7.86	C
25	ATOM	653	CB	THR	A	92	75.000	64.561	23.863	1.00	7.77	C
	ATOM	654	OG1	THR	A	92	74.892	63.711	25.021	1.00	6.92	O
	ATOM	655	CG2	THR	A	92	75.618	63.748	22.716	1.00	7.73	C
	ATOM	656	C	THR	A	92	75.120	66.869	24.940	1.00	8.10	C
	ATOM	657	O	THR	A	92	75.376	67.110	26.127	1.00	6.99	O
30	ATOM	658	N	PRO	A	93	74.248	67.603	24.231	1.00	8.13	N
	ATOM	659	CA	PRO	A	93	73.575	68.734	24.878	1.00	7.93	C
	ATOM	660	CB	PRO	A	93	72.618	69.240	23.800	1.00	7.98	C
	ATOM	661	CG	PRO	A	93	73.285	68.843	22.527	1.00	8.35	C
	ATOM	662	CD	PRO	A	93	73.847	67.480	22.822	1.00	8.00	C
35	ATOM	663	C	PRO	A	93	72.821	68.314	26.125	1.00	8.83	C
	ATOM	664	O	PRO	A	93	72.265	67.198	26.188	1.00	9.93	O
	ATOM	665	N	ILE	A	94	72.835	69.206	27.102	1.00	8.49	N
	ATOM	666	CA	ILE	A	94	72.417	68.917	28.456	1.00	8.19	C
	ATOM	667	CB	ILE	A	94	73.391	69.548	29.495	1.00	7.74	C
40	ATOM	668	CG1	ILE	A	94	73.431	71.092	29.388	1.00	7.40	C
	ATOM	669	CD1	ILE	A	94	74.265	71.742	30.478	1.00	7.41	C
	ATOM	670	CG2	ILE	A	94	74.802	68.970	29.327	1.00	6.92	C
	ATOM	671	C	ILE	A	94	71.037	69.454	28.758	1.00	8.68	C
	ATOM	672	O	ILE	A	94	70.513	69.175	29.849	1.00	7.38	O
45	ATOM	673	N	VAL	A	95	70.452	70.222	27.825	1.00	8.70	N

	ATOM	674	CA	VAL A	95	69.220	70.974	28.111	1.00	8.89	C
	ATOM	675	CB	VAL A	95	69.027	72.148	27.136	1.00	9.88	C
	ATOM	676	CG1	VAL A	95	70.243	73.077	27.203	1.00	9.93	C
	ATOM	677	CG2	VAL A	95	68.785	71.625	25.724	1.00	8.69	C
5	ATOM	678	C	VAL A	95	67.984	70.088	28.087	1.00	8.23	C
	ATOM	679	O	VAL A	95	67.997	69.019	27.487	1.00	9.61	O
	ATOM	680	N	ASP A	96	66.913	70.508	28.749	1.00	8.61	N
	ATOM	681	CA	ASP A	96	65.703	69.664	28.823	1.00	7.56	C
	ATOM	682	CB	ASP A	96	64.590	70.332	29.648	1.00	7.93	C
10	ATOM	683	CG	ASP A	96	63.355	69.443	29.808	1.00	8.23	C
	ATOM	684	OD1	ASP A	96	63.489	68.190	29.980	1.00	8.77	O
	ATOM	685	OD2	ASP A	96	62.228	69.985	29.796	1.00	7.69	O
	ATOM	686	C	ASP A	96	65.194	69.336	27.428	1.00	7.56	C
	ATOM	687	O	ASP A	96	64.994	70.233	26.624	1.00	7.31	O
15	ATOM	688	N	ASN A	97	65.018	68.041	27.144	1.00	8.12	N
	ATOM	689	CA	ASN A	97	64.407	67.568	25.884	1.00	7.65	C
	ATOM	690	CB	ASN A	97	65.234	66.442	25.249	1.00	7.08	C
	ATOM	691	CG	ASN A	97	66.444	66.945	24.432	1.00	7.51	C
	ATOM	692	OD1	ASN A	97	66.673	66.451	23.339	1.00	6.84	O
20	ATOM	693	ND2	ASN A	97	67.212	67.899	24.963	1.00	6.08	N
	ATOM	694	C	ASN A	97	63.015	67.059	26.258	1.00	8.12	C
	ATOM	695	O	ASN A	97	62.697	66.915	27.454	1.00	8.47	O
	ATOM	696	N	PRO A	98	62.157	66.810	25.265	1.00	8.50	N
	ATOM	697	CA	PRO A	98	60.791	66.405	25.614	1.00	8.16	C
25	ATOM	698	CB	PRO A	98	60.109	66.292	24.252	1.00	8.27	C
	ATOM	699	CG	PRO A	98	60.910	67.217	23.355	1.00	8.40	C
	ATOM	700	CD	PRO A	98	62.317	66.944	23.802	1.00	8.79	C
	ATOM	701	C	PRO A	98	60.665	65.088	26.404	1.00	8.40	C
	ATOM	702	O	PRO A	98	61.570	64.262	26.398	1.00	8.90	O
30	ATOM	703	N	ASP A	99	59.536	64.937	27.085	1.00	8.91	N
	ATOM	704	CA	ASP A	99	59.307	63.858	28.053	1.00	10.21	C
	ATOM	705	CB	ASP A	99	58.765	64.455	29.352	1.00	11.40	C
	ATOM	706	CG	ASP A	99	59.751	65.439	30.001	1.00	11.08	C
	ATOM	707	OD1	ASP A	99	60.934	65.470	29.627	1.00	9.70	O
35	ATOM	708	OD2	ASP A	99	59.343	66.204	30.876	1.00	11.83	O
	ATOM	709	C	ASP A	99	58.357	62.800	27.489	1.00	9.78	C
	ATOM	710	O	ASP A	99	57.805	62.000	28.230	1.00	9.41	O
	ATOM	711	N	GLN A	100	58.196	62.814	26.168	1.00	9.73	N
	ATOM	712	CA	GLN A	100	57.585	61.738	25.386	1.00	10.34	C
40	ATOM	713	CB	GLN A	100	56.166	62.111	24.915	1.00	9.23	C
	ATOM	714	CG	GLN A	100	55.161	62.353	26.049	1.00	9.49	C
	ATOM	715	CD	GLN A	100	53.773	62.763	25.568	1.00	10.49	C
	ATOM	716	OE1	GLN A	100	53.595	63.210	24.417	1.00	10.91	O
	ATOM	717	NE2	GLN A	100	52.763	62.627	26.467	1.00	8.16	N
45	ATOM	718	C	GLN A	100	58.443	61.468	24.161	1.00	10.06	C

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     ATOM    719   O    GLN A 100    59.230  62.319  23.759  1.00 11.00        O
     ATOM    720   N    ARG A 101    58.265  60.300  23.562  1.00  9.65        N
     ATOM    721   CA   ARG A 101    58.781  60.044  22.213  1.00  9.72        C
     ATOM    722   CB   ARG A 101    58.788  58.557  21.859  1.00  9.97        C
 5   ATOM    723   CG   ARG A 101    57.405  57.950  21.685  1.00 10.82        C
     ATOM    724   CD   ARG A 101    57.491  56.459  21.389  1.00 11.39        C
     ATOM    725   NE   ARG A 101    57.797  55.699  22.601  1.00 12.66        N
     ATOM    726   CZ   ARG A 101    57.859  54.369  22.674  1.00 15.60        C
     ATOM    727   NH1  ARG A 101    57.615  53.615  21.611  1.00 17.16        N
10   ATOM    728   NH2  ARG A 101    58.166  53.777  23.821  1.00 13.77        N
     ATOM    729   C    ARG A 101    57.948  60.787  21.169  1.00  9.87        C
     ATOM    730   O    ARG A 101    56.778  61.115  21.408  1.00 10.29        O
     ATOM    731   N    PHE A 102    58.576  61.041  20.014  1.00  8.92        N
     ATOM    732   CA   PHE A 102    57.954  61.798  18.916  1.00  9.48        C
15   ATOM    733   CB   PHE A 102    59.055  62.345  18.010  1.00  9.36        C
     ATOM    734   CG   PHE A 102    58.565  63.258  16.899  1.00  8.41        C
     ATOM    735   CD1  PHE A 102    57.745  64.339  17.165  1.00  8.84        C
     ATOM    736   CE1  PHE A 102    57.339  65.193  16.148  1.00  8.66        C
     ATOM    737   CZ   PHE A 102    57.798  64.988  14.858  1.00  8.96        C
20   ATOM    738   CE2  PHE A 102    58.622  63.941  14.595  1.00  9.20        C
     ATOM    739   CD2  PHE A 102    59.015  63.081  15.625  1.00  9.33        C
     ATOM    740   C    PHE A 102    56.959  60.956  18.094  1.00 10.34        C
     ATOM    741   O    PHE A 102    57.301  59.854  17.632  1.00 10.41        O
     ATOM    742   N    THR A 103    55.727  61.452  17.915  1.00 10.57        N
25   ATOM    743   CA   THR A 103    54.721  60.690  17.136  1.00  9.76        C
     ATOM    744   CB   THR A 103    53.315  60.712  17.789  1.00 10.24        C
     ATOM    745   OG1  THR A 103    52.801  62.051  17.784  1.00 10.00        O
     ATOM    746   CG2  THR A 103    53.383  60.193  19.221  1.00  8.11        C
     ATOM    747   C    THR A 103    54.624  61.152  15.681  1.00 11.29        C
30   ATOM    748   O    THR A 103    53.801  60.660  14.944  1.00 10.52        O
     ATOM    749   N    GLY A 104    55.499  62.054  15.241  1.00 10.63        N
     ATOM    750   CA   GLY A 104    55.557  62.418  13.818  1.00 11.41        C
     ATOM    751   C    GLY A 104    56.723  61.734  13.121  1.00 11.50        C
     ATOM    752   O    GLY A 104    57.230  60.713  13.597  1.00 12.94        O
35   ATOM    753   N    GLY A 105    57.153  62.310  12.005  1.00 11.93        N
     ATOM    754   CA   GLY A 105    58.451  62.001  11.422  1.00 12.45        C
     ATOM    755   C    GLY A 105    58.443  60.770  10.535  1.00 11.99        C
     ATOM    756   O    GLY A 105    57.410  60.211  10.236  1.00 12.76        O
     ATOM    757   N    SER A 106    59.615  60.370  10.090  1.00 13.86        N
40   ATOM    758   CA   SER A 106    59.743  59.201   9.243  1.00 15.64        C
     ATOM    759   CB   SER A 106    60.402  59.601   7.932  1.00 21.06        C
     ATOM    760   OG   SER A 106    61.592  60.283   8.227  1.00 33.58        O
     ATOM    761   C    SER A 106    60.514  58.092   9.959  1.00 13.96        C
     ATOM    762   O    SER A 106    61.283  58.335  10.894  1.00 12.62        O
45   ATOM    763   N    ALA A 107    60.265  56.860   9.526  1.00 16.61        N
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	ATOM	764	CA	ALA A 107	60.715	55.655	10.221	1.00 16.25	C
	ATOM	765	CB	ALA A 107	59.991	54.423	9.678	1.00 17.15	C
	ATOM	766	C	ALA A 107	62.225	55.466	10.090	1.00 17.43	C
	ATOM	767	O	ALA A 107	62.806	55.670	9.026	1.00 15.32	O
5	ATOM	768	N	PRO A 108	62.874	55.096	11.192	1.00 18.09	N
	ATOM	769	CA	PRO A 108	64.308	54.883	11.165	1.00 15.95	C
	ATOM	770	CB	PRO A 108	64.656	54.723	12.651	1.00 17.38	C
	ATOM	771	CG	PRO A 108	63.410	54.141	13.254	1.00 18.61	C
	ATOM	772	CD	PRO A 108	62.294	54.849	12.527	1.00 18.07	C
10	ATOM	773	C	PRO A 108	64.646	53.635	10.376	1.00 18.29	C
	ATOM	774	O	PRO A 108	63.933	52.655	10.436	1.00 16.49	O
	ATOM	775	N	THR A 109	65.697	53.686	9.574	1.00 21.18	N
	ATOM	776	CA	THR A 109	66.147	52.510	8.872	1.00 21.58	C
	ATOM	777	CB	THR A 109	65.984	52.635	7.340	1.00 26.72	C
15	ATOM	778	OG1	THR A 109	66.829	53.675	6.855	1.00 29.49	O
	ATOM	779	CG2	THR A 109	64.545	52.945	6.942	1.00 33.30	C
	ATOM	780	C	THR A 109	67.628	52.364	9.210	1.00 24.94	C
	ATOM	781	O	THR A 109	68.252	53.288	9.757	1.00 25.33	O
	ATOM	782	N	CYS A 110	68.196	51.223	8.856	1.00 24.91	N
20	ATOM	783	CA	CYS A 110	69.579	50.941	9.206	1.00 39.83	C
	ATOM	784	CB	CYS A 110	69.771	49.443	9.309	1.00 49.43	C
	ATOM	785	SG	CYS A 110	71.304	48.984	10.127	1.00 57.18	S
	ATOM	786	C	CYS A 110	70.480	51.540	8.140	1.00 36.26	C
	ATOM	787	O	CYS A 110	70.895	50.878	7.222	1.00 43.68	O
25	ATOM	788	N	GLY A 111	70.780	52.815	8.268	1.00 45.28	N
	ATOM	789	CA	GLY A 111	71.282	53.574	7.132	1.00 45.13	C
	ATOM	790	C	GLY A 111	70.829	54.982	7.369	1.00 51.84	C
	ATOM	791	O	GLY A 111	69.719	55.207	7.847	1.00 68.71	O
	ATOM	792	N	GLY A 112	71.678	55.934	7.023	1.00 61.20	N
30	ATOM	793	CA	GLY A 112	71.602	57.273	7.603	1.00 62.75	C
	ATOM	794	C	GLY A 112	70.648	58.259	6.955	1.00 60.42	C
	ATOM	795	O	GLY A 112	71.066	59.353	6.559	1.00 79.36	O
	ATOM	796	N	ILE A 113	69.372	57.900	6.834	1.00 49.88	N
	ATOM	797	CA	ILE A 113	68.366	58.943	6.669	1.00 47.96	C
35	ATOM	798	CB	ILE A 113	66.986	58.484	6.122	1.00 59.41	C
	ATOM	799	CG1	ILE A 113	67.064	57.179	5.306	1.00 64.07	C
	ATOM	800	CD1	ILE A 113	65.701	56.600	4.957	1.00 62.95	C
	ATOM	801	CG2	ILE A 113	66.372	59.608	5.288	1.00 41.47	C
	ATOM	802	C	ILE A 113	68.203	59.451	8.100	1.00 39.00	C
40	ATOM	803	O	ILE A 113	68.182	58.647	9.053	1.00 39.36	O
	ATOM	804	N	LEU A 114	68.138	60.764	8.260	1.00 29.33	N
	ATOM	805	CA	LEU A 114	67.740	61.371	9.528	1.00 24.96	C
	ATOM	806	CB	LEU A 114	67.936	62.884	9.458	1.00 27.04	C
	ATOM	807	CG	LEU A 114	67.777	63.738	10.711	1.00 32.37	C
45	ATOM	808	CD1	LEU A 114	68.312	65.144	10.463	1.00 27.25	C

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        ATOM   809  CD2 LEU A 114     66.316  63.798  11.126  1.00 31.93      C
        ATOM   810  C   LEU A 114     66.266  60.986   9.738  1.00 30.91      C
        ATOM   811  O   LEU A 114     65.444  61.280   8.882  1.00 32.11      O
        ATOM   812  N   ALA A 115     65.938  60.317  10.854  1.00 22.31      N
   5    ATOM   813  CA  ALA A 115     64.601  59.687  11.022  1.00 17.88      C
        ATOM   814  CB  ALA A 115     64.625  58.229  10.534  1.00 16.41      C
        ATOM   815  C   ALA A 115     64.188  59.757  12.472  1.00 15.02      C
        ATOM   816  O   ALA A 115     64.820  59.135  13.334  1.00 15.07      O
        ATOM   817  N   ASP A 116     63.163  60.559  12.752  1.00 13.37      N
  10    ATOM   818  CA  ASP A 116     62.755  60.875  14.143  1.00 11.94      C
        ATOM   819  CB  ASP A 116     62.602  62.399  14.288  1.00 13.11      C
        ATOM   820  CG  ASP A 116     63.939  63.128  14.215  1.00 17.42      C
        ATOM   821  OD1 ASP A 116     64.960  62.454  14.445  1.00 18.27      O
        ATOM   822  OD2 ASP A 116     63.968  64.362  13.963  1.00 18.41      O
  15    ATOM   823  C   ASP A 116     61.482  60.178  14.645  1.00  9.91      C
        ATOM   824  O   ASP A 116     61.099  60.351  15.794  1.00 11.02      O
        ATOM   825  N   GLN A 117     60.825  59.394  13.806  1.00 10.99      N
        ATOM   826  CA  GLN A 117     59.582  58.729  14.191  1.00 11.26      C
        ATOM   827  CB  GLN A 117     59.030  57.961  12.988  1.00 12.70      C
  20    ATOM   828  CG  GLN A 117     57.681  57.320  13.209  1.00 12.29      C
        ATOM   829  CD  GLN A 117     57.202  56.602  11.973  1.00 13.35      C
        ATOM   830  OE1 GLN A 117     56.837  57.232  10.974  1.00 19.23      O
        ATOM   831  NE2 GLN A 117     57.181  55.308  12.029  1.00 10.56      N
        ATOM   832  C   GLN A 117     59.790  57.773  15.366  1.00 11.00      C
  25    ATOM   833  O   GLN A 117     60.649  56.884  15.314  1.00  9.15      O
        ATOM   834  N   GLY A 118     59.005  57.966  16.430  1.00 11.48      N
        ATOM   835  CA  GLY A 118     59.034  57.065  17.608  1.00  9.34      C
        ATOM   836  C   GLY A 118     60.262  57.255  18.488  1.00  8.98      C
        ATOM   837  O   GLY A 118     60.474  56.490  19.421  1.00  9.55      O
  30    ATOM   838  N   LYS A 119     61.025  58.319  18.248  1.00  8.15      N
        ATOM   839  CA  LYS A 119     62.330  58.538  18.888  1.00  7.91      C
        ATOM   840  CB  LYS A 119     63.339  59.042  17.843  1.00  8.40      C
        ATOM   841  CG  LYS A 119     64.707  59.476  18.364  1.00  9.03      C
        ATOM   842  CD  LYS A 119     65.685  59.851  17.232  1.00  8.89      C
  35    ATOM   843  CE  LYS A 119     66.210  58.623  16.473  1.00  9.64      C
        ATOM   844  NZ  LYS A 119     66.918  58.935  15.184  1.00  9.41      N
        ATOM   845  C   LYS A 119     62.194  59.513  20.045  1.00  8.61      C
        ATOM   846  O   LYS A 119     61.330  60.404  20.022  1.00 10.22      O
        ATOM   847  N   ALA A 120     63.012  59.308  21.077  1.00  7.51      N
  40    ATOM   848  CA  ALA A 120     63.098  60.222  22.209  1.00  7.13      C
        ATOM   849  CB  ALA A 120     63.038  59.429  23.513  1.00  6.28      C
        ATOM   850  C   ALA A 120     64.395  61.036  22.153  1.00  7.14      C
        ATOM   851  O   ALA A 120     65.351  60.647  21.470  1.00  6.72      O
        ATOM   852  N   GLY A 121     64.425  62.135  22.901  1.00  6.81      N
  45    ATOM   853  CA  GLY A 121     65.573  63.034  22.957  1.00  8.27      C
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	ATOM	854	C	GLY A 121	66.733	62.599	23.829	1.00	8.37	C
	ATOM	855	O	GLY A 121	67.340	63.440	24.512	1.00	8.71	O
	ATOM	856	N	TYR A 122	67.052	61.293	23.813	1.00	7.94	N
	ATOM	857	CA	TYR A 122	68.169	60.752	24.598	1.00	7.85	C
5	ATOM	858	CB	TYR A 122	68.257	59.243	24.429	1.00	7.36	C
	ATOM	859	CG	TYR A 122	68.793	58.827	23.065	1.00	8.14	C
	ATOM	860	CD1	TYR A 122	70.154	58.724	22.841	1.00	9.19	C
	ATOM	861	CE1	TYR A 122	70.661	58.394	21.585	1.00	9.17	C
	ATOM	862	CZ	TYR A 122	69.802	58.127	20.549	1.00	8.00	C
10	ATOM	863	OH	TYR A 122	70.303	57.803	19.310	1.00	7.95	O
	ATOM	864	CE2	TYR A 122	68.437	58.237	20.747	1.00	8.48	C
	ATOM	865	CD2	TYR A 122	67.942	58.592	22.003	1.00	8.41	C
	ATOM	866	C	TYR A 122	69.509	61.407	24.209	1.00	8.49	C
	ATOM	867	O	TYR A 122	70.467	61.414	24.990	1.00	9.08	O
15	ATOM	868	N	HIS A 123	69.541	61.905	22.976	1.00	8.09	N
	ATOM	869	CA	HIS A 123	70.703	62.505	22.340	1.00	8.06	C
	ATOM	870	CB	HIS A 123	70.578	62.357	20.829	1.00	7.45	C
	ATOM	871	CG	HIS A 123	69.227	62.750	20.311	1.00	8.31	C
	ATOM	872	ND1	HIS A 123	68.819	64.030	20.303	1.00	7.16	N
20	ATOM	873	CE1	HIS A 123	67.558	64.081	19.841	1.00	8.00	C
	ATOM	874	NE2	HIS A 123	67.144	62.824	19.576	1.00	8.19	N
	ATOM	875	CD2	HIS A 123	68.147	61.979	19.859	1.00	8.31	C
	ATOM	876	C	HIS A 123	70.913	63.946	22.723	1.00	8.09	C
	ATOM	877	O	HIS A 123	72.015	64.469	22.542	1.00	8.47	O
25	ATOM	878	N	GLY A 124	69.866	64.582	23.252	1.00	8.41	N
	ATOM	879	CA	GLY A 124	69.897	65.966	23.755	1.00	8.27	C
	ATOM	880	C	GLY A 124	69.664	67.107	22.760	1.00	8.38	C
	ATOM	881	O	GLY A 124	69.557	68.254	23.174	1.00	10.78	O
	ATOM	882	N	TYR A 125	69.553	66.802	21.472	1.00	8.01	N
30	ATOM	883	CA	TYR A 125	69.474	67.838	20.411	1.00	8.90	C
	ATOM	884	CB	TYR A 125	69.973	67.287	19.078	1.00	9.02	C
	ATOM	885	CG	TYR A 125	71.420	66.886	19.093	1.00	9.71	C
	ATOM	886	CD1	TYR A 125	72.439	67.857	19.184	1.00	11.89	C
	ATOM	887	CE1	TYR A 125	73.765	67.500	19.209	1.00	11.14	C
35	ATOM	888	CZ	TYR A 125	74.099	66.139	19.154	1.00	11.90	C
	ATOM	889	OH	TYR A 125	75.397	65.737	19.181	1.00	11.84	O
	ATOM	890	CE2	TYR A 125	73.109	65.171	19.076	1.00	11.88	C
	ATOM	891	CD2	TYR A 125	71.785	65.550	19.043	1.00	9.99	C
	ATOM	892	C	TYR A 125	68.098	68.475	20.199	1.00	9.13	C
40	ATOM	893	O	TYR A 125	67.929	69.328	19.305	1.00	9.20	O
	ATOM	894	N	TRP A 126	67.134	68.092	21.033	1.00	8.70	N
	ATOM	895	CA	TRP A 126	65.784	68.631	20.948	1.00	8.45	C
	ATOM	896	CB	TRP A 126	64.786	67.497	20.828	1.00	8.19	C
	ATOM	897	CG	TRP A 126	64.948	66.595	19.647	1.00	7.80	C
45	ATOM	898	CD1	TRP A 126	65.703	66.793	18.501	1.00	7.99	C

	ATOM	899	NE1	TRP A 126	65.559	65.735	17.643	1.00	8.77	N
	ATOM	900	CE2	TRP A 126	64.714	64.818	18.163	1.00	8.26	C
	ATOM	901	CD2	TRP A 126	64.280	65.316	19.450	1.00	7.54	C
	ATOM	902	CE3	TRP A 126	63.409	64.562	20.198	1.00	8.14	C
5	ATOM	903	CZ3	TRP A 126	62.983	63.341	19.699	1.00	8.06	C
	ATOM	904	CH2	TRP A 126	63.393	62.880	18.459	1.00	8.34	C
	ATOM	905	CZ2	TRP A 126	64.285	63.598	17.672	1.00	8.33	C
	ATOM	906	C	TRP A 126	65.433	69.473	22.149	1.00	8.53	C
	ATOM	907	O	TRP A 126	64.646	69.066	23.004	1.00	8.34	O
10	ATOM	908	N	GLY A 127	66.007	70.670	22.222	1.00	8.52	N
	ATOM	909	CA	GLY A 127	65.856	71.519	23.371	1.00	8.25	C
	ATOM	910	C	GLY A 127	64.478	72.126	23.556	1.00	8.41	C
	ATOM	911	O	GLY A 127	63.875	72.583	22.599	1.00	8.48	O
	ATOM	912	N	VAL A 128	64.006	72.132	24.810	1.00	8.05	N
15	ATOM	913	CA	AVAL A 128	62.735	72.722	25.228	0.50	7.57	C
	ATOM	914	CA	BVAL A 128	62.752	72.796	25.150	0.50	8.37	C
	ATOM	915	CB	AVAL A 128	61.847	71.645	25.883	0.50	7.06	C
	ATOM	916	CB	BVAL A 128	61.597	71.801	25.476	0.50	9.15	C
	ATOM	917	CG1	AVAL A 128	60.541	72.240	26.427	0.50	6.29	C
20	ATOM	918	CG1	BVAL A 128	61.962	70.400	25.015	0.50	9.16	C
	ATOM	919	CG2	AVAL A 128	61.545	70.549	24.870	0.50	6.90	C
	ATOM	920	CG2	BVAL A 128	61.169	71.823	26.941	0.50	9.05	C
	ATOM	921	C	VAL A 128	62.981	73.865	26.209	1.00	8.10	C
	ATOM	922	O	VAL A 128	62.403	74.939	26.113	1.00	9.16	O
25	ATOM	923	N	ASN A 129	63.859	73.627	27.171	1.00	8.52	N
	ATOM	924	CA	ASN A 129	64.257	74.687	28.090	1.00	9.76	C
	ATOM	925	CB	ASN A 129	63.715	74.475	29.504	1.00	9.54	C
	ATOM	926	CG	ASN A 129	63.887	75.714	30.370	1.00	11.86	C
	ATOM	927	OD1	ASN A 129	64.876	76.456	30.223	1.00	11.47	O
30	ATOM	928	ND2	ASN A 129	62.928	75.953	31.282	1.00	10.82	N
	ATOM	929	C	ASN A 129	65.764	74.750	28.122	1.00	9.14	C
	ATOM	930	O	ASN A 129	66.407	73.896	28.725	1.00	8.31	O
	ATOM	931	N	PHE A 130	66.324	75.752	27.459	1.00	8.93	N
	ATOM	932	CA	PHE A 130	67.783	75.830	27.286	1.00	9.13	C
35	ATOM	933	CB	PHE A 130	68.126	76.736	26.089	1.00	9.44	C
	ATOM	934	CG	PHE A 130	67.823	76.108	24.739	1.00	9.95	C
	ATOM	935	CD1	PHE A 130	66.509	75.854	24.328	1.00	8.88	C
	ATOM	936	CE1	PHE A 130	66.244	75.287	23.100	1.00	10.21	C
	ATOM	937	CZ	PHE A 130	67.284	74.958	22.239	1.00	10.77	C
40	ATOM	938	CE2	PHE A 130	68.591	75.198	22.633	1.00	11.17	C
	ATOM	939	CD2	PHE A 130	68.851	75.777	23.877	1.00	10.30	C
	ATOM	940	C	PHE A 130	68.473	76.312	28.572	1.00	8.31	C
	ATOM	941	O	PHE A 130	69.695	76.311	28.655	1.00	8.16	O
	ATOM	942	N	TYR A 131	67.682	76.706	29.579	1.00	8.67	N
45	ATOM	943	CA	TYR A 131	68.204	77.137	30.871	1.00	9.14	C

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     ATOM   944   CB   TYR A 131      67.446  78.364  31.385  1.00   9.45        C
     ATOM   945   CG   TYR A 131      67.771  79.608  30.586  1.00  10.55        C
     ATOM   946   CD1  TYR A 131      67.201  79.817  29.350  1.00  10.18        C
     ATOM   947   CE1  TYR A 131      67.483  80.947  28.610  1.00  11.25        C
  5  ATOM   948   CZ   TYR A 131      68.363  81.875  29.088  1.00  11.51        C
     ATOM   949   OH   TYR A 131      68.660  82.957  28.302  1.00  12.41        O
     ATOM   950   CE2  TYR A 131      68.962  81.701  30.314  1.00  12.46        C
     ATOM   951   CD2  TYR A 131      68.672  80.555  31.058  1.00  12.49        C
     ATOM   952   C    TYR A 131      68.165  76.046  31.942  1.00  10.15        C
 10  ATOM   953   O    TYR A 131      68.588  76.290  33.034  1.00   9.65        O
     ATOM   954   N    GLN A 132      67.650  74.863  31.633  1.00  10.60        N
     ATOM   955   CA   GLN A 132      67.530  73.796  32.635  1.00  10.64        C
     ATOM   956   CB   GLN A 132      66.059  73.529  32.986  1.00  12.22        C
     ATOM   957   CG   GLN A 132      65.381  74.646  33.750  1.00  15.14        C
 15  ATOM   958   CD   GLN A 132      63.929  74.334  34.139  1.00  15.81        C
     ATOM   959   OE1  GLN A 132      63.416  73.222  33.943  1.00  19.68        O
     ATOM   960   NE2  GLN A 132      63.275  75.319  34.685  1.00  16.95        N
     ATOM   961   C    GLN A 132      68.137  72.521  32.084  1.00   9.69        C
     ATOM   962   O    GLN A 132      67.989  72.206  30.904  1.00  10.13        O
 20  ATOM   963   N    VAL A 133      68.795  71.787  32.960  1.00  10.21        N
     ATOM   964   CA   VAL A 133      69.376  70.502  32.632  1.00  10.16        C
     ATOM   965   CB   VAL A 133      70.437  70.114  33.675  1.00  11.32        C
     ATOM   966   CG1  VAL A 133      70.946  68.707  33.419  1.00  12.83        C
     ATOM   967   CG2  VAL A 133      71.586  71.103  33.599  1.00  13.12        C
 25  ATOM   968   C    VAL A 133      68.282  69.460  32.527  1.00   8.89        C
     ATOM   969   O    VAL A 133      67.335  69.468  33.281  1.00   7.09        O
     ATOM   970   N    ASP A 134      68.370  68.593  31.536  1.00   8.88        N
     ATOM   971   CA   ASP A 134      67.397  67.527  31.412  1.00   9.39        C
     ATOM   972   CB   ASP A 134      67.660  66.665  30.179  1.00   9.63        C
 30  ATOM   973   CG   ASP A 134      66.513  65.686  29.932  1.00   9.77        C
     ATOM   974   OD1  ASP A 134      66.530  64.554  30.510  1.00   9.09        O
     ATOM   975   OD2  ASP A 134      65.579  66.102  29.227  1.00   8.12        O
     ATOM   976   C    ASP A 134      67.412  66.628  32.657  1.00   9.22        C
     ATOM   977   O    ASP A 134      68.477  66.309  33.179  1.00  10.21        O
 35  ATOM   978   N    GLU A 135      66.224  66.240  33.118  1.00   9.96        N
     ATOM   979   CA   GLU A 135      66.047  65.459  34.343  1.00   9.72        C
     ATOM   980   CB   GLU A 135      64.532  65.295  34.660  1.00  12.37        C
     ATOM   981   CG   GLU A 135      63.748  64.378  33.718  1.00  11.48        C
     ATOM   982   CD   GLU A 135      63.500  64.952  32.336  1.00  12.01        C
 40  ATOM   983   OE1  GLU A 135      63.634  66.184  32.127  1.00  12.59        O
     ATOM   984   OE2  GLU A 135      63.190  64.152  31.433  1.00   9.85        O
     ATOM   985   C    GLU A 135      66.732  64.091  34.379  1.00   8.97        C
     ATOM   986   O    GLU A 135      66.926  63.511  35.456  1.00  10.04        O
     ATOM   987   N    HIS A 136      67.071  63.542  33.221  1.00   8.92        N
 45  ATOM   988   CA   HIS A 136      67.820  62.289  33.178  1.00   8.25        C
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	ATOM	989	CB	HIS A 136	67.767	61.695	31.801	1.00	8.45	C
	ATOM	990	CG	HIS A 136	66.390	61.264	31.372	1.00	8.53	C
	ATOM	991	ND1	HIS A 136	65.501	62.107	30.821	1.00	8.93	N
	ATOM	992	CE1	HIS A 136	64.387	61.418	30.486	1.00	9.04	C
5	ATOM	993	NE2	HIS A 136	64.574	60.126	30.812	1.00	8.94	N
	ATOM	994	CD2	HIS A 136	65.796	59.995	31.353	1.00	8.84	C
	ATOM	995	C	HIS A 136	69.258	62.399	33.603	1.00	8.98	C
	ATOM	996	O	HIS A 136	69.872	61.397	33.982	1.00	11.05	O
	ATOM	997	N	LEU A 137	69.832	63.593	33.557	1.00	9.41	N
10	ATOM	998	CA	LEU A 137	71.313	63.711	33.625	1.00	9.45	C
	ATOM	999	CB	LEU A 137	71.790	64.812	32.680	1.00	9.45	C
	ATOM	1000	CG	LEU A 137	71.488	64.536	31.197	1.00	10.52	C
	ATOM	1001	CD1	LEU A 137	71.891	65.726	30.311	1.00	9.09	C
	ATOM	1002	CD2	LEU A 137	72.152	63.258	30.713	1.00	9.69	C
15	ATOM	1003	C	LEU A 137	71.965	63.895	35.022	1.00	9.36	C
	ATOM	1004	O	LEU A 137	73.008	63.272	35.303	1.00	7.32	O
	ATOM	1005	N	PRO A 138	71.376	64.744	35.891	1.00	9.50	N
	ATOM	1006	CA	PRO A 138	72.044	65.010	37.139	1.00	10.29	C
	ATOM	1007	CB	PRO A 138	71.597	66.438	37.451	1.00	10.28	C
20	ATOM	1008	CG	PRO A 138	70.174	66.447	36.998	1.00	10.84	C
	ATOM	1009	CD	PRO A 138	70.152	65.551	35.774	1.00	10.44	C
	ATOM	1010	C	PRO A 138	71.627	64.055	38.271	1.00	11.03	C
	ATOM	1011	O	PRO A 138	70.660	63.298	38.143	1.00	10.18	O
	ATOM	1012	N	SER A 139	72.404	64.072	39.348	1.00	11.65	N
25	ATOM	1013	CA	SER A 139	72.102	63.317	40.552	1.00	12.27	C
	ATOM	1014	CB	SER A 139	73.058	62.126	40.699	1.00	12.48	C
	ATOM	1015	OG	SER A 139	73.018	61.239	39.606	1.00	13.25	O
	ATOM	1016	C	SER A 139	72.369	64.277	41.717	1.00	13.85	C
	ATOM	1017	O	SER A 139	73.116	65.243	41.560	1.00	12.37	O
30	ATOM	1018	N	PRO A 140	71.846	63.960	42.906	1.00	17.20	N
	ATOM	1019	CA	PRO A 140	72.307	64.706	44.083	1.00	18.70	C
	ATOM	1020	CB	PRO A 140	71.583	64.009	45.245	1.00	20.40	C
	ATOM	1021	CG	PRO A 140	70.373	63.364	44.600	1.00	17.87	C
	ATOM	1022	CD	PRO A 140	70.911	62.880	43.281	1.00	17.00	C
35	ATOM	1023	C	PRO A 140	73.806	64.557	44.214	1.00	17.28	C
	ATOM	1024	O	PRO A 140	74.338	63.472	44.037	1.00	17.34	O
	ATOM	1025	N	GLY A 141	74.502	65.643	44.482	1.00	16.43	N
	ATOM	1026	CA	GLY A 141	75.962	65.587	44.489	1.00	18.74	C
	ATOM	1027	C	GLY A 141	76.631	65.520	43.123	1.00	18.04	C
40	ATOM	1028	O	GLY A 141	77.845	65.438	43.067	1.00	22.48	O
	ATOM	1029	N	MET A 142	75.860	65.535	42.024	1.00	16.24	N
	ATOM	1030	CA	MET A 142	76.437	65.521	40.675	1.00	13.09	C
	ATOM	1031	CB	MET A 142	76.781	64.093	40.237	1.00	14.71	C
	ATOM	1032	CG	MET A 142	77.649	64.002	38.983	1.00	16.11	C
45	ATOM	1033	SD	MET A 142	79.099	65.060	39.002	1.00	17.36	S

	ATOM	1034	CE	MET A 142	80.244	64.352	40.174	1.00	12.41	C
	ATOM	1035	C	MET A 142	75.525	66.196	39.673	1.00	12.42	C
	ATOM	1036	O	MET A 142	74.959	65.562	38.786	1.00	10.34	O
	ATOM	1037	N	ASP A 143	75.377	67.505	39.827	1.00	13.19	N
5	ATOM	1038	CA	ASP A 143	74.710	68.325	38.829	1.00	11.91	C
	ATOM	1039	CB	ASP A 143	73.987	69.510	39.498	1.00	15.02	C
	ATOM	1040	CG	ASP A 143	74.926	70.434	40.277	1.00	16.73	C
	ATOM	1041	OD1	ASP A 143	76.166	70.322	40.147	1.00	17.79	O
	ATOM	1042	OD2	ASP A 143	74.413	71.287	41.030	1.00	16.51	O
10	ATOM	1043	C	ASP A 143	75.750	68.762	37.797	1.00	11.44	C
	ATOM	1044	O	ASP A 143	76.911	68.347	37.862	1.00	9.33	O
	ATOM	1045	N	PHE A 144	75.341	69.565	36.809	1.00	11.16	N
	ATOM	1046	CA	PHE A 144	76.271	70.003	35.769	1.00	10.14	C
	ATOM	1047	CB	PHE A 144	75.571	70.904	34.742	1.00	11.49	C
15	ATOM	1048	CG	PHE A 144	76.494	71.361	33.623	1.00	11.77	C
	ATOM	1049	CD1	PHE A 144	77.016	70.449	32.730	1.00	11.66	C
	ATOM	1050	CE1	PHE A 144	77.876	70.852	31.737	1.00	10.97	C
	ATOM	1051	CZ	PHE A 144	78.233	72.182	31.626	1.00	11.63	C
	ATOM	1052	CE2	PHE A 144	77.713	73.111	32.507	1.00	11.40	C
20	ATOM	1053	CD2	PHE A 144	76.859	72.696	33.499	1.00	10.90	C
	ATOM	1054	C	PHE A 144	77.529	70.687	36.323	1.00	10.74	C
	ATOM	1055	O	PHE A 144	78.641	70.350	35.932	1.00	11.37	O
	ATOM	1056	N	ARG A 145	77.351	71.644	37.231	1.00	10.47	N
	ATOM	1057	CA	ARG A 145	78.458	72.297	37.912	1.00	12.14	C
25	ATOM	1058	CB	ARG A 145	77.922	73.190	39.018	1.00	16.55	C
	ATOM	1059	CG	ARG A 145	77.857	74.661	38.704	1.00	18.46	C
	ATOM	1060	CD	ARG A 145	77.467	75.487	39.948	1.00	15.76	C
	ATOM	1061	NE	ARG A 145	76.872	76.736	39.487	1.00	21.12	N
	ATOM	1062	CZ	ARG A 145	77.564	77.813	39.125	1.00	24.33	C
30	ATOM	1063	NH1	ARG A 145	78.902	77.839	39.201	1.00	26.15	N
	ATOM	1064	NH2	ARG A 145	76.917	78.889	38.701	1.00	24.96	N
	ATOM	1065	C	ARG A 145	79.431	71.304	38.562	1.00	12.33	C
	ATOM	1066	O	ARG A 145	80.653	71.465	38.464	1.00	11.76	O
	ATOM	1067	N	ASP A 146	78.881	70.307	39.258	1.00	10.65	N
35	ATOM	1068	CA	ASP A 146	79.705	69.263	39.893	1.00	11.11	C
	ATOM	1069	CB	ASP A 146	78.855	68.280	40.714	1.00	12.33	C
	ATOM	1070	CG	ASP A 146	78.088	68.968	41.842	1.00	13.59	C
	ATOM	1071	OD1	ASP A 146	78.683	69.833	42.501	1.00	15.25	O
	ATOM	1072	OD2	ASP A 146	76.902	68.651	42.041	1.00	14.56	O
40	ATOM	1073	C	ASP A 146	80.493	68.477	38.848	1.00	10.17	C
	ATOM	1074	O	ASP A 146	81.654	68.133	39.062	1.00	9.83	O
	ATOM	1075	N	LEU A 147	79.864	68.184	37.719	1.00	9.45	N
	ATOM	1076	CA	LEU A 147	80.555	67.437	36.687	1.00	8.76	C
	ATOM	1077	CB	LEU A 147	79.593	67.022	35.581	1.00	8.79	C
45	ATOM	1078	CG	LEU A 147	80.239	66.363	34.341	1.00	7.88	C

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        ATOM   1079  CD1 LEU A 147    80.720  64.964  34.710  1.00   7.67          C
        ATOM   1080  CD2 LEU A 147    79.222  66.316  33.185  1.00   7.01          C
        ATOM   1081  C   LEU A 147    81.702  68.265  36.112  1.00   9.10          C
        ATOM   1082  O   LEU A 147    82.817  67.767  35.928  1.00   8.89          O
  5     ATOM   1083  N   ALA A 148    81.451  69.528  35.802  1.00  10.28          N
        ATOM   1084  CA  ALA A 148    82.539  70.346  35.279  1.00  10.21          C
        ATOM   1085  CB  ALA A 148    82.043  71.711  34.787  1.00  10.97          C
        ATOM   1086  C   ALA A 148    83.659  70.478  36.334  1.00   9.79          C
        ATOM   1087  O   ALA A 148    84.838  70.371  35.998  1.00   9.35          O
 10     ATOM   1088  N   ALA A 149    83.305  70.636  37.604  1.00   9.63          N
        ATOM   1089  CA  ALA A 149    84.327  70.721  38.679  1.00   9.33          C
        ATOM   1090  CB  ALA A 149    83.714  71.104  40.040  1.00   8.38          C
        ATOM   1091  C   ALA A 149    85.097  69.389  38.803  1.00  11.27          C
        ATOM   1092  O   ALA A 149    86.296  69.388  39.110  1.00  12.08          O
 15     ATOM   1093  N   ALA A 150    84.432  68.255  38.580  1.00  11.83          N
        ATOM   1094  CA  ALA A 150    85.137  66.948  38.658  1.00  14.01          C
        ATOM   1095  CB  ALA A 150    84.173  65.766  38.578  1.00  12.75          C
        ATOM   1096  C   ALA A 150    86.166  66.870  37.546  1.00  13.00          C
        ATOM   1097  O   ALA A 150    87.300  66.469  37.761  1.00  13.57          O
 20     ATOM   1098  N   MET A 151    85.791  67.332  36.371  1.00  13.01          N
        ATOM   1099  CA  MET A 151    86.733  67.356  35.256  1.00  13.02          C
        ATOM   1100  CB  MET A 151    86.045  67.768  33.956  1.00  12.26          C
        ATOM   1101  CG  MET A 151    85.024  66.752  33.479  1.00  14.82          C
        ATOM   1102  SD  MET A 151    84.476  67.113  31.811  1.00  15.18          S
 25     ATOM   1103  CE  MET A 151    83.191  65.868  31.584  1.00  16.42          C
        ATOM   1104  C   MET A 151    87.886  68.286  35.545  1.00  11.45          C
        ATOM   1105  O   MET A 151    89.034  67.930  35.310  1.00  13.59          O
        ATOM   1106  N   HIS A 152    87.584  69.466  36.057  1.00  11.04          N
        ATOM   1107  CA  HIS A 152    88.624  70.454  36.356  1.00  11.67          C
 30     ATOM   1108  CB  HIS A 152    87.999  71.778  36.792  1.00  11.43          C
        ATOM   1109  CG  HIS A 152    87.153  72.432  35.697  1.00  12.31          C
        ATOM   1110  ND1 HIS A 152    86.192  73.335  35.960  1.00  12.29          N
        ATOM   1111  CE1 HIS A 152    85.607  73.730  34.810  1.00  10.76          C
        ATOM   1112  NE2 HIS A 152    86.164  73.044  33.806  1.00  12.01          N
 35     ATOM   1113  CD2 HIS A 152    87.133  72.233  34.321  1.00  11.22          C
        ATOM   1114  C   HIS A 152    89.627  69.974  37.364  1.00  13.31          C
        ATOM   1115  O   HIS A 152    90.830  70.152  37.159  1.00  11.45          O
        ATOM   1116  N   ARG A 153    89.169  69.345  38.447  1.00  13.29          N
        ATOM   1117  CA  ARG A 153    90.106  68.770  39.427  1.00  17.06          C
 40     ATOM   1118  CB  ARG A 153    89.358  68.107  40.606  1.00  21.01          C
        ATOM   1119  CG  ARG A 153    88.677  69.115  41.516  1.00  22.99          C
        ATOM   1120  CD  ARG A 153    88.226  68.456  42.808  1.00  31.60          C
        ATOM   1121  NE  ARG A 153    87.257  67.388  42.550  1.00  29.94          N
        ATOM   1122  CZ  ARG A 153    85.938  67.557  42.442  1.00  30.44          C
 45     ATOM   1123  NH1 ARG A 153    85.382  68.762  42.568  1.00  31.35          N
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	ATOM	1124	NH2	ARG	A	153	85.166	66.507	42.198	1.00	30.71	N
	ATOM	1125	C	ARG	A	153	91.068	67.758	38.822	1.00	16.63	C
	ATOM	1126	O	ARG	A	153	92.159	67.543	39.366	1.00	16.28	O
	ATOM	1127	N	LYS	A	154	90.670	67.126	37.718	1.00	13.26	N
5	ATOM	1128	CA	LYS	A	154	91.524	66.177	37.030	1.00	12.93	C
	ATOM	1129	CB	LYS	A	154	90.715	64.973	36.581	1.00	15.97	C
	ATOM	1130	CG	LYS	A	154	90.275	64.098	37.756	1.00	19.37	C
	ATOM	1131	CD	LYS	A	154	89.440	62.932	37.259	1.00	23.42	C
	ATOM	1132	CE	LYS	A	154	88.702	62.211	38.383	1.00	30.99	C
10	ATOM	1133	NZ	LYS	A	154	89.622	61.640	39.392	1.00	27.38	N
	ATOM	1134	C	LYS	A	154	92.263	66.794	35.855	1.00	15.47	C
	ATOM	1135	O	LYS	A	154	92.841	66.069	35.038	1.00	14.55	O
	ATOM	1136	N	GLY	A	155	92.276	68.123	35.781	1.00	13.30	N
	ATOM	1137	CA	GLY	A	155	92.968	68.802	34.696	1.00	13.43	C
15	ATOM	1138	C	GLY	A	155	92.278	68.614	33.356	1.00	14.51	C
	ATOM	1139	O	GLY	A	155	92.912	68.790	32.342	1.00	15.46	O
	ATOM	1140	N	MET	A	156	90.977	68.293	33.347	1.00	11.95	N
	ATOM	1141	CA	MET	A	156	90.241	68.077	32.090	1.00	11.76	C
	ATOM	1142	CB	MET	A	156	89.457	66.771	32.162	1.00	12.29	C
20	ATOM	1143	CG	MET	A	156	90.355	65.578	32.470	1.00	13.09	C
	ATOM	1144	SD	MET	A	156	89.457	64.061	32.800	1.00	15.41	S
	ATOM	1145	CE	MET	A	156	89.132	63.520	31.122	1.00	13.69	C
	ATOM	1146	C	MET	A	156	89.309	69.243	31.716	1.00	11.04	C
	ATOM	1147	O	MET	A	156	88.832	69.997	32.595	1.00	13.61	O
25	ATOM	1148	N	LYS	A	157	89.054	69.408	30.421	1.00	9.98	N
	ATOM	1149	CA	LYS	A	157	88.124	70.444	29.967	1.00	10.72	C
	ATOM	1150	CB	LYS	A	157	88.680	71.228	28.777	1.00	13.10	C
	ATOM	1151	CG	LYS	A	157	90.049	71.891	28.971	1.00	17.30	C
	ATOM	1152	CD	LYS	A	157	89.950	73.166	29.769	1.00	17.60	C
30	ATOM	1153	CE	LYS	A	157	91.171	74.056	29.568	1.00	19.32	C
	ATOM	1154	NZ	LYS	A	157	92.405	73.243	29.573	1.00	22.94	N
	ATOM	1155	C	LYS	A	157	86.803	69.801	29.546	1.00	10.51	C
	ATOM	1156	O	LYS	A	157	86.773	68.680	28.992	1.00	9.65	O
	ATOM	1157	N	LEU	A	158	85.723	70.537	29.773	1.00	10.14	N
35	ATOM	1158	CA	LEU	A	158	84.393	70.116	29.372	1.00	9.72	C
	ATOM	1159	CB	LEU	A	158	83.385	70.362	30.504	1.00	11.39	C
	ATOM	1160	CG	LEU	A	158	82.001	69.714	30.336	1.00	11.70	C
	ATOM	1161	CD1	LEU	A	158	81.338	69.510	31.699	1.00	9.61	C
	ATOM	1162	CD2	LEU	A	158	81.110	70.545	29.399	1.00	9.56	C
40	ATOM	1163	C	LEU	A	158	83.987	70.852	28.118	1.00	9.43	C
	ATOM	1164	O	LEU	A	158	83.848	72.073	28.132	1.00	9.84	O
	ATOM	1165	N	VAL	A	159	83.811	70.095	27.038	1.00	8.74	N
	ATOM	1166	CA	VAL	A	159	83.271	70.592	25.786	1.00	8.60	C
	ATOM	1167	CB	VAL	A	159	83.963	69.928	24.552	1.00	8.80	C
45	ATOM	1168	CG1	VAL	A	159	83.401	70.504	23.248	1.00	9.13	C

	ATOM	1169	CG2	VAL	A	159	85.473	70.131	24.591	1.00	7.66	C
	ATOM	1170	C	VAL	A	159	81.758	70.345	25.754	1.00	9.14	C
	ATOM	1171	O	VAL	A	159	81.314	69.202	25.730	1.00	9.70	O
	ATOM	1172	N	LEU	A	160	80.970	71.419	25.764	1.00	9.39	N
5	ATOM	1173	CA	LEU	A	160	79.514	71.306	25.711	1.00	9.75	C
	ATOM	1174	CB	LEU	A	160	78.849	72.395	26.546	1.00	8.89	C
	ATOM	1175	CG	LEU	A	160	77.322	72.349	26.614	1.00	10.13	C
	ATOM	1176	CD1	LEU	A	160	76.814	71.088	27.327	1.00	8.66	C
	ATOM	1177	CD2	LEU	A	160	76.850	73.588	27.385	1.00	9.44	C
10	ATOM	1178	C	LEU	A	160	79.024	71.398	24.264	1.00	9.38	C
	ATOM	1179	O	LEU	A	160	79.311	72.353	23.546	1.00	9.29	O
	ATOM	1180	N	ASP	A	161	78.311	70.375	23.839	1.00	9.16	N
	ATOM	1181	CA	ASP	A	161	77.601	70.376	22.565	1.00	8.48	C
	ATOM	1182	CB	ASP	A	161	77.138	68.943	22.333	1.00	9.13	C
15	ATOM	1183	CG	ASP	A	161	76.791	68.627	20.905	1.00	11.27	C
	ATOM	1184	OD1	ASP	A	161	76.360	69.536	20.151	1.00	11.78	O
	ATOM	1185	OD2	ASP	A	161	76.950	67.415	20.544	1.00	11.60	O
	ATOM	1186	C	ASP	A	161	76.399	71.311	22.716	1.00	8.96	C
	ATOM	1187	O	ASP	A	161	75.605	71.137	23.664	1.00	7.22	O
20	ATOM	1188	N	ILE	A	162	76.256	72.266	21.796	1.00	7.98	N
	ATOM	1189	CA	ILE	A	162	75.198	73.244	21.836	1.00	8.99	C
	ATOM	1190	CB	ILE	A	162	75.706	74.656	22.235	1.00	10.59	C
	ATOM	1191	CG1	ILE	A	162	76.518	75.336	21.119	1.00	10.61	C
	ATOM	1192	CD1	ILE	A	162	76.726	76.821	21.359	1.00	12.11	C
25	ATOM	1193	CG2	ILE	A	162	76.572	74.586	23.494	1.00	9.93	C
	ATOM	1194	C	ILE	A	162	74.424	73.353	20.530	1.00	8.62	C
	ATOM	1195	O	ILE	A	162	74.966	73.150	19.438	1.00	10.83	O
	ATOM	1196	N	VAL	A	163	73.144	73.695	20.653	1.00	7.41	N
	ATOM	1197	CA	VAL	A	163	72.280	73.932	19.499	1.00	7.61	C
30	ATOM	1198	CB	VAL	A	163	71.066	72.997	19.488	1.00	6.78	C
	ATOM	1199	CG1	VAL	A	163	70.202	73.251	18.245	1.00	6.43	C
	ATOM	1200	CG2	VAL	A	163	71.546	71.556	19.529	1.00	6.38	C
	ATOM	1201	C	VAL	A	163	71.776	75.376	19.480	1.00	8.62	C
	ATOM	1202	O	VAL	A	163	71.347	75.908	20.508	1.00	8.53	O
35	ATOM	1203	N	GLY	A	164	71.820	75.994	18.301	1.00	7.93	N
	ATOM	1204	CA	GLY	A	164	71.130	77.274	18.081	1.00	7.48	C
	ATOM	1205	C	GLY	A	164	70.020	77.198	17.051	1.00	7.00	C
	ATOM	1206	O	GLY	A	164	69.088	77.984	17.083	1.00	7.88	O
	ATOM	1207	N	ASN	A	165	70.110	76.252	16.130	1.00	8.26	N
40	ATOM	1208	CA	ASN	A	165	69.221	76.215	14.979	1.00	8.67	C
	ATOM	1209	CB	ASN	A	165	69.703	75.160	13.969	1.00	8.87	C
	ATOM	1210	CG	ASN	A	165	68.745	75.002	12.813	1.00	9.62	C
	ATOM	1211	OD1	ASN	A	165	68.580	75.937	12.041	1.00	9.53	O
	ATOM	1212	ND2	ASN	A	165	68.105	73.814	12.680	1.00	7.11	N
45	ATOM	1213	C	ASN	A	165	67.774	75.920	15.314	1.00	8.35	C

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	ATOM	1214	O	ASN	A	165	66.854	76.413	14.647	1.00	8.60	O
	ATOM	1215	N	HIS	A	166	67.559	75.074	16.313	1.00	7.83	N
	ATOM	1216	CA	HIS	A	166	66.229	74.506	16.508	1.00	7.65	C
	ATOM	1217	CB	HIS	A	166	66.091	73.263	15.628	1.00	8.29	C
5	ATOM	1218	CG	HIS	A	166	67.172	72.236	15.862	1.00	8.07	C
	ATOM	1219	ND1	HIS	A	166	68.272	72.169	15.098	1.00	8.29	N
	ATOM	1220	CE1	HIS	A	166	69.057	71.155	15.518	1.00	7.93	C
	ATOM	1221	NE2	HIS	A	166	68.455	70.563	16.554	1.00	6.83	N
	ATOM	1222	CD2	HIS	A	166	67.272	71.207	16.785	1.00	7.64	C
10	ATOM	1223	C	HIS	A	166	65.915	74.135	17.900	1.00	8.08	C
	ATOM	1224	O	HIS	A	166	66.823	74.019	18.754	1.00	7.94	O
	ATOM	1225	N	GLY	A	167	64.606	74.009	18.154	1.00	8.96	N
	ATOM	1226	CA	GLY	A	167	64.071	73.474	19.403	1.00	8.66	C
	ATOM	1227	C	GLY	A	167	63.925	71.971	19.236	1.00	8.82	C
15	ATOM	1228	O	GLY	A	167	64.912	71.242	19.214	1.00	9.81	O
	ATOM	1229	N	SER	A	168	62.696	71.518	19.072	1.00	8.21	N
	ATOM	1230	CA	SER	A	168	62.386	70.101	19.014	1.00	8.23	C
	ATOM	1231	CB	SER	A	168	61.710	69.691	20.325	1.00	8.48	C
	ATOM	1232	OG	SER	A	168	60.578	70.497	20.627	1.00	8.24	O
20	ATOM	1233	C	SER	A	168	61.476	69.829	17.829	1.00	8.48	C
	ATOM	1234	O	SER	A	168	60.941	70.772	17.218	1.00	9.27	O
	ATOM	1235	N	PRO	A	169	61.282	68.546	17.478	1.00	8.51	N
	ATOM	1236	CA	PRO	A	169	60.333	68.214	16.433	1.00	8.01	C
	ATOM	1237	CB	PRO	A	169	60.291	66.691	16.485	1.00	8.56	C
25	ATOM	1238	CG	PRO	A	169	61.668	66.311	16.939	1.00	8.29	C
	ATOM	1239	CD	PRO	A	169	62.009	67.360	17.955	1.00	8.76	C
	ATOM	1240	C	PRO	A	169	58.973	68.856	16.740	1.00	8.71	C
	ATOM	1241	O	PRO	A	169	58.507	68.782	17.875	1.00	9.30	O
	ATOM	1242	N	ALA	A	170	58.350	69.477	15.742	1.00	8.29	N
30	ATOM	1243	CA	ALA	A	170	57.331	70.516	16.016	1.00	8.65	C
	ATOM	1244	CB	ALA	A	170	57.906	71.887	15.643	1.00	7.77	C
	ATOM	1245	C	ALA	A	170	55.975	70.320	15.342	1.00	8.72	C
	ATOM	1246	O	ALA	A	170	55.021	71.017	15.691	1.00	11.53	O
	ATOM	1247	N	TRP	A	171	55.877	69.411	14.377	1.00	9.44	N
35	ATOM	1248	CA	TRP	A	171	54.588	69.135	13.712	1.00	9.22	C
	ATOM	1249	CB	TRP	A	171	54.250	70.198	12.631	1.00	9.17	C
	ATOM	1250	CG	TRP	A	171	55.097	70.062	11.407	1.00	10.08	C
	ATOM	1251	CD1	TRP	A	171	54.828	69.330	10.270	1.00	12.31	C
	ATOM	1252	NE1	TRP	A	171	55.861	69.430	9.371	1.00	13.50	N
40	ATOM	1253	CE2	TRP	A	171	56.849	70.206	9.869	1.00	11.29	C
	ATOM	1254	CD2	TRP	A	171	56.434	70.628	11.194	1.00	9.86	C
	ATOM	1255	CE3	TRP	A	171	57.256	71.492	11.914	1.00	11.00	C
	ATOM	1256	CZ3	TRP	A	171	58.503	71.842	11.364	1.00	10.59	C
	ATOM	1257	CH2	TRP	A	171	58.887	71.395	10.106	1.00	10.19	C
45	ATOM	1258	CZ2	TRP	A	171	58.063	70.580	9.330	1.00	11.61	C

	ATOM	1259	C	TRP	A	171	54.525	67.751	13.157	1.00	8.65	C
	ATOM	1260	O	TRP	A	171	55.510	67.003	13.202	1.00	10.22	O
	ATOM	1261	N	GLY	A	172	53.344	67.384	12.663	1.00	10.12	N
	ATOM	1262	CA	GLY	A	172	53.087	66.056	12.107	1.00	10.47	C
5	ATOM	1263	C	GLY	A	172	52.718	65.028	13.153	1.00	12.29	C
	ATOM	1264	O	GLY	A	172	52.660	63.826	12.858	1.00	12.87	O
	ATOM	1265	N	MET	A	173	52.471	65.491	14.374	1.00	12.39	N
	ATOM	1266	CA	MET	A	173	52.213	64.600	15.497	1.00	11.92	C
	ATOM	1267	CB	MET	A	173	52.595	65.286	16.817	1.00	11.23	C
10	ATOM	1268	CG	MET	A	173	54.105	65.396	16.983	1.00	11.15	C
	ATOM	1269	SD	MET	A	173	54.626	66.456	18.324	1.00	11.59	S
	ATOM	1270	CE	MET	A	173	54.753	68.069	17.495	1.00	10.82	C
	ATOM	1271	C	MET	A	173	50.739	64.172	15.521	1.00	12.16	C
	ATOM	1272	O	MET	A	173	49.894	64.888	14.996	1.00	10.97	O
15	ATOM	1273	N	ALA	A	174	50.457	63.042	16.178	1.00	12.44	N
	ATOM	1274	CA	ALA	A	174	49.095	62.508	16.344	1.00	11.08	C
	ATOM	1275	CB	ALA	A	174	49.149	61.126	16.988	1.00	11.37	C
	ATOM	1276	C	ALA	A	174	48.192	63.417	17.163	1.00	11.00	C
	ATOM	1277	O	ALA	A	174	46.966	63.341	17.051	1.00	12.83	O
20	ATOM	1278	N	PHE	A	175	48.792	64.249	18.001	1.00	10.60	N
	ATOM	1279	CA	PHE	A	175	48.102	65.258	18.798	1.00	11.40	C
	ATOM	1280	CB	PHE	A	175	47.381	64.652	20.033	1.00	12.77	C
	ATOM	1281	CG	PHE	A	175	48.310	64.086	21.087	1.00	12.88	C
	ATOM	1282	CD1	PHE	A	175	48.895	62.858	20.924	1.00	12.18	C
25	ATOM	1283	CE1	PHE	A	175	49.759	62.344	21.884	1.00	14.01	C
	ATOM	1284	CZ	PHE	A	175	50.025	63.063	23.029	1.00	11.54	C
	ATOM	1285	CE2	PHE	A	175	49.427	64.280	23.216	1.00	12.37	C
	ATOM	1286	CD2	PHE	A	175	48.574	64.797	22.257	1.00	12.29	C
	ATOM	1287	C	PHE	A	175	49.148	66.282	19.200	1.00	11.29	C
30	ATOM	1288	O	PHE	A	175	50.334	66.092	18.933	1.00	11.82	O
	ATOM	1289	N	ASP	A	176	48.739	67.371	19.840	1.00	10.78	N
	ATOM	1290	CA	ASP	A	176	49.675	68.429	20.157	1.00	11.84	C
	ATOM	1291	CB	ASP	A	176	48.935	69.767	20.323	1.00	13.37	C
	ATOM	1292	CG	ASP	A	176	49.875	70.965	20.549	1.00	13.44	C
35	ATOM	1293	OD1	ASP	A	176	51.093	70.805	20.750	1.00	12.54	O
	ATOM	1294	OD2	ASP	A	176	49.363	72.102	20.571	1.00	15.40	O
	ATOM	1295	C	ASP	A	176	50.460	68.026	21.387	1.00	12.02	C
	ATOM	1296	O	ASP	A	176	50.057	68.314	22.500	1.00	12.00	O
	ATOM	1297	N	GLN	A	177	51.591	67.349	21.188	1.00	10.47	N
40	ATOM	1298	CA	GLN	A	177	52.286	66.701	22.328	1.00	10.73	C
	ATOM	1299	CB	GLN	A	177	53.374	65.735	21.845	1.00	10.09	C
	ATOM	1300	CG	GLN	A	177	52.861	64.538	21.071	1.00	8.92	C
	ATOM	1301	CD	GLN	A	177	53.962	63.574	20.714	1.00	8.65	C
	ATOM	1302	OE1	GLN	A	177	54.292	63.396	19.525	1.00	8.24	O
45	ATOM	1303	NE2	GLN	A	177	54.555	62.936	21.744	1.00	7.40	N

	ATOM	1304	C	GLN A 177	52.918	67.748	23.254	1.00	10.04	C
	ATOM	1305	O	GLN A 177	53.416	68.776	22.780	1.00	8.99	O
	ATOM	1306	N	PRO A 178	52.925	67.480	24.564	1.00	10.85	N
	ATOM	1307	CA	PRO A 178	53.580	68.402	25.484	1.00	11.80	C
5	ATOM	1308	CB	PRO A 178	53.253	67.810	26.860	1.00	13.58	C
	ATOM	1309	CG	PRO A 178	53.050	66.344	26.589	1.00	14.37	C
	ATOM	1310	CD	PRO A 178	52.284	66.367	25.294	1.00	13.22	C
	ATOM	1311	C	PRO A 178	55.100	68.471	25.223	1.00	11.27	C
	ATOM	1312	O	PRO A 178	55.711	67.511	24.724	1.00	8.31	O
10	ATOM	1313	N	LYS A 179	55.669	69.631	25.524	1.00	11.67	N
	ATOM	1314	CA	LYS A 179	57.099	69.949	25.295	1.00	11.52	C
	ATOM	1315	CB	LYS A 179	58.041	69.051	26.142	1.00	12.11	C
	ATOM	1316	CG	LYS A 179	57.918	69.337	27.632	1.00	14.00	C
	ATOM	1317	CD	LYS A 179	59.064	68.746	28.457	1.00	15.10	C
15	ATOM	1318	CE	LYS A 179	59.028	69.283	29.879	1.00	13.97	C
	ATOM	1319	NZ	LYS A 179	60.185	68.786	30.671	1.00	11.58	N
	ATOM	1320	C	LYS A 179	57.569	70.059	23.831	1.00	10.28	C
	ATOM	1321	O	LYS A 179	58.251	71.039	23.490	1.00	10.46	O
	ATOM	1322	N	PHE A 180	57.226	69.099	22.977	1.00	8.82	N
20	ATOM	1323	CA	PHE A 180	57.513	69.221	21.557	1.00	8.16	C
	ATOM	1324	CB	PHE A 180	56.907	68.055	20.771	1.00	8.23	C
	ATOM	1325	CG	PHE A 180	57.679	66.775	20.905	1.00	7.35	C
	ATOM	1326	CD1	PHE A 180	58.850	66.573	20.189	1.00	7.39	C
	ATOM	1327	CE1	PHE A 180	59.571	65.398	20.303	1.00	7.17	C
25	ATOM	1328	CZ	PHE A 180	59.124	64.405	21.162	1.00	8.06	C
	ATOM	1329	CE2	PHE A 180	57.961	64.597	21.890	1.00	7.86	C
	ATOM	1330	CD2	PHE A 180	57.252	65.780	21.769	1.00	7.55	C
	ATOM	1331	C	PHE A 180	56.983	70.550	21.006	1.00	8.91	C
	ATOM	1332	O	PHE A 180	55.851	70.962	21.298	1.00	8.93	O
30	ATOM	1333	N	GLY A 181	57.811	71.209	20.209	1.00	7.53	N
	ATOM	1334	CA	GLY A 181	57.482	72.482	19.604	1.00	8.62	C
	ATOM	1335	C	GLY A 181	57.420	73.673	20.541	1.00	9.53	C
	ATOM	1336	O	GLY A 181	56.997	74.763	20.130	1.00	11.40	O
	ATOM	1337	N	LYS A 182	57.833	73.489	21.794	1.00	9.58	N
35	ATOM	1338	CA	LYS A 182	57.624	74.521	22.815	1.00	9.35	C
	ATOM	1339	CB	LYS A 182	56.674	74.002	23.912	1.00	10.05	C
	ATOM	1340	CG	LYS A 182	55.212	73.865	23.448	1.00	10.48	C
	ATOM	1341	CD	LYS A 182	54.618	72.529	23.903	1.00	12.92	C
	ATOM	1342	CE	LYS A 182	53.209	72.283	23.374	1.00	12.16	C
40	ATOM	1343	NZ	LYS A 182	53.207	72.193	21.891	1.00	11.08	N
	ATOM	1344	C	LYS A 182	58.952	74.952	23.408	1.00	8.81	C
	ATOM	1345	O	LYS A 182	59.846	74.140	23.565	1.00	9.49	O
	ATOM	1346	N	ILE A 183	59.077	76.241	23.709	1.00	8.75	N
	ATOM	1347	CA	ILE A 183	60.255	76.777	24.346	1.00	9.45	C
45	ATOM	1348	CB	ILE A 183	61.083	77.623	23.357	1.00	12.55	C

	ATOM	1349	CG1	ILE A 183	61.710	76.659	22.331	1.00	15.65	C
	ATOM	1350	CD1	ILE A 183	62.529	77.286	21.266	1.00	22.71	C
	ATOM	1351	CG2	ILE A 183	62.171	78.408	24.090	1.00	10.48	C
	ATOM	1352	C	ILE A 183	59.853	77.545	25.605	1.00	9.68	C
5	ATOM	1353	O	ILE A 183	58.910	78.353	25.586	1.00	9.02	O
	ATOM	1354	N	TYR A 184	60.577	77.257	26.692	1.00	8.94	N
	ATOM	1355	CA	TYR A 184	60.332	77.841	27.983	1.00	10.44	C
	ATOM	1356	CB	TYR A 184	59.983	76.733	29.003	1.00	10.93	C
	ATOM	1357	CG	TYR A 184	58.704	75.963	28.685	1.00	10.76	C
10	ATOM	1358	CD1	TYR A 184	58.718	74.862	27.841	1.00	11.50	C
	ATOM	1359	CE1	TYR A 184	57.567	74.145	27.562	1.00	10.91	C
	ATOM	1360	CZ	TYR A 184	56.363	74.538	28.126	1.00	12.16	C
	ATOM	1361	OH	TYR A 184	55.193	73.849	27.840	1.00	15.56	O
	ATOM	1362	CE2	TYR A 184	56.317	75.621	28.978	1.00	12.75	C
15	ATOM	1363	CD2	TYR A 184	57.486	76.325	29.256	1.00	12.17	C
	ATOM	1364	C	TYR A 184	61.548	78.611	28.467	1.00	10.26	C
	ATOM	1365	O	TYR A 184	62.674	78.217	28.213	1.00	9.38	O
	ATOM	1366	N	ASP A 185	61.318	79.683	29.229	1.00	14.31	N
	ATOM	1367	CA	ASP A 185	62.446	80.446	29.803	1.00	18.13	C
20	ATOM	1368	CB	ASP A 185	62.165	81.960	29.817	1.00	22.31	C
	ATOM	1369	CG	ASP A 185	61.126	82.381	30.826	1.00	27.88	C
	ATOM	1370	OD1	ASP A 185	60.775	81.621	31.779	1.00	27.23	O
	ATOM	1371	OD2	ASP A 185	60.649	83.518	30.638	1.00	39.07	O
	ATOM	1372	C	ASP A 185	62.897	79.907	31.149	1.00	19.78	C
25	ATOM	1373	O	ASP A 185	62.370	78.883	31.635	1.00	15.62	O
	ATOM	1374	N	LYS A 186	63.923	80.538	31.720	1.00	26.05	N
	ATOM	1375	CA	LYS A 186	64.474	80.086	33.009	1.00	28.37	C
	ATOM	1376	CB	LYS A 186	65.671	80.947	33.458	1.00	37.38	C
	ATOM	1377	CG	LYS A 186	65.436	82.462	33.452	1.00	50.77	C
30	ATOM	1378	CD	LYS A 186	66.739	83.253	33.329	1.00	52.62	C
	ATOM	1379	CE	LYS A 186	66.503	84.664	32.793	1.00	54.21	C
	ATOM	1380	NZ	LYS A 186	67.681	85.166	32.024	1.00	56.86	N
	ATOM	1381	C	LYS A 186	63.376	80.052	34.091	1.00	31.29	C
	ATOM	1382	O	LYS A 186	63.306	79.088	34.838	1.00	29.02	O
35	ATOM	1383	N	ASP A 187	62.486	81.053	34.111	1.00	29.44	N
	ATOM	1384	CA	ASP A 187	61.306	81.057	35.044	1.00	32.56	C
	ATOM	1385	CB	ASP A 187	60.494	82.354	34.913	1.00	33.92	C
	ATOM	1386	CG	ASP A 187	61.298	83.577	35.190	1.00	40.40	C
	ATOM	1387	OD1	ASP A 187	62.181	83.493	36.066	1.00	39.07	O
40	ATOM	1388	OD2	ASP A 187	61.048	84.617	34.527	1.00	50.00	O
	ATOM	1389	C	ASP A 187	60.290	79.935	34.839	1.00	29.49	C
	ATOM	1390	O	ASP A 187	59.374	79.807	35.625	1.00	37.65	O
	ATOM	1391	N	GLY A 188	60.404	79.164	33.763	1.00	25.14	N
	ATOM	1392	CA	GLY A 188	59.374	78.211	33.389	1.00	17.75	C
45	ATOM	1393	C	GLY A 188	58.222	78.783	32.561	1.00	16.77	C

	ATOM	1394	O	GLY A 188	57.274	78.068	32.279	1.00 17.77	O
	ATOM	1395	N	THR A 189	58.312	80.039	32.130	1.00 16.40	N
	ATOM	1396	CA	THR A 189	57.295	80.646	31.277	1.00 17.50	C
	ATOM	1397	CB	THR A 189	57.446	82.185	31.246	1.00 19.57	C
5	ATOM	1398	OG1	THR A 189	57.549	82.670	32.586	1.00 21.09	O
	ATOM	1399	CG2	THR A 189	56.249	82.862	30.543	1.00 18.14	C
	ATOM	1400	C	THR A 189	57.374	80.134	29.841	1.00 16.32	C
	ATOM	1401	O	THR A 189	58.469	80.021	29.272	1.00 14.35	O
	ATOM	1402	N	LEU A 190	56.211	79.833	29.262	1.00 13.94	N
10	ATOM	1403	CA	LEU A 190	56.107	79.440	27.863	1.00 13.04	C
	ATOM	1404	CB	LEU A 190	54.701	78.935	27.550	1.00 12.37	C
	ATOM	1405	CG	LEU A 190	54.466	78.433	26.121	1.00 12.62	C
	ATOM	1406	CD1	LEU A 190	55.259	77.176	25.810	1.00 10.45	C
	ATOM	1407	CD2	LEU A 190	52.954	78.196	25.942	1.00 14.52	C
15	ATOM	1408	C	LEU A 190	56.359	80.656	27.018	1.00 13.62	C
	ATOM	1409	O	LEU A 190	55.620	81.614	27.103	1.00 11.26	O
	ATOM	1410	N	ILE A 191	57.377	80.619	26.171	1.00 12.52	N
	ATOM	1411	CA	ILE A 191	57.625	81.744	25.309	1.00 12.76	C
	ATOM	1412	CB	ILE A 191	58.966	82.411	25.643	1.00 14.33	C
20	ATOM	1413	CG1	ILE A 191	60.124	81.455	25.382	1.00 13.90	C
	ATOM	1414	CD1	ILE A 191	61.495	82.098	25.563	1.00 13.42	C
	ATOM	1415	CG2	ILE A 191	58.952	82.952	27.090	1.00 14.41	C
	ATOM	1416	C	ILE A 191	57.519	81.415	23.804	1.00 11.52	C
	ATOM	1417	O	ILE A 191	57.552	82.331	22.974	1.00 13.36	O
25	ATOM	1418	N	ALA A 192	57.401	80.138	23.433	1.00 11.55	N
	ATOM	1419	CA	ALA A 192	57.132	79.779	22.010	1.00 9.87	C
	ATOM	1420	CB	ALA A 192	58.435	79.657	21.198	1.00 8.37	C
	ATOM	1421	C	ALA A 192	56.356	78.483	21.973	1.00 10.48	C
	ATOM	1422	O	ALA A 192	56.614	77.605	22.785	1.00 11.24	O
30	ATOM	1423	N	ASP A 193	55.386	78.370	21.058	1.00 9.96	N
	ATOM	1424	CA	ASP A 193	54.649	77.122	20.892	1.00 9.77	C
	ATOM	1425	CB	ASP A 193	53.413	77.120	21.804	1.00 10.43	C
	ATOM	1426	CG	ASP A 193	52.706	75.778	21.851	1.00 11.12	C
	ATOM	1427	OD1	ASP A 193	53.020	74.840	21.061	1.00 10.11	O
35	ATOM	1428	OD2	ASP A 193	51.810	75.656	22.710	1.00 10.10	O
	ATOM	1429	C	ASP A 193	54.235	76.941	19.436	1.00 9.82	C
	ATOM	1430	O	ASP A 193	53.372	77.659	18.946	1.00 8.98	O
	ATOM	1431	N	HIS A 194	54.844	75.954	18.776	1.00 9.00	N
	ATOM	1432	CA	HIS A 194	54.589	75.627	17.367	1.00 9.00	C
40	ATOM	1433	CB	HIS A 194	55.705	74.662	16.876	1.00 7.91	C
	ATOM	1434	CG	HIS A 194	56.261	74.949	15.488	1.00 8.06	C
	ATOM	1435	ND1	HIS A 194	55.640	74.557	14.337	1.00 8.17	N
	ATOM	1436	CE1	HIS A 194	56.421	74.870	13.288	1.00 7.83	C
	ATOM	1437	NE2	HIS A 194	57.551	75.418	13.754	1.00 7.69	N
45	ATOM	1438	CD2	HIS A 194	57.483	75.492	15.099	1.00 7.85	C

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     ATOM   1439  C    HIS A 194      53.219  74.975  17.173  1.00   9.75           C
     ATOM   1440  O    HIS A 194      52.753  74.819  16.023  1.00   8.97           O
     ATOM   1441  N    GLN A 195      52.578  74.573  18.279  1.00   9.77           N
     ATOM   1442  CA   GLN A 195      51.189  74.077  18.293  1.00  10.69           C
  5  ATOM   1443  CB   GLN A 195      50.215  75.248  18.106  1.00  11.53           C
     ATOM   1444  CG   GLN A 195      50.263  76.249  19.232  1.00  12.30           C
     ATOM   1445  CD   GLN A 195      49.330  77.417  18.999  1.00  17.08           C
     ATOM   1446  OE1  GLN A 195      49.424  78.121  17.999  1.00  14.58           O
     ATOM   1447  NE2  GLN A 195      48.425  77.632  19.943  1.00  19.44           N
 10  ATOM   1448  C    GLN A 195      50.893  72.973  17.259  1.00  10.35           C
     ATOM   1449  O    GLN A 195      49.801  72.906  16.699  1.00  10.47           O
     ATOM   1450  N    ASN A 196      51.887  72.142  16.968  1.00   9.63           N
     ATOM   1451  CA   ASN A 196      51.719  71.044  16.024  1.00  10.05           C
     ATOM   1452  CB   ASN A 196      50.759  69.975  16.593  1.00   9.67           C
 15  ATOM   1453  CG   ASN A 196      50.842  68.643  15.861  1.00   9.67           C
     ATOM   1454  OD1  ASN A 196      51.900  68.263  15.393  1.00   9.77           O
     ATOM   1455  ND2  ASN A 196      49.725  67.892  15.827  1.00   7.83           N
     ATOM   1456  C    ASN A 196      51.242  71.539  14.668  1.00   9.69           C
     ATOM   1457  O    ASN A 196      50.549  70.824  13.975  1.00  10.02           O
 20  ATOM   1458  N    LEU A 197      51.639  72.760  14.299  1.00  10.69           N
     ATOM   1459  CA   LEU A 197      51.375  73.325  12.978  1.00  10.53           C
     ATOM   1460  CB   LEU A 197      50.912  74.779  13.079  1.00  10.60           C
     ATOM   1461  CG   LEU A 197      49.576  75.044  13.780  1.00  12.87           C
     ATOM   1462  CD1  LEU A 197      49.349  76.556  14.059  1.00  11.44           C
 25  ATOM   1463  CD2  LEU A 197      48.412  74.409  13.000  1.00  11.47           C
     ATOM   1464  C    LEU A 197      52.642  73.290  12.134  1.00  10.25           C
     ATOM   1465  O    LEU A 197      53.721  73.555  12.634  1.00  10.13           O
     ATOM   1466  N    PRO A 198      52.519  72.944  10.845  1.00  11.95           N
     ATOM   1467  CA   PRO A 198      53.680  73.161   9.967  1.00  12.95           C
 30  ATOM   1468  CB   PRO A 198      53.197  72.721   8.572  1.00  15.22           C
     ATOM   1469  CG   PRO A 198      51.746  72.443   8.688  1.00  17.25           C
     ATOM   1470  CD   PRO A 198      51.293  72.566  10.124  1.00  14.07           C
     ATOM   1471  C    PRO A 198      54.091  74.651   9.970  1.00  11.84           C
     ATOM   1472  O    PRO A 198      53.246  75.521  10.237  1.00   8.86           O
 35  ATOM   1473  N    PRO A 199      55.379  74.944   9.694  1.00  11.71           N
     ATOM   1474  CA   PRO A 199      55.835  76.339   9.814  1.00  11.73           C
     ATOM   1475  CB   PRO A 199      57.299  76.270   9.342  1.00  11.77           C
     ATOM   1476  CG   PRO A 199      57.716  74.844   9.631  1.00  11.53           C
     ATOM   1477  CD   PRO A 199      56.482  74.040   9.304  1.00  11.79           C
 40  ATOM   1478  C    PRO A 199      55.025  77.334   8.969  1.00  10.05           C
     ATOM   1479  O    PRO A 199      54.747  78.446   9.418  1.00  11.19           O
     ATOM   1480  N    GLN A 200      54.603  76.904   7.791  1.00   9.70           N
     ATOM   1481  CA   GLN A 200      53.879  77.769   6.872  1.00  11.05           C
     ATOM   1482  CB   GLN A 200      53.707  77.093   5.498  1.00  12.75           C
 45  ATOM   1483  CG   GLN A 200      55.007  76.653   4.831  1.00  14.55           C
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	ATOM	1484	CD	GLN A	200	55.345	75.174	5.079	1.00	18.94	C
	ATOM	1485	OE1	GLN A	200	55.220	74.657	6.199	1.00	15.92	O
	ATOM	1486	NE2	GLN A	200	55.787	74.495	4.025	1.00	17.31	N
	ATOM	1487	C	GLN A	200	52.513	78.141	7.419	1.00	10.65	C
5	ATOM	1488	O	GLN A	200	51.916	79.067	6.934	1.00	11.06	O
	ATOM	1489	N	GLN A	201	52.005	77.405	8.399	1.00	9.86	N
	ATOM	1490	CA	GLN A	201	50.724	77.740	9.034	1.00	11.01	C
	ATOM	1491	CB	GLN A	201	49.902	76.471	9.311	1.00	11.55	C
	ATOM	1492	CG	GLN A	201	49.381	75.828	8.015	1.00	14.28	C
10	ATOM	1493	CD	GLN A	201	48.673	74.499	8.267	1.00	16.74	C
	ATOM	1494	OE1	GLN A	201	47.979	74.334	9.252	1.00	18.13	O
	ATOM	1495	NE2	GLN A	201	48.831	73.573	7.358	1.00	18.73	N
	ATOM	1496	C	GLN A	201	50.851	78.568	10.306	1.00	11.88	C
	ATOM	1497	O	GLN A	201	49.840	78.931	10.899	1.00	11.87	O
15	ATOM	1498	N	LEU A	202	52.069	78.886	10.738	1.00	11.95	N
	ATOM	1499	CA	LEU A	202	52.211	79.762	11.907	1.00	11.03	C
	ATOM	1500	CB	LEU A	202	53.628	79.742	12.446	1.00	10.09	C
	ATOM	1501	CG	LEU A	202	54.211	78.382	12.856	1.00	9.78	C
	ATOM	1502	CD1	LEU A	202	55.682	78.615	13.183	1.00	8.27	C
20	ATOM	1503	CD2	LEU A	202	53.411	77.789	14.029	1.00	8.33	C
	ATOM	1504	C	LEU A	202	51.829	81.200	11.527	1.00	12.76	C
	ATOM	1505	O	LEU A	202	51.837	81.545	10.374	1.00	11.37	O
	ATOM	1506	N	ASP A	203	51.531	82.032	12.519	1.00	13.21	N
	ATOM	1507	CA	ASP A	203	51.093	83.420	12.303	1.00	14.72	C
25	ATOM	1508	CB	ASP A	203	49.574	83.457	12.540	1.00	17.99	C
	ATOM	1509	CG	ASP A	203	48.937	84.831	12.271	1.00	22.41	C
	ATOM	1510	OD1	ASP A	203	49.585	85.761	11.748	1.00	21.46	O
	ATOM	1511	OD2	ASP A	203	47.760	84.946	12.610	1.00	24.92	O
	ATOM	1512	C	ASP A	203	51.844	84.366	13.276	1.00	14.34	C
30	ATOM	1513	O	ASP A	203	51.250	84.909	14.183	1.00	14.43	O
	ATOM	1514	N	PRO A	204	53.168	84.519	13.118	1.00	13.08	N
	ATOM	1515	CA	PRO A	204	53.934	85.355	14.056	1.00	15.31	C
	ATOM	1516	CB	PRO A	204	55.368	85.309	13.517	1.00	16.29	C
	ATOM	1517	CG	PRO A	204	55.287	84.726	12.134	1.00	14.61	C
35	ATOM	1518	CD	PRO A	204	53.999	83.940	12.062	1.00	14.12	C
	ATOM	1519	C	PRO A	204	53.457	86.801	14.135	1.00	19.16	C
	ATOM	1520	O	PRO A	204	53.633	87.432	15.161	1.00	20.94	O
	ATOM	1521	N	GLU A	205	52.850	87.317	13.077	1.00	19.31	N
	ATOM	1522	CA	GLU A	205	52.336	88.683	13.112	1.00	23.12	C
40	ATOM	1523	CB	GLU A	205	51.748	89.103	11.755	1.00	26.07	C
	ATOM	1524	CG	GLU A	205	51.411	90.595	11.702	1.00	37.73	C
	ATOM	1525	CD	GLU A	205	50.472	90.976	10.562	1.00	48.65	C
	ATOM	1526	OE1	GLU A	205	50.573	90.397	9.460	1.00	50.75	O
	ATOM	1527	OE2	GLU A	205	49.629	91.872	10.768	1.00	61.08	O
45	ATOM	1528	C	GLU A	205	51.286	88.836	14.210	1.00	21.84	C

	ATOM	1529	O	GLU	A	205	51.289	89.818	14.920	1.00	22.08	O
	ATOM	1530	N	HIS	A	206	50.412	87.857	14.390	1.00	21.55	N
	ATOM	1531	CA	HIS	A	206	49.335	87.998	15.374	1.00	22.21	C
	ATOM	1532	CB	HIS	A	206	47.983	87.660	14.747	1.00	23.84	C
5	ATOM	1533	CG	HIS	A	206	47.680	88.471	13.501	1.00	32.48	C
	ATOM	1534	ND1	HIS	A	206	47.743	87.949	12.258	1.00	33.64	N
	ATOM	1535	CE1	HIS	A	206	47.441	88.906	11.353	1.00	35.01	C
	ATOM	1536	NE2	HIS	A	206	47.192	90.050	12.022	1.00	34.14	N
	ATOM	1537	CD2	HIS	A	206	47.330	89.822	13.344	1.00	33.21	C
10	ATOM	1538	C	HIS	A	206	49.536	87.202	16.633	1.00	27.52	C
	ATOM	1539	O	HIS	A	206	48.958	87.554	17.653	1.00	24.65	O
	ATOM	1540	N	ASN	A	207	50.342	86.136	16.580	1.00	20.01	N
	ATOM	1541	CA	ASN	A	207	50.517	85.228	17.710	1.00	17.23	C
	ATOM	1542	CB	ASN	A	207	50.225	83.799	17.280	1.00	17.75	C
15	ATOM	1543	CG	ASN	A	207	50.035	82.879	18.449	1.00	21.33	C
	ATOM	1544	OD1	ASN	A	207	50.565	83.111	19.566	1.00	21.62	O
	ATOM	1545	ND2	ASN	A	207	49.243	81.842	18.230	1.00	20.26	N
	ATOM	1546	C	ASN	A	207	51.934	85.321	18.256	1.00	16.81	C
	ATOM	1547	O	ASN	A	207	52.878	84.831	17.625	1.00	14.76	O
20	ATOM	1548	N	PRO	A	208	52.092	85.955	19.426	1.00	17.46	N
	ATOM	1549	CA	PRO	A	208	53.398	86.096	20.062	1.00	16.37	C
	ATOM	1550	CB	PRO	A	208	53.059	86.721	21.430	1.00	17.56	C
	ATOM	1551	CG	PRO	A	208	51.778	87.451	21.201	1.00	19.70	C
	ATOM	1552	CD	PRO	A	208	51.018	86.569	20.249	1.00	19.67	C
25	ATOM	1553	C	PRO	A	208	54.148	84.783	20.260	1.00	14.70	C
	ATOM	1554	O	PRO	A	208	55.377	84.790	20.212	1.00	13.89	O
	ATOM	1555	N	LEU	A	209	53.420	83.682	20.488	1.00	12.12	N
	ATOM	1556	CA	LEU	A	209	54.036	82.365	20.685	1.00	13.53	C
	ATOM	1557	CB	LEU	A	209	53.064	81.391	21.376	1.00	14.74	C
30	ATOM	1558	CG	LEU	A	209	52.626	81.776	22.798	1.00	16.44	C
	ATOM	1559	CD1	LEU	A	209	51.472	80.887	23.283	1.00	15.18	C
	ATOM	1560	CD2	LEU	A	209	53.821	81.684	23.738	1.00	15.92	C
	ATOM	1561	C	LEU	A	209	54.607	81.731	19.399	1.00	10.98	C
	ATOM	1562	O	LEU	A	209	55.238	80.671	19.468	1.00	9.53	O
35	ATOM	1563	N	HIS	A	210	54.429	82.387	18.254	1.00	9.36	N
	ATOM	1564	CA	HIS	A	210	55.040	81.921	16.998	1.00	10.30	C
	ATOM	1565	CB	HIS	A	210	54.016	81.943	15.859	1.00	10.35	C
	ATOM	1566	CG	HIS	A	210	52.830	81.038	16.068	1.00	9.77	C
	ATOM	1567	ND1	HIS	A	210	51.738	81.062	15.241	1.00	8.73	N
40	ATOM	1568	CE1	HIS	A	210	50.851	80.135	15.660	1.00	9.01	C
	ATOM	1569	NE2	HIS	A	210	51.343	79.547	16.755	1.00	10.12	N
	ATOM	1570	CD2	HIS	A	210	52.563	80.072	17.037	1.00	9.06	C
	ATOM	1571	C	HIS	A	210	56.260	82.706	16.581	1.00	9.75	C
	ATOM	1572	O	HIS	A	210	57.000	82.278	15.713	1.00	8.60	O
45	ATOM	1573	N	ARG	A	211	56.525	83.834	17.223	1.00	11.42	N

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	ATOM	1574	CA	ARG A 211	57.590	84.752	16.792	1.00	10.78	C
	ATOM	1575	CB	ARG A 211	57.474	86.090	17.544	1.00	13.67	C
	ATOM	1576	CG	ARG A 211	56.265	86.842	17.093	1.00	19.18	C
	ATOM	1577	CD	ARG A 211	55.967	88.144	17.845	1.00	23.33	C
5	ATOM	1578	NE	ARG A 211	54.614	88.564	17.454	1.00	26.69	N
	ATOM	1579	CZ	ARG A 211	53.811	89.382	18.138	1.00	30.08	C
	ATOM	1580	NH1	ARG A 211	54.185	89.935	19.293	1.00	25.05	N
	ATOM	1581	NH2	ARG A 211	52.607	89.639	17.655	1.00	29.36	N
	ATOM	1582	C	ARG A 211	59.013	84.238	16.936	1.00	9.58	C
10	ATOM	1583	O	ARG A 211	59.919	84.750	16.294	1.00	9.05	O
	ATOM	1584	N	PHE A 212	59.216	83.243	17.785	1.00	8.15	N
	ATOM	1585	CA	PHE A 212	60.494	82.589	17.875	1.00	8.77	C
	ATOM	1586	CB	PHE A 212	60.556	81.688	19.124	1.00	9.63	C
	ATOM	1587	CG	PHE A 212	61.284	82.307	20.272	1.00	11.98	C
15	ATOM	1588	CD1	PHE A 212	60.969	83.593	20.694	1.00	14.73	C
	ATOM	1589	CE1	PHE A 212	61.628	84.176	21.772	1.00	18.02	C
	ATOM	1590	CZ	PHE A 212	62.630	83.476	22.414	1.00	15.52	C
	ATOM	1591	CE2	PHE A 212	62.960	82.206	21.997	1.00	14.74	C
	ATOM	1592	CD2	PHE A 212	62.293	81.619	20.926	1.00	15.43	C
20	ATOM	1593	C	PHE A 212	60.831	81.767	16.638	1.00	7.80	C
	ATOM	1594	O	PHE A 212	61.956	81.358	16.470	1.00	7.92	O
	ATOM	1595	N	TYR A 213	59.873	81.544	15.761	1.00	7.63	N
	ATOM	1596	CA	TYR A 213	60.067	80.552	14.714	1.00	7.71	C
	ATOM	1597	CB	TYR A 213	58.986	79.492	14.842	1.00	7.51	C
25	ATOM	1598	CG	TYR A 213	58.994	78.744	16.148	1.00	7.14	C
	ATOM	1599	CD1	TYR A 213	60.172	78.236	16.683	1.00	7.13	C
	ATOM	1600	CE1	TYR A 213	60.172	77.513	17.868	1.00	8.13	C
	ATOM	1601	CZ	TYR A 213	58.972	77.293	18.533	1.00	7.47	C
	ATOM	1602	OH	TYR A 213	58.958	76.587	19.709	1.00	6.99	O
30	ATOM	1603	CE2	TYR A 213	57.789	77.796	18.018	1.00	6.83	C
	ATOM	1604	CD2	TYR A 213	57.803	78.511	16.844	1.00	7.07	C
	ATOM	1605	C	TYR A 213	60.031	81.127	13.307	1.00	8.50	C
	ATOM	1606	O	TYR A 213	59.257	82.038	13.008	1.00	7.98	O
	ATOM	1607	N	ASN A 214	60.852	80.552	12.428	1.00	7.88	N
35	ATOM	1608	CA	ASN A 214	60.750	80.821	10.997	1.00	7.95	C
	ATOM	1609	CB	ASN A 214	62.053	80.428	10.277	1.00	7.75	C
	ATOM	1610	CG	ASN A 214	63.168	81.377	10.587	1.00	7.21	C
	ATOM	1611	OD1	ASN A 214	62.932	82.588	10.795	1.00	6.20	O
	ATOM	1612	ND2	ASN A 214	64.390	80.856	10.613	1.00	6.54	N
40	ATOM	1613	C	ASN A 214	59.553	80.050	10.429	1.00	8.37	C
	ATOM	1614	O	ASN A 214	59.093	79.068	11.005	1.00	6.32	O
	ATOM	1615	N	THR A 215	59.020	80.549	9.320	1.00	8.85	N
	ATOM	1616	CA	THR A 215	57.782	80.021	8.767	1.00	9.29	C
	ATOM	1617	CB	THR A 215	56.681	81.100	8.798	1.00	10.96	C
45	ATOM	1618	OG1	THR A 215	57.057	82.131	7.918	1.00	10.00	O

	ATOM	1619	CG2	THR A 215	56.493	81.694	10.197	1.00 10.48	C
	ATOM	1620	C	THR A 215	57.960	79.522	7.335	1.00 10.13	C
	ATOM	1621	O	THR A 215	56.984	79.432	6.578	1.00 11.44	O
	ATOM	1622	N	VAL A 216	59.176	79.146	6.963	1.00 10.50	N
5	ATOM	1623	CA	VAL A 216	59.468	78.725	5.569	1.00 12.11	C
	ATOM	1624	CB	VAL A 216	60.973	78.912	5.202	1.00 13.76	C
	ATOM	1625	CG1	VAL A 216	61.295	78.346	3.811	1.00 12.99	C
	ATOM	1626	CG2	VAL A 216	61.364	80.405	5.287	1.00 14.35	C
	ATOM	1627	C	VAL A 216	59.032	77.279	5.310	1.00 11.49	C
10	ATOM	1628	O	VAL A 216	58.495	76.983	4.253	1.00 13.28	O
	ATOM	1629	N	GLY A 217	59.235	76.396	6.286	1.00 11.73	N
	ATOM	1630	CA	GLY A 217	59.054	74.956	6.112	1.00 11.01	C
	ATOM	1631	C	GLY A 217	60.278	74.341	5.441	1.00 10.70	C
	ATOM	1632	O	GLY A 217	61.156	75.050	5.041	1.00 10.37	O
15	ATOM	1633	N	PRO A 218	60.323	73.017	5.297	1.00 13.52	N
	ATOM	1634	CA	PRO A 218	61.419	72.322	4.616	1.00 12.51	C
	ATOM	1635	CB	PRO A 218	60.961	70.862	4.609	1.00 16.88	C
	ATOM	1636	CG	PRO A 218	60.072	70.755	5.814	1.00 17.49	C
	ATOM	1637	CD	PRO A 218	59.319	72.067	5.822	1.00 16.29	C
20	ATOM	1638	C	PRO A 218	61.554	72.828	3.207	1.00 11.94	C
	ATOM	1639	O	PRO A 218	60.555	73.139	2.573	1.00 10.11	O
	ATOM	1640	N	VAL A 219	62.781	72.985	2.741	1.00 11.40	N
	ATOM	1641	CA	VAL A 219	63.032	73.494	1.395	1.00 11.36	C
	ATOM	1642	CB	VAL A 219	63.920	74.756	1.431	1.00 11.22	C
25	ATOM	1643	CG1	VAL A 219	64.409	75.122	0.040	1.00 9.95	C
	ATOM	1644	CG2	VAL A 219	63.154	75.931	2.060	1.00 8.78	C
	ATOM	1645	C	VAL A 219	63.683	72.367	0.611	1.00 11.48	C
	ATOM	1646	O	VAL A 219	64.702	71.824	1.020	1.00 12.35	O
	ATOM	1647	N	ASP A 220	63.065	72.003	−0.499	1.00 12.70	N
30	ATOM	1648	CA	ASP A 220	63.620	71.004	−1.444	1.00 14.09	C
	ATOM	1649	CB	ASP A 220	62.564	70.651	−2.512	1.00 19.09	C
	ATOM	1650	CG	ASP A 220	63.013	69.504	−3.422	1.00 23.00	C
	ATOM	1651	OD1	ASP A 220	62.514	68.395	−3.228	1.00 33.98	O
	ATOM	1652	OD2	ASP A 220	63.882	69.697	−4.301	1.00 19.58	O
35	ATOM	1653	C	ASP A 220	64.853	71.583	−2.137	1.00 12.59	C
	ATOM	1654	O	ASP A 220	64.809	72.725	−2.623	1.00 12.92	O
	ATOM	1655	N	GLY A 221	65.940	70.810	−2.179	1.00 12.37	N
	ATOM	1656	CA	GLY A 221	67.205	71.221	−2.785	1.00 11.61	C
	ATOM	1657	C	GLY A 221	67.180	71.643	−4.249	1.00 14.90	C
40	ATOM	1658	O	GLY A 221	68.077	72.339	−4.724	1.00 12.92	O
	ATOM	1659	N	ALA A 222	66.144	71.221	−4.970	1.00 15.04	N
	ATOM	1660	CA	ALA A 222	65.919	71.649	−6.343	1.00 16.06	C
	ATOM	1661	CB	ALA A 222	65.042	70.606	−7.053	1.00 14.37	C
	ATOM	1662	C	ALA A 222	65.259	73.033	−6.437	1.00 15.61	C
45	ATOM	1663	O	ALA A 222	65.190	73.613	−7.528	1.00 18.27	O

	ATOM	1664	N	LYS A 223	64.720	73.535	-5.326	1.00	14.15	N
	ATOM	1665	CA	LYS A 223	63.855	74.738	-5.347	1.00	14.84	C
	ATOM	1666	CB	LYS A 223	62.384	74.339	-5.086	1.00	17.77	C
	ATOM	1667	CG	LYS A 223	61.779	73.313	-6.073	1.00	19.77	C
5	ATOM	1668	CD	LYS A 223	61.871	73.726	-7.547	1.00	20.13	C
	ATOM	1669	CE	LYS A 223	61.187	72.711	-8.493	1.00	23.78	C
	ATOM	1670	NZ	LYS A 223	61.352	73.102	-9.924	1.00	19.55	N
	ATOM	1671	C	LYS A 223	64.285	75.799	-4.299	1.00	12.23	C
	ATOM	1672	O	LYS A 223	63.473	76.600	-3.831	1.00	14.57	O
10	ATOM	1673	N	GLY A 224	65.547	75.793	-3.916	1.00	9.38	N
	ATOM	1674	CA	GLY A 224	66.077	76.781	-2.953	1.00	8.00	C
	ATOM	1675	C	GLY A 224	67.222	76.129	-2.212	1.00	9.36	C
	ATOM	1676	O	GLY A 224	67.511	74.930	-2.420	1.00	8.77	O
	ATOM	1677	N	SER A 225	67.886	76.883	-1.348	1.00	8.68	N
15	ATOM	1678	CA	SER A 225	68.874	76.286	-0.461	1.00	7.59	C
	ATOM	1679	CB	SER A 225	69.738	77.379	0.190	1.00	7.43	C
	ATOM	1680	OG	SER A 225	70.619	76.789	1.142	1.00	6.53	O
	ATOM	1681	C	SER A 225	68.146	75.534	0.641	1.00	8.56	C
	ATOM	1682	O	SER A 225	67.248	76.101	1.286	1.00	8.06	O
20	ATOM	1683	N	ILE A 226	68.550	74.300	0.928	1.00	7.50	N
	ATOM	1684	CA	ILE A 226	67.912	73.585	2.042	1.00	7.85	C
	ATOM	1685	CB	ILE A 226	68.368	72.105	2.161	1.00	9.15	C
	ATOM	1686	CG1	ILE A 226	69.816	71.994	2.658	1.00	10.46	C
	ATOM	1687	CD1	ILE A 226	70.309	70.556	2.877	1.00	9.97	C
25	ATOM	1688	CG2	ILE A 226	68.147	71.364	0.826	1.00	8.05	C
	ATOM	1689	C	ILE A 226	68.100	74.330	3.366	1.00	8.37	C
	ATOM	1690	O	ILE A 226	67.236	74.287	4.236	1.00	7.38	O
	ATOM	1691	N	PHE A 227	69.187	75.099	3.472	1.00	8.65	N
	ATOM	1692	CA	PHE A 227	69.505	75.797	4.708	1.00	9.48	C
30	ATOM	1693	CB	PHE A 227	70.965	76.273	4.707	1.00	9.08	C
	ATOM	1694	CG	PHE A 227	71.922	75.176	4.443	1.00	8.38	C
	ATOM	1695	CD1	PHE A 227	71.943	74.077	5.252	1.00	8.71	C
	ATOM	1696	CE1	PHE A 227	72.813	73.038	5.018	1.00	9.21	C
	ATOM	1697	CZ	PHE A 227	73.664	73.090	3.938	1.00	9.94	C
35	ATOM	1698	CE2	PHE A 227	73.644	74.190	3.120	1.00	10.56	C
	ATOM	1699	CD2	PHE A 227	72.771	75.225	3.370	1.00	8.98	C
	ATOM	1700	C	PHE A 227	68.595	76.940	5.044	1.00	9.68	C
	ATOM	1701	O	PHE A 227	68.628	77.417	6.180	1.00	9.62	O
	ATOM	1702	N	ASP A 228	67.765	77.360	4.092	1.00	9.83	N
40	ATOM	1703	CA	ASP A 228	66.748	78.367	4.328	1.00	10.19	C
	ATOM	1704	CB	ASP A 228	66.376	79.108	3.015	1.00	11.95	C
	ATOM	1705	CG	ASP A 228	67.518	79.985	2.481	1.00	15.69	C
	ATOM	1706	OD1	ASP A 228	68.495	80.196	3.224	1.00	15.19	O
	ATOM	1707	OD2	ASP A 228	67.453	80.449	1.318	1.00	17.15	O
45	ATOM	1708	C	ASP A 228	65.489	77.796	4.948	1.00	9.82	C

	ATOM	1709	O	ASP	A	228	64.611	78.559	5.382	1.00	9.11	O
	ATOM	1710	N	GLY	A	229	65.395	76.468	5.033	1.00	8.99	N
	ATOM	1711	CA	GLY	A	229	64.217	75.831	5.589	1.00	8.16	C
	ATOM	1712	C	GLY	A	229	64.504	75.012	6.812	1.00	8.52	C
5	ATOM	1713	O	GLY	A	229	65.634	74.940	7.273	1.00	8.41	O
	ATOM	1714	N	ASN	A	230	63.456	74.399	7.351	1.00	8.65	N
	ATOM	1715	CA	ASN	A	230	63.588	73.541	8.519	1.00	8.57	C
	ATOM	1716	CB	ASN	A	230	62.218	73.058	9.001	1.00	9.59	C
	ATOM	1717	CG	ASN	A	230	61.289	74.185	9.351	1.00	7.92	C
10	ATOM	1718	OD1	ASN	A	230	60.844	74.916	8.444	1.00	7.22	O
	ATOM	1719	ND2	ASN	A	230	60.981	74.360	10.674	1.00	7.00	N
	ATOM	1720	C	ASN	A	230	64.449	72.320	8.230	1.00	9.27	C
	ATOM	1721	O	ASN	A	230	64.451	71.807	7.112	1.00	8.03	O
	ATOM	1722	N	LEU	A	231	65.184	71.872	9.241	1.00	9.54	N
15	ATOM	1723	CA	LEU	A	231	65.806	70.562	9.229	1.00	9.90	C
	ATOM	1724	CB	LEU	A	231	67.043	70.567	10.122	1.00	9.26	C
	ATOM	1725	CG	LEU	A	231	67.814	69.251	10.327	1.00	10.74	C
	ATOM	1726	CD1	LEU	A	231	68.277	68.661	8.991	1.00	9.80	C
	ATOM	1727	CD2	LEU	A	231	68.981	69.494	11.291	1.00	10.19	C
20	ATOM	1728	C	LEU	A	231	64.804	69.515	9.734	1.00	10.16	C
	ATOM	1729	O	LEU	A	231	64.239	69.699	10.801	1.00	9.71	O
	ATOM	1730	N	ALA	A	232	64.596	68.435	8.971	1.00	10.65	N
	ATOM	1731	CA	ALA	A	232	63.612	67.394	9.295	1.00	11.25	C
	ATOM	1732	CB	ALA	A	232	64.144	66.460	10.397	1.00	11.26	C
25	ATOM	1733	C	ALA	A	232	62.311	68.067	9.720	1.00	10.60	C
	ATOM	1734	O	ALA	A	232	61.822	68.893	8.990	1.00	11.68	O
	ATOM	1735	N	GLN	A	233	61.748	67.733	10.886	1.00	10.40	N
	ATOM	1736	CA	GLN	A	233	60.548	68.426	11.361	1.00	11.70	C
	ATOM	1737	CB	GLN	A	233	59.371	67.471	11.600	1.00	13.09	C
30	ATOM	1738	CG	GLN	A	233	59.068	66.550	10.399	1.00	13.83	C
	ATOM	1739	CD	GLN	A	233	60.063	65.419	10.209	1.00	17.23	C
	ATOM	1740	OE1	GLN	A	233	60.507	64.750	11.188	1.00	18.61	O
	ATOM	1741	NE2	GLN	A	233	60.446	65.188	8.943	1.00	14.32	N
	ATOM	1742	C	GLN	A	233	60.800	69.278	12.595	1.00	10.17	C
35	ATOM	1743	O	GLN	A	233	59.869	69.575	13.362	1.00	10.82	O
	ATOM	1744	N	LEU	A	234	62.031	69.735	12.728	1.00	8.49	N
	ATOM	1745	CA	LEU	A	234	62.459	70.529	13.869	1.00	8.01	C
	ATOM	1746	CB	LEU	A	234	63.982	70.517	13.986	1.00	7.26	C
	ATOM	1747	CG	LEU	A	234	64.645	69.146	14.226	1.00	7.55	C
40	ATOM	1748	CD1	LEU	A	234	66.147	69.240	13.920	1.00	6.15	C
	ATOM	1749	CD2	LEU	A	234	64.347	68.643	15.646	1.00	6.17	C
	ATOM	1750	C	LEU	A	234	62.008	71.949	13.707	1.00	8.63	C
	ATOM	1751	O	LEU	A	234	62.103	72.508	12.615	1.00	10.74	O
	ATOM	1752	N	SER	A	235	61.529	72.547	14.794	1.00	7.87	N
45	ATOM	1753	CA	SER	A	235	61.231	73.982	14.819	1.00	9.14	C

	ATOM	1754	CB	SER	A	235	60.806	74.421	16.222	1.00	9.04	C
	ATOM	1755	OG	SER	A	235	61.847	74.248	17.190	1.00	7.50	O
	ATOM	1756	C	SER	A	235	62.479	74.751	14.361	1.00	10.95	C
	ATOM	1757	O	SER	A	235	63.584	74.394	14.739	1.00	13.76	O
5	ATOM	1758	N	ASP	A	236	62.309	75.765	13.518	1.00	9.21	N
	ATOM	1759	CA	ASP	A	236	63.437	76.550	13.094	1.00	8.91	C
	ATOM	1760	CB	ASP	A	236	63.436	76.728	11.578	1.00	10.02	C
	ATOM	1761	CG	ASP	A	236	64.838	76.978	11.019	1.00	10.03	C
	ATOM	1762	OD1	ASP	A	236	65.716	76.086	11.130	1.00	9.94	O
10	ATOM	1763	OD2	ASP	A	236	65.060	78.058	10.476	1.00	10.02	O
	ATOM	1764	C	ASP	A	236	63.463	77.916	13.794	1.00	9.38	C
	ATOM	1765	O	ASP	A	236	62.599	78.763	13.561	1.00	9.80	O
	ATOM	1766	N	LEU	A	237	64.460	78.134	14.644	1.00	7.95	N
	ATOM	1767	CA	LEU	A	237	64.514	79.368	15.403	1.00	8.32	C
15	ATOM	1768	CB	LEU	A	237	65.517	79.257	16.557	1.00	8.30	C
	ATOM	1769	CG	LEU	A	237	65.179	78.200	17.623	1.00	9.05	C
	ATOM	1770	CD1	LEU	A	237	66.160	78.296	18.787	1.00	7.94	C
	ATOM	1771	CD2	LEU	A	237	63.744	78.343	18.139	1.00	9.53	C
	ATOM	1772	C	LEU	A	237	64.831	80.558	14.480	1.00	8.89	C
20	ATOM	1773	O	LEU	A	237	65.658	80.467	13.556	1.00	8.00	O
	ATOM	1774	N	ASN	A	238	64.130	81.663	14.724	1.00	9.05	N
	ATOM	1775	CA	ASN	A	238	64.217	82.851	13.856	1.00	8.98	C
	ATOM	1776	CB	ASN	A	238	62.946	83.700	13.976	1.00	9.29	C
	ATOM	1777	CG	ASN	A	238	63.008	84.967	13.146	1.00	9.11	C
25	ATOM	1778	OD1	ASN	A	238	63.990	85.223	12.433	1.00	9.95	O
	ATOM	1779	ND2	ASN	A	238	61.937	85.731	13.178	1.00	8.67	N
	ATOM	1780	C	ASN	A	238	65.439	83.672	14.224	1.00	8.67	C
	ATOM	1781	O	ASN	A	238	65.413	84.447	15.183	1.00	8.71	O
	ATOM	1782	N	GLU	A	239	66.515	83.455	13.470	1.00	9.46	N
30	ATOM	1783	CA	GLU	A	239	67.788	84.146	13.678	1.00	9.95	C
	ATOM	1784	CB	GLU	A	239	68.805	83.725	12.609	1.00	9.75	C
	ATOM	1785	CG	GLU	A	239	68.472	84.174	11.178	1.00	10.21	C
	ATOM	1786	CD	GLU	A	239	67.484	83.271	10.427	1.00	12.25	C
	ATOM	1787	OE1	GLU	A	239	66.965	82.242	10.962	1.00	11.92	O
35	ATOM	1788	OE2	GLU	A	239	67.177	83.629	9.270	1.00	12.19	O
	ATOM	1789	C	GLU	A	239	67.685	85.670	13.643	1.00	9.26	C
	ATOM	1790	O	GLU	A	239	68.587	86.346	14.119	1.00	9.01	O
	ATOM	1791	N	ARG	A	240	66.628	86.202	13.041	1.00	9.48	N
	ATOM	1792	CA	ARG	A	240	66.453	87.658	12.934	1.00	10.29	C
40	ATOM	1793	CB	ARG	A	240	65.680	88.024	11.642	1.00	9.90	C
	ATOM	1794	CG	ARG	A	240	66.375	87.568	10.355	1.00	10.51	C
	ATOM	1795	CD	ARG	A	240	65.548	87.841	9.095	1.00	10.04	C
	ATOM	1796	NE	ARG	A	240	64.229	87.222	9.204	1.00	11.65	N
	ATOM	1797	CZ	ARG	A	240	63.049	87.839	9.156	1.00	14.40	C
45	ATOM	1798	NH1	ARG	A	240	62.939	89.143	8.960	1.00	17.97	N

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         ATOM   1799  NH2 ARG A 240      61.949  87.131   9.287  1.00 13.77        N
         ATOM   1800  C   ARG A 240      65.730  88.262  14.120  1.00 10.21        C
         ATOM   1801  O   ARG A 240      65.625  89.477  14.220  1.00 10.26        O
         ATOM   1802  N   ASN A 241      65.225  87.430  15.018  1.00  9.85        N
   5     ATOM   1803  CA  ASN A 241      64.440  87.930  16.138  1.00  9.04        C
         ATOM   1804  CB  ASN A 241      63.365  86.886  16.527  1.00  8.60        C
         ATOM   1805  CG  ASN A 241      62.496  87.320  17.703  1.00 11.12        C
         ATOM   1806  OD1 ASN A 241      62.865  88.212  18.479  1.00  8.46        O
         ATOM   1807  ND2 ASN A 241      61.340  86.657  17.857  1.00  8.55        N
  10     ATOM   1808  C   ASN A 241      65.416  88.167  17.262  1.00  7.66        C
         ATOM   1809  O   ASN A 241      66.020  87.223  17.760  1.00  7.50        O
         ATOM   1810  N   PRO A 242      65.550  89.412  17.716  1.00  7.70        N
         ATOM   1811  CA  PRO A 242      66.588  89.627  18.728  1.00  8.44        C
         ATOM   1812  CB  PRO A 242      66.637  91.155  18.869  1.00  8.57        C
  15     ATOM   1813  CG  PRO A 242      65.261  91.603  18.501  1.00  9.52        C
         ATOM   1814  CD  PRO A 242      64.789  90.646  17.421  1.00  8.80        C
         ATOM   1815  C   PRO A 242      66.298  88.945  20.062  1.00  8.57        C
         ATOM   1816  O   PRO A 242      67.230  88.685  20.834  1.00  9.95        O
         ATOM   1817  N   ASP A 243      65.041  88.622  20.330  1.00  9.65        N
  20     ATOM   1818  CA  ASP A 243      64.699  87.818  21.513  1.00 10.05        C
         ATOM   1819  CB  ASP A 243      63.207  87.645  21.654  1.00 10.85        C
         ATOM   1820  CG  ASP A 243      62.491  88.910  22.053  1.00 12.95        C
         ATOM   1821  OD1 ASP A 243      63.098  89.879  22.552  1.00 14.17        O
         ATOM   1822  OD2 ASP A 243      61.265  88.884  21.906  1.00 14.33        O
  25     ATOM   1823  C   ASP A 243      65.317  86.408  21.443  1.00 10.25        C
         ATOM   1824  O   ASP A 243      65.688  85.843  22.485  1.00  8.57        O
         ATOM   1825  N   VAL A 244      65.394  85.841  20.232  1.00  9.35        N
         ATOM   1826  CA  VAL A 244      66.012  84.510  20.027  1.00  8.85        C
         ATOM   1827  CB  VAL A 244      65.807  83.992  18.584  1.00  8.65        C
  30     ATOM   1828  CG1 VAL A 244      66.668  82.777  18.279  1.00  6.72        C
         ATOM   1829  CG2 VAL A 244      64.332  83.715  18.338  1.00  7.73        C
         ATOM   1830  C   VAL A 244      67.491  84.556  20.372  1.00  9.96        C
         ATOM   1831  O   VAL A 244      68.000  83.725  21.140  1.00  8.97        O
         ATOM   1832  N   LEU A 245      68.194  85.554  19.852  1.00  8.99        N
  35     ATOM   1833  CA  LEU A 245      69.607  85.664  20.140  1.00  8.92        C
         ATOM   1834  CB  LEU A 245      70.253  86.795  19.296  1.00  9.87        C
         ATOM   1835  CG  LEU A 245      71.749  87.033  19.518  1.00 11.93        C
         ATOM   1836  CD1 LEU A 245      72.556  85.781  19.201  1.00 10.23        C
         ATOM   1837  CD2 LEU A 245      72.230  88.246  18.685  1.00 12.15        C
  40     ATOM   1838  C   LEU A 245      69.806  85.887  21.642  1.00  8.71        C
         ATOM   1839  O   LEU A 245      70.660  85.240  22.252  1.00  7.81        O
         ATOM   1840  N   ASP A 246      68.991  86.767  22.236  1.00  8.57        N
         ATOM   1841  CA  ASP A 246      69.076  87.047  23.676  1.00  8.50        C
         ATOM   1842  CB  ASP A 246      68.036  88.071  24.127  1.00  8.41        C
  45     ATOM   1843  CG  ASP A 246      68.344  89.478  23.683  1.00  9.39        C
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      ATOM  1844  OD1 ASP A 246      69.427  89.766  23.094  1.00 11.58          O
      ATOM  1845  OD2 ASP A 246      67.467  90.314  23.934  1.00  9.12          O
      ATOM  1846  C   ASP A 246      68.848  85.768  24.467  1.00  8.86          C
      ATOM  1847  O   ASP A 246      69.564  85.504  25.434  1.00  8.72          O
  5   ATOM  1848  N   TYR A 247      67.840  84.988  24.071  1.00  7.85          N
      ATOM  1849  CA  TYR A 247      67.528  83.743  24.778  1.00  8.07          C
      ATOM  1850  CB  TYR A 247      66.283  83.109  24.176  1.00  8.64          C
      ATOM  1851  CG  TYR A 247      65.903  81.792  24.786  1.00  8.20          C
      ATOM  1852  CD1 TYR A 247      66.344  80.609  24.241  1.00  8.56          C
 10   ATOM  1853  CE1 TYR A 247      65.985  79.393  24.796  1.00  8.28          C
      ATOM  1854  CZ  TYR A 247      65.167  79.365  25.895  1.00  7.93          C
      ATOM  1855  OH  TYR A 247      64.830  78.149  26.438  1.00  8.17          O
      ATOM  1856  CE2 TYR A 247      64.706  80.523  26.448  1.00  8.24          C
      ATOM  1857  CD2 TYR A 247      65.051  81.735  25.888  1.00  8.63          C
 15   ATOM  1858  C   TYR A 247      68.729  82.752  24.748  1.00  8.02          C
      ATOM  1859  O   TYR A 247      69.188  82.258  25.802  1.00  8.17          O
      ATOM  1860  N   LEU A 248      69.267  82.524  23.567  1.00  7.77          N
      ATOM  1861  CA  LEU A 248      70.357  81.561  23.396  1.00  7.94          C
      ATOM  1862  CB  LEU A 248      70.538  81.235  21.924  1.00  8.51          C
 20   ATOM  1863  CG  LEU A 248      69.348  80.538  21.227  1.00  8.35          C
      ATOM  1864  CD1 LEU A 248      69.495  80.612  19.705  1.00  7.39          C
      ATOM  1865  CD2 LEU A 248      69.262  79.111  21.735  1.00  7.29          C
      ATOM  1866  C   LEU A 248      71.681  82.054  24.016  1.00  7.97          C
      ATOM  1867  O   LEU A 248      72.395  81.284  24.641  1.00  8.18          O
 25   ATOM  1868  N   VAL A 249      72.005  83.326  23.848  1.00  7.89          N
      ATOM  1869  CA  VAL A 249      73.208  83.868  24.460  1.00  8.40          C
      ATOM  1870  CB  VAL A 249      73.460  85.339  24.076  1.00  8.93          C
      ATOM  1871  CG1 VAL A 249      74.480  85.991  25.022  1.00  8.60          C
      ATOM  1872  CG2 VAL A 249      73.907  85.462  22.627  1.00  8.39          C
 30   ATOM  1873  C   VAL A 249      73.125  83.699  25.978  1.00  8.41          C
      ATOM  1874  O   VAL A 249      74.070  83.252  26.595  1.00  9.01          O
      ATOM  1875  N   GLY A 250      71.983  84.008  26.573  1.00  8.12          N
      ATOM  1876  CA  GLY A 250      71.854  83.924  28.026  1.00  8.21          C
      ATOM  1877  C   GLY A 250      71.981  82.487  28.514  1.00  7.99          C
 35   ATOM  1878  O   GLY A 250      72.579  82.221  29.545  1.00  7.72          O
      ATOM  1879  N   ALA A 251      71.432  81.550  27.759  1.00  8.09          N
      ATOM  1880  CA  ALA A 251      71.494  80.131  28.121  1.00  8.04          C
      ATOM  1881  CB  ALA A 251      70.635  79.295  27.169  1.00  7.87          C
      ATOM  1882  C   ALA A 251      72.939  79.662  28.100  1.00  8.94          C
 40   ATOM  1883  O   ALA A 251      73.433  79.079  29.069  1.00  8.37          O
      ATOM  1884  N   TYR A 252      73.644  79.941  27.002  1.00  9.53          N
      ATOM  1885  CA  TYR A 252      75.003  79.460  26.874  1.00  9.09          C
      ATOM  1886  CB  TYR A 252      75.396  79.343  25.395  1.00  9.00          C
      ATOM  1887  CG  TYR A 252      74.508  78.284  24.726  1.00  9.23          C
 45   ATOM  1888  CD1 TYR A 252      74.482  76.976  25.209  1.00  9.03          C
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	ATOM	1889	CE1	TYR A 252	73.653	76.026	24.660	1.00	8.33	C
	ATOM	1890	CZ	TYR A 252	72.830	76.371	23.604	1.00	8.72	C
	ATOM	1891	OH	TYR A 252	71.999	75.425	23.038	1.00	7.85	O
	ATOM	1892	CE2	TYR A 252	72.853	77.657	23.103	1.00	8.90	C
5	ATOM	1893	CD2	TYR A 252	73.674	78.601	23.672	1.00	8.75	C
	ATOM	1894	C	TYR A 252	76.019	80.177	27.777	1.00	9.99	C
	ATOM	1895	O	TYR A 252	76.988	79.541	28.247	1.00	10.36	O
	ATOM	1896	N	LEU A 253	75.769	81.449	28.084	1.00	9.12	N
	ATOM	1897	CA	LEU A 253	76.558	82.146	29.107	1.00	9.45	C
10	ATOM	1898	CB	LEU A 253	76.254	83.656	29.161	1.00	8.84	C
	ATOM	1899	CG	LEU A 253	76.794	84.547	28.022	1.00	9.73	C
	ATOM	1900	CD1	LEU A 253	76.288	85.995	28.233	1.00	8.83	C
	ATOM	1901	CD2	LEU A 253	78.328	84.535	27.930	1.00	8.02	C
	ATOM	1902	C	LEU A 253	76.332	81.501	30.482	1.00	8.81	C
15	ATOM	1903	O	LEU A 253	77.262	81.386	31.274	1.00	9.64	O
	ATOM	1904	N	GLN A 254	75.116	81.077	30.772	1.00	8.17	N
	ATOM	1905	CA	GLN A 254	74.864	80.349	32.026	1.00	8.63	C
	ATOM	1906	CB	GLN A 254	73.393	79.954	32.166	1.00	9.69	C
	ATOM	1907	CG	GLN A 254	73.048	79.230	33.460	1.00	9.28	C
20	ATOM	1908	CD	GLN A 254	71.595	78.842	33.503	1.00	9.80	C
	ATOM	1909	OE1	GLN A 254	70.769	79.682	33.718	1.00	10.05	O
	ATOM	1910	NE2	GLN A 254	71.279	77.561	33.263	1.00	9.63	N
	ATOM	1911	C	GLN A 254	75.723	79.086	32.108	1.00	7.72	C
	ATOM	1912	O	GLN A 254	76.364	78.817	33.127	1.00	7.05	O
25	ATOM	1913	N	TRP A 255	75.742	78.314	31.039	1.00	7.22	N
	ATOM	1914	CA	TRP A 255	76.489	77.064	31.059	1.00	7.92	C
	ATOM	1915	CB	TRP A 255	76.096	76.135	29.909	1.00	7.81	C
	ATOM	1916	CG	TRP A 255	74.630	75.821	29.890	1.00	8.61	C
	ATOM	1917	CD1	TRP A 255	73.755	76.010	28.839	1.00	8.34	C
30	ATOM	1918	NE1	TRP A 255	72.494	75.637	29.180	1.00	9.61	N
	ATOM	1919	CE2	TRP A 255	72.442	75.205	30.449	1.00	9.34	C
	ATOM	1920	CD2	TRP A 255	73.789	75.314	30.993	1.00	9.16	C
	ATOM	1921	CE3	TRP A 255	74.013	74.938	32.308	1.00	9.42	C
	ATOM	1922	CZ3	TRP A 255	72.922	74.497	33.071	1.00	9.28	C
35	ATOM	1923	CH2	TRP A 255	71.641	74.410	32.522	1.00	10.00	C
	ATOM	1924	CZ2	TRP A 255	71.378	74.781	31.205	1.00	9.11	C
	ATOM	1925	C	TRP A 255	77.974	77.271	31.119	1.00	7.83	C
	ATOM	1926	O	TRP A 255	78.687	76.457	31.736	1.00	7.86	O
	ATOM	1927	N	ILE A 256	78.474	78.343	30.506	1.00	8.00	N
40	ATOM	1928	CA	ILE A 256	79.860	78.725	30.758	1.00	8.64	C
	ATOM	1929	CB	ILE A 256	80.337	79.860	29.848	1.00	9.07	C
	ATOM	1930	CG1	ILE A 256	80.362	79.386	28.396	1.00	9.62	C
	ATOM	1931	CD1	ILE A 256	80.391	80.512	27.374	1.00	9.62	C
	ATOM	1932	CG2	ILE A 256	81.729	80.327	30.274	1.00	9.03	C
45	ATOM	1933	C	ILE A 256	80.092	79.115	32.224	1.00	9.08	C

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      ATOM  1934  O    ILE A 256    81.085  78.699  32.820  1.00  9.19        O
      ATOM  1935  N    ASP A 257    79.209  79.914  32.813  1.00 11.89        N
      ATOM  1936  CA   ASP A 257    79.341  80.243  34.230  1.00 12.12        C
      ATOM  1937  CB   ASP A 257    78.161  81.043  34.791  1.00 16.27        C
   5  ATOM  1938  CG   ASP A 257    78.065  82.429  34.226  1.00 25.30        C
      ATOM  1939  OD1  ASP A 257    79.053  82.920  33.631  1.00 31.80        O
      ATOM  1940  OD2  ASP A 257    76.973  83.024  34.362  1.00 34.61        O
      ATOM  1941  C    ASP A 257    79.434  78.975  35.054  1.00 11.56        C
      ATOM  1942  O    ASP A 257    80.121  78.973  36.041  1.00 11.65        O
  10  ATOM  1943  N    GLN A 258    78.715  77.928  34.666  1.00 10.15        N
      ATOM  1944  CA   GLN A 258    78.734  76.662  35.397  1.00  9.64        C
      ATOM  1945  CB   GLN A 258    77.416  75.915  35.191  1.00  9.24        C
      ATOM  1946  CG   GLN A 258    76.260  76.704  35.767  1.00  9.14        C
      ATOM  1947  CD   GLN A 258    74.975  75.917  35.872  1.00 11.25        C
  15  ATOM  1948  OE1  GLN A 258    74.984  74.690  35.785  1.00 11.49        O
      ATOM  1949  NE2  GLN A 258    73.852  76.631  36.071  1.00  9.01        N
      ATOM  1950  C    GLN A 258    79.911  75.757  35.124  1.00 10.42        C
      ATOM  1951  O    GLN A 258    80.042  74.736  35.802  1.00 10.37        O
      ATOM  1952  N    GLY A 259    80.780  76.111  34.173  1.00  9.71        N
  20  ATOM  1953  CA   GLY A 259    82.029  75.373  33.972  1.00  9.16        C
      ATOM  1954  C    GLY A 259    82.350  74.824  32.593  1.00  9.89        C
      ATOM  1955  O    GLY A 259    83.379  74.180  32.436  1.00  9.39        O
      ATOM  1956  N    ALA A 260    81.526  75.110  31.580  1.00  9.37        N
      ATOM  1957  CA   ALA A 260    81.819  74.691  30.215  1.00  9.37        C
  25  ATOM  1958  CB   ALA A 260    80.634  74.971  29.287  1.00  8.87        C
      ATOM  1959  C    ALA A 260    83.061  75.431  29.711  1.00 10.05        C
      ATOM  1960  O    ALA A 260    83.136  76.656  29.839  1.00 10.90        O
      ATOM  1961  N    ASP A 261    84.012  74.685  29.146  1.00  8.84        N
      ATOM  1962  CA   ASP A 261    85.298  75.218  28.699  1.00 10.61        C
  30  ATOM  1963  CB   ASP A 261    86.396  74.238  29.069  1.00 11.23        C
      ATOM  1964  CG   ASP A 261    86.511  74.070  30.560  1.00 13.42        C
      ATOM  1965  OD1  ASP A 261    86.750  75.108  31.212  1.00 12.25        O
      ATOM  1966  OD2  ASP A 261    86.296  72.942  31.091  1.00 12.74        O
      ATOM  1967  C    ASP A 261    85.393  75.562  27.209  1.00 11.02        C
  35  ATOM  1968  O    ASP A 261    86.235  76.329  26.811  1.00 12.22        O
      ATOM  1969  N    ALA A 262    84.512  74.987  26.404  1.00  9.84        N
      ATOM  1970  CA   ALA A 262    84.473  75.175  24.968  1.00  8.24        C
      ATOM  1971  CB   ALA A 262    85.608  74.384  24.317  1.00  6.61        C
      ATOM  1972  C    ALA A 262    83.116  74.648  24.493  1.00  8.23        C
  40  ATOM  1973  O    ALA A 262    82.416  73.922  25.240  1.00  8.59        O
      ATOM  1974  N    PHE A 263    82.717  75.035  23.284  1.00  7.94        N
      ATOM  1975  CA   PHE A 263    81.500  74.519  22.654  1.00  7.83        C
      ATOM  1976  CB   PHE A 263    80.557  75.651  22.247  1.00  8.04        C
      ATOM  1977  CG   PHE A 263    80.028  76.476  23.375  1.00  7.66        C
  45  ATOM  1978  CD1  PHE A 263    79.780  75.934  24.625  1.00  7.82        C
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	ATOM	1979	CE1	PHE A 263	79.236	76.709	25.641	1.00	7.86	C
	ATOM	1980	CZ	PHE A 263	78.902	78.033	25.404	1.00	8.25	C
	ATOM	1981	CE2	PHE A 263	79.119	78.585	24.158	1.00	7.88	C
	ATOM	1982	CD2	PHE A 263	79.694	77.802	23.147	1.00	8.19	C
5	ATOM	1983	C	PHE A 263	81.793	73.767	21.364	1.00	8.11	C
	ATOM	1984	O	PHE A 263	82.657	74.157	20.539	1.00	8.29	O
	ATOM	1985	N	ARG A 264	81.044	72.704	21.186	1.00	8.17	N
	ATOM	1986	CA	ARG A 264	80.885	72.100	19.879	1.00	8.28	C
	ATOM	1987	CB	ARG A 264	80.966	70.574	19.960	1.00	8.04	C
10	ATOM	1988	CG	ARG A 264	80.730	69.848	18.629	1.00	9.74	C
	ATOM	1989	CD	ARG A 264	79.253	69.554	18.350	1.00	10.19	C
	ATOM	1990	NE	ARG A 264	79.056	68.614	17.241	1.00	10.60	N
	ATOM	1991	CZ	ARG A 264	77.870	68.172	16.818	1.00	9.18	C
	ATOM	1992	NH1	ARG A 264	76.739	68.575	17.374	1.00	8.78	N
15	ATOM	1993	NH2	ARG A 264	77.815	67.334	15.810	1.00	11.27	N
	ATOM	1994	C	ARG A 264	79.532	72.589	19.401	1.00	8.33	C
	ATOM	1995	O	ARG A 264	78.503	72.354	20.088	1.00	7.37	O
	ATOM	1996	N	ILE A 265	79.517	73.294	18.254	1.00	7.99	N
	ATOM	1997	CA	ILE A 265	78.281	73.894	17.724	1.00	8.22	C
20	ATOM	1998	CB	ILE A 265	78.541	75.265	17.060	1.00	9.13	C
	ATOM	1999	CG1	ILE A 265	79.226	76.245	18.029	1.00	10.88	C
	ATOM	2000	CD1	ILE A 265	79.666	77.548	17.385	1.00	11.69	C
	ATOM	2001	CG2	ILE A 265	77.239	75.892	16.556	1.00	8.65	C
	ATOM	2002	C	ILE A 265	77.580	72.987	16.711	1.00	9.45	C
25	ATOM	2003	O	ILE A 265	78.026	72.828	15.570	1.00	9.58	O
	ATOM	2004	N	ASP A 266	76.476	72.405	17.132	1.00	8.42	N
	ATOM	2005	CA	ASP A 266	75.616	71.606	16.267	1.00	8.74	C
	ATOM	2006	CB	ASP A 266	74.428	71.066	17.084	1.00	9.76	C
	ATOM	2007	CG	ASP A 266	73.624	70.019	16.338	1.00	10.48	C
30	ATOM	2008	OD1	ASP A 266	74.174	68.910	16.102	1.00	10.90	O
	ATOM	2009	OD2	ASP A 266	72.445	70.298	15.975	1.00	11.82	O
	ATOM	2010	C	ASP A 266	75.063	72.447	15.116	1.00	8.79	C
	ATOM	2011	O	ASP A 266	74.866	73.657	15.262	1.00	7.60	O
	ATOM	2012	N	THR A 267	74.835	71.767	13.991	1.00	8.41	N
35	ATOM	2013	CA	THR A 267	74.082	72.254	12.846	1.00	8.27	C
	ATOM	2014	CB	THR A 267	72.568	72.065	13.060	1.00	7.93	C
	ATOM	2015	OG1	THR A 267	72.233	72.475	14.401	1.00	7.29	O
	ATOM	2016	CG2	THR A 267	72.156	70.559	12.815	1.00	8.83	C
	ATOM	2017	C	THR A 267	74.423	73.683	12.453	1.00	8.67	C
40	ATOM	2018	O	THR A 267	73.542	74.476	12.203	1.00	9.33	O
	ATOM	2019	N	ILE A 268	75.715	73.975	12.314	1.00	9.47	N
	ATOM	2020	CA	ILE A 268	76.171	75.349	12.125	1.00	8.75	C
	ATOM	2021	CB	ILE A 268	77.710	75.496	12.374	1.00	8.74	C
	ATOM	2022	CG1	ILE A 268	78.075	76.957	12.691	1.00	7.85	C
45	ATOM	2023	CD1	ILE A 268	79.502	77.162	13.177	1.00	8.43	C

	ATOM	2024	CG2	ILE	A	268	78.516	74.876	11.222	1.00	7.16	C
	ATOM	2025	C	ILE	A	268	75.731	75.905	10.780	1.00	8.85	C
	ATOM	2026	O	ILE	A	268	75.455	77.084	10.677	1.00	8.54	O
	ATOM	2027	N	ALA	A	269	75.582	75.049	9.771	1.00	8.14	N
5	ATOM	2028	CA	ALA	A	269	75.172	75.505	8.431	1.00	8.02	C
	ATOM	2029	CB	ALA	A	269	75.413	74.392	7.413	1.00	8.12	C
	ATOM	2030	C	ALA	A	269	73.715	75.917	8.380	1.00	8.11	C
	ATOM	2031	O	ALA	A	269	73.276	76.556	7.406	1.00	8.13	O
	ATOM	2032	N	TRP	A	270	72.952	75.540	9.405	1.00	6.32	N
10	ATOM	2033	CA	TRP	A	270	71.513	75.759	9.377	1.00	7.80	C
	ATOM	2034	CB	TRP	A	270	70.799	74.603	10.099	1.00	7.06	C
	ATOM	2035	CG	TRP	A	270	70.941	73.347	9.295	1.00	7.18	C
	ATOM	2036	CD1	TRP	A	270	72.021	72.457	9.247	1.00	7.64	C
	ATOM	2037	NE1	TRP	A	270	71.786	71.467	8.298	1.00	7.96	N
15	ATOM	2038	CE2	TRP	A	270	70.579	71.658	7.709	1.00	7.74	C
	ATOM	2039	CD2	TRP	A	270	69.995	72.862	8.290	1.00	7.30	C
	ATOM	2040	CE3	TRP	A	270	68.757	73.284	7.853	1.00	8.03	C
	ATOM	2041	CZ3	TRP	A	270	68.102	72.541	6.875	1.00	8.01	C
	ATOM	2042	CH2	TRP	A	270	68.673	71.402	6.327	1.00	8.56	C
20	ATOM	2043	CZ2	TRP	A	270	69.924	70.932	6.739	1.00	8.33	C
	ATOM	2044	C	TRP	A	270	71.055	77.132	9.874	1.00	8.35	C
	ATOM	2045	O	TRP	A	270	69.861	77.425	9.819	1.00	7.81	O
	ATOM	2046	N	MET	A	271	71.993	77.966	10.346	1.00	8.38	N
	ATOM	2047	CA	MET	A	271	71.730	79.389	10.564	1.00	10.00	C
25	ATOM	2048	CB	MET	A	271	71.844	79.731	12.052	1.00	10.84	C
	ATOM	2049	CG	MET	A	271	70.960	78.861	12.947	1.00	12.10	C
	ATOM	2050	SD	MET	A	271	71.071	79.290	14.704	1.00	13.63	S
	ATOM	2051	CE	MET	A	271	69.680	80.438	14.835	1.00	11.73	C
	ATOM	2052	C	MET	A	271	72.749	80.197	9.767	1.00	10.23	C
30	ATOM	2053	O	MET	A	271	73.867	79.736	9.544	1.00	8.46	O
	ATOM	2054	N	PRO	A	272	72.406	81.435	9.386	1.00	12.06	N
	ATOM	2055	CA	PRO	A	272	73.403	82.176	8.610	1.00	10.33	C
	ATOM	2056	CB	PRO	A	272	72.674	83.481	8.232	1.00	12.08	C
	ATOM	2057	CG	PRO	A	272	71.208	83.140	8.369	1.00	13.71	C
35	ATOM	2058	CD	PRO	A	272	71.146	82.177	9.527	1.00	12.40	C
	ATOM	2059	C	PRO	A	272	74.668	82.496	9.405	1.00	10.38	C
	ATOM	2060	O	PRO	A	272	74.607	82.645	10.637	1.00	9.16	O
	ATOM	2061	N	ASP	A	273	75.783	82.639	8.690	1.00	9.25	N
	ATOM	2062	CA	ASP	A	273	77.058	83.069	9.275	1.00	11.03	C
40	ATOM	2063	CB	ASP	A	273	78.048	83.421	8.181	1.00	12.34	C
	ATOM	2064	CG	ASP	A	273	78.514	82.236	7.394	1.00	14.80	C
	ATOM	2065	OD1	ASP	A	273	78.096	81.089	7.645	1.00	17.36	O
	ATOM	2066	OD2	ASP	A	273	79.332	82.476	6.485	1.00	17.41	O
	ATOM	2067	C	ASP	A	273	76.906	84.340	10.141	1.00	9.98	C
45	ATOM	2068	O	ASP	A	273	77.574	84.486	11.158	1.00	9.36	O

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      ATOM   2069  N    SER A 274    76.055  85.261   9.720  1.00  9.01          N
      ATOM   2070  CA   SER A 274    75.896  86.527  10.445  1.00 10.29          C
      ATOM   2071  CB   SER A 274    75.022  87.489   9.650  1.00 12.00          C
      ATOM   2072  OG   SER A 274    73.760  86.886   9.349  1.00 12.83          O
  5   ATOM   2073  C    SER A 274    75.279  86.285  11.823  1.00 11.00          C
      ATOM   2074  O    SER A 274    75.561  87.019  12.766  1.00  8.84          O
      ATOM   2075  N    PHE A 275    74.426  85.263  11.944  1.00  9.61          N
      ATOM   2076  CA   PHE A 275    73.928  84.896  13.266  1.00  8.95          C
      ATOM   2077  CB   PHE A 275    72.783  83.868  13.211  1.00  9.22          C
 10   ATOM   2078  CG   PHE A 275    72.324  83.441  14.578  1.00  9.15          C
      ATOM   2079  CD1  PHE A 275    72.929  82.362  15.217  1.00 11.17          C
      ATOM   2080  CE1  PHE A 275    72.545  81.984  16.486  1.00 11.39          C
      ATOM   2081  CZ   PHE A 275    71.523  82.657  17.116  1.00 11.35          C
      ATOM   2082  CE2  PHE A 275    70.904  83.723  16.483  1.00 11.89          C
 15   ATOM   2083  CD2  PHE A 275    71.324  84.123  15.232  1.00  9.81          C
      ATOM   2084  C    PHE A 275    75.044  84.370  14.154  1.00  8.45          C
      ATOM   2085  O    PHE A 275    75.152  84.767  15.315  1.00  9.57          O
      ATOM   2086  N    TRP A 276    75.857  83.447  13.647  1.00  7.89          N
      ATOM   2087  CA   TRP A 276    76.933  82.921  14.457  1.00  8.10          C
 20   ATOM   2088  CB   TRP A 276    77.629  81.750  13.759  1.00  7.97          C
      ATOM   2089  CG   TRP A 276    76.691  80.593  13.606  1.00  8.55          C
      ATOM   2090  CD1  TRP A 276    76.202  80.043  12.440  1.00  8.47          C
      ATOM   2091  NE1  TRP A 276    75.342  79.028  12.715  1.00  9.25          N
      ATOM   2092  CE2  TRP A 276    75.213  78.859  14.054  1.00  9.45          C
 25   ATOM   2093  CD2  TRP A 276    76.039  79.856  14.686  1.00  9.04          C
      ATOM   2094  CE3  TRP A 276    76.107  79.895  16.077  1.00 10.69          C
      ATOM   2095  CZ3  TRP A 276    75.332  78.990  16.809  1.00  8.96          C
      ATOM   2096  CH2  TRP A 276    74.555  78.028  16.167  1.00  8.94          C
      ATOM   2097  CZ2  TRP A 276    74.483  77.938  14.789  1.00  8.47          C
 30   ATOM   2098  C    TRP A 276    77.892  84.005  14.854  1.00  8.26          C
      ATOM   2099  O    TRP A 276    78.393  84.003  15.962  1.00  9.13          O
      ATOM   2100  N    GLN A 277    78.180  84.941  13.960  1.00  8.58          N
      ATOM   2101  CA   GLN A 277    79.079  86.062  14.308  1.00  9.13          C
      ATOM   2102  CB   GLN A 277    79.352  86.934  13.071  1.00  9.92          C
 35   ATOM   2103  CG   GLN A 277    80.263  88.139  13.335  1.00  8.79          C
      ATOM   2104  CD   GLN A 277    81.686  87.732  13.527  1.00  8.57          C
      ATOM   2105  OE1  GLN A 277    82.090  86.651  13.139  1.00  9.25          O
      ATOM   2106  NE2  GLN A 277    82.463  88.590  14.171  1.00 10.36          N
      ATOM   2107  C    GLN A 277    78.522  86.943  15.434  1.00  9.78          C
 40   ATOM   2108  O    GLN A 277    79.256  87.310  16.355  1.00 10.07          O
      ATOM   2109  N    ALA A 278    77.239  87.285  15.370  1.00 10.30          N
      ATOM   2110  CA   ALA A 278    76.564  87.992  16.499  1.00 11.00          C
      ATOM   2111  CB   ALA A 278    75.102  88.337  16.144  1.00  9.15          C
      ATOM   2112  C    ALA A 278    76.631  87.147  17.804  1.00 10.57          C
 45   ATOM   2113  O    ALA A 278    76.927  87.675  18.892  1.00 11.24          O
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     ATOM   2114   N    PHE A 279    76.417  85.846  17.692  1.00 10.59           N
     ATOM   2115   CA   PHE A 279    76.454  84.946  18.867  1.00  9.81           C
     ATOM   2116   CB   PHE A 279    75.912  83.557  18.507  1.00  9.84           C
     ATOM   2117   CG   PHE A 279    76.025  82.534  19.623  1.00  8.63           C
 5   ATOM   2118   CD1  PHE A 279    75.045  82.437  20.606  1.00  9.28           C
     ATOM   2119   CE1  PHE A 279    75.157  81.481  21.635  1.00 10.65           C
     ATOM   2120   CZ   PHE A 279    76.227  80.602  21.654  1.00  9.20           C
     ATOM   2121   CE2  PHE A 279    77.194  80.681  20.661  1.00  8.93           C
     ATOM   2122   CD2  PHE A 279    77.083  81.632  19.651  1.00  8.26           C
10   ATOM   2123   C    PHE A 279    77.860  84.824  19.483  1.00 10.19           C
     ATOM   2124   O    PHE A 279    78.035  85.053  20.694  1.00 10.52           O
     ATOM   2125   N    THR A 280    78.861  84.476  18.675  1.00  9.66           N
     ATOM   2126   CA   THR A 280    80.201  84.331  19.221  1.00  8.43           C
     ATOM   2127   CB   THR A 280    81.186  83.689  18.227  1.00  8.87           C
15   ATOM   2128   OG1  THR A 280    81.401  84.562  17.105  1.00  6.74           O
     ATOM   2129   CG2  THR A 280    80.643  82.319  17.770  1.00  8.64           C
     ATOM   2130   C    THR A 280    80.770  85.648  19.742  1.00  9.37           C
     ATOM   2131   O    THR A 280    81.550  85.636  20.686  1.00  8.49           O
     ATOM   2132   N    THR A 281    80.413  86.774  19.137  1.00  9.37           N
20   ATOM   2133   CA   THR A 281    80.868  88.082  19.646  1.00  9.96           C
     ATOM   2134   CB   THR A 281    80.388  89.234  18.732  1.00 10.41           C
     ATOM   2135   OG1  THR A 281    81.007  89.085  17.461  1.00 10.47           O
     ATOM   2136   CG2  THR A 281    80.728  90.647  19.324  1.00 10.46           C
     ATOM   2137   C    THR A 281    80.344  88.312  21.068  1.00 10.67           C
25   ATOM   2138   O    THR A 281    81.082  88.710  21.965  1.00 10.13           O
     ATOM   2139   N    ARG A 282    79.059  88.042  21.255  1.00 11.38           N
     ATOM   2140   CA   ARG A 282    78.415  88.222  22.544  1.00 12.07           C
     ATOM   2141   CB   ARG A 282    76.888  88.182  22.392  1.00 13.37           C
     ATOM   2142   CG   ARG A 282    76.439  89.573  21.990  1.00 16.82           C
30   ATOM   2143   CD   ARG A 282    74.982  89.693  21.745  1.00 21.18           C
     ATOM   2144   NE   ARG A 282    74.212  89.471  22.962  1.00 22.09           N
     ATOM   2145   CZ   ARG A 282    72.896  89.567  22.991  1.00 18.56           C
     ATOM   2146   NH1  ARG A 282    72.248  89.899  21.891  1.00 21.11           N
     ATOM   2147   NH2  ARG A 282    72.233  89.301  24.103  1.00 22.68           N
35   ATOM   2148   C    ARG A 282    78.926  87.256  23.597  1.00  9.91           C
     ATOM   2149   O    ARG A 282    79.157  87.666  24.732  1.00  9.98           O
     ATOM   2150   N    ILE A 283    79.186  86.008  23.211  1.00  8.83           N
     ATOM   2151   CA   ILE A 283    79.809  85.034  24.144  1.00  8.69           C
     ATOM   2152   CB   ILE A 283    79.914  83.612  23.560  1.00  8.33           C
40   ATOM   2153   CG1  ILE A 283    78.512  83.012  23.332  1.00  8.21           C
     ATOM   2154   CD1  ILE A 283    77.723  82.744  24.600  1.00  7.73           C
     ATOM   2155   CG2  ILE A 283    80.757  82.724  24.461  1.00  7.70           C
     ATOM   2156   C    ILE A 283    81.200  85.522  24.533  1.00  9.40           C
     ATOM   2157   O    ILE A 283    81.547  85.519  25.708  1.00  8.82           O
45   ATOM   2158   N    ARG A 284    81.986  85.988  23.555  1.00  9.27           N
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      ATOM   2159   CA   ARG A 284      83.368  86.323  23.810  1.00   9.40        C
      ATOM   2160   CB   ARG A 284      84.219  86.135  22.570  1.00   9.54        C
      ATOM   2161   CG   ARG A 284      84.283  84.672  22.149  1.00   9.85        C
      ATOM   2162   CD   ARG A 284      84.867  84.517  20.762  1.00  11.05        C
  5   ATOM   2163   NE   ARG A 284      85.155  83.130  20.424  1.00   9.94        N
      ATOM   2164   CZ   ARG A 284      85.190  82.648  19.192  1.00  10.48        C
      ATOM   2165   NH1  ARG A 284      84.932  83.437  18.158  1.00  11.07        N
      ATOM   2166   NH2  ARG A 284      85.506  81.370  18.982  1.00   9.33        N
      ATOM   2167   C    ARG A 284      83.561  87.712  24.418  1.00  10.50        C
 10   ATOM   2168   O    ARG A 284      84.616  87.981  24.964  1.00   9.41        O
      ATOM   2169   N    ALA A 285      82.542  88.558  24.397  1.00  12.56        N
      ATOM   2170   CA   ALA A 285      82.618  89.842  25.131  1.00  14.16        C
      ATOM   2171   CB   ALA A 285      81.335  90.649  24.977  1.00  13.34        C
      ATOM   2172   C    ALA A 285      82.890  89.560  26.603  1.00  16.76        C
 15   ATOM   2173   O    ALA A 285      83.639  90.278  27.241  1.00  14.83        O
      ATOM   2174   N    LYS A 286      82.289  88.491  27.123  1.00  17.44        N
      ATOM   2175   CA   LYS A 286      82.434  88.068  28.517  1.00  21.02        C
      ATOM   2176   CB   LYS A 286      81.126  87.360  28.937  1.00  27.53        C
      ATOM   2177   CG   LYS A 286      79.855  88.212  28.846  1.00  36.52        C
 20   ATOM   2178   CD   LYS A 286      79.645  89.078  30.082  1.00  41.07        C
      ATOM   2179   CE   LYS A 286      78.341  89.872  29.999  1.00  48.98        C
      ATOM   2180   NZ   LYS A 286      77.157  89.108  30.506  1.00  43.98        N
      ATOM   2181   C    LYS A 286      83.606  87.089  28.704  1.00  17.36        C
      ATOM   2182   O    LYS A 286      84.221  87.044  29.750  1.00  16.20        O
 25   ATOM   2183   N    HIS A 287      83.890  86.297  27.671  1.00  16.25        N
      ATOM   2184   CA   HIS A 287      84.897  85.226  27.723  1.00  11.67        C
      ATOM   2185   CB   HIS A 287      84.176  83.887  27.787  1.00  10.16        C
      ATOM   2186   CG   HIS A 287      83.236  83.803  28.965  1.00  11.21        C
      ATOM   2187   ND1  HIS A 287      83.671  83.554  30.231  1.00  10.60        N
 30   ATOM   2188   CE1  HIS A 287      82.627  83.636  31.088  1.00  11.11        C
      ATOM   2189   NE2  HIS A 287      81.513  83.926  30.365  1.00  11.59        N
      ATOM   2190   CD2  HIS A 287      81.867  84.063  29.063  1.00  12.14        C
      ATOM   2191   C    HIS A 287      85.807  85.319  26.542  1.00  11.38        C
      ATOM   2192   O    HIS A 287      85.665  84.559  25.601  1.00  10.48        O
 35   ATOM   2193   N    PRO A 288      86.754  86.268  26.568  1.00  11.91        N
      ATOM   2194   CA   PRO A 288      87.639  86.448  25.430  1.00  13.13        C
      ATOM   2195   CB   PRO A 288      88.691  87.450  25.951  1.00  16.17        C
      ATOM   2196   CG   PRO A 288      88.016  88.184  27.054  1.00  15.44        C
      ATOM   2197   CD   PRO A 288      87.025  87.239  27.652  1.00  14.38        C
 40   ATOM   2198   C    PRO A 288      88.294  85.147  24.969  1.00  12.37        C
      ATOM   2199   O    PRO A 288      88.768  84.379  25.775  1.00  11.70        O
      ATOM   2200   N    GLY A 289      88.301  84.912  23.666  1.00  12.99        N
      ATOM   2201   CA   GLY A 289      88.974  83.756  23.096  1.00  14.02        C
      ATOM   2202   C    GLY A 289      88.232  82.435  23.283  1.00  15.06        C
 45   ATOM   2203   O    GLY A 289      88.771  81.411  22.938  1.00  12.37        O
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	ATOM	2204	N	PHE A 290	86.999	82.444	23.809	1.00	11.44	N
	ATOM	2205	CA	PHE A 290	86.307	81.192	24.102	1.00	10.22	C
	ATOM	2206	CB	PHE A 290	84.875	81.445	24.620	1.00	9.87	C
	ATOM	2207	CG	PHE A 290	84.238	80.258	25.257	1.00	8.59	C
5	ATOM	2208	CD1	PHE A 290	84.499	79.942	26.580	1.00	8.96	C
	ATOM	2209	CE1	PHE A 290	83.913	78.832	27.166	1.00	8.20	C
	ATOM	2210	CZ	PHE A 290	83.079	78.023	26.439	1.00	9.40	C
	ATOM	2211	CE2	PHE A 290	82.790	78.343	25.125	1.00	8.96	C
	ATOM	2212	CD2	PHE A 290	83.392	79.452	24.543	1.00	8.91	C
10	ATOM	2213	C	PHE A 290	86.316	80.317	22.836	1.00	9.94	C
	ATOM	2214	O	PHE A 290	85.907	80.755	21.740	1.00	10.10	O
	ATOM	2215	N	PHE A 291	86.825	79.103	22.976	1.00	9.05	N
	ATOM	2216	CA	PHE A 291	87.013	78.210	21.814	1.00	9.15	C
	ATOM	2217	CB	PHE A 291	88.145	77.220	22.076	1.00	9.25	C
15	ATOM	2218	CG	PHE A 291	88.474	76.347	20.871	1.00	9.99	C
	ATOM	2219	CD1	PHE A 291	89.121	76.887	19.754	1.00	10.58	C
	ATOM	2220	CE1	PHE A 291	89.433	76.081	18.662	1.00	12.19	C
	ATOM	2221	CZ	PHE A 291	89.133	74.731	18.695	1.00	11.62	C
	ATOM	2222	CE2	PHE A 291	88.477	74.205	19.785	1.00	11.64	C
20	ATOM	2223	CD2	PHE A 291	88.166	75.019	20.866	1.00	10.63	C
	ATOM	2224	C	PHE A 291	85.735	77.434	21.441	1.00	9.18	C
	ATOM	2225	O	PHE A 291	85.036	76.887	22.309	1.00	8.66	O
	ATOM	2226	N	MET A 292	85.433	77.413	20.152	1.00	7.88	N
	ATOM	2227	CA	MET A 292	84.284	76.716	19.632	1.00	9.77	C
25	ATOM	2228	CB	MET A 292	83.108	77.659	19.387	1.00	10.35	C
	ATOM	2229	CG	MET A 292	82.811	78.590	20.549	1.00	11.54	C
	ATOM	2230	SD	MET A 292	81.378	79.612	20.212	1.00	14.13	S
	ATOM	2231	CE	MET A 292	81.483	80.824	21.522	1.00	8.87	C
	ATOM	2232	C	MET A 292	84.632	76.044	18.318	1.00	9.69	C
30	ATOM	2233	O	MET A 292	85.452	76.554	17.556	1.00	9.85	O
	ATOM	2234	N	PHE A 293	84.023	74.887	18.082	1.00	9.21	N
	ATOM	2235	CA	PHE A 293	84.140	74.214	16.792	1.00	9.16	C
	ATOM	2236	CB	PHE A 293	85.195	73.102	16.794	1.00	10.12	C
	ATOM	2237	CG	PHE A 293	84.996	72.012	17.819	1.00	11.55	C
35	ATOM	2238	CD1	PHE A 293	85.522	72.138	19.099	1.00	11.47	C
	ATOM	2239	CE1	PHE A 293	85.374	71.115	20.041	1.00	12.63	C
	ATOM	2240	CZ	PHE A 293	84.740	69.935	19.688	1.00	12.04	C
	ATOM	2241	CE2	PHE A 293	84.237	69.786	18.398	1.00	12.95	C
	ATOM	2242	CD2	PHE A 293	84.400	70.808	17.459	1.00	10.73	C
40	ATOM	2243	C	PHE A 293	82.777	73.754	16.279	1.00	9.55	C
	ATOM	2244	O	PHE A 293	81.991	73.147	16.992	1.00	9.18	O
	ATOM	2245	N	GLY A 294	82.496	74.053	15.021	1.00	9.20	N
	ATOM	2246	CA	GLY A 294	81.203	73.738	14.477	1.00	9.79	C
	ATOM	2247	C	GLY A 294	81.115	72.512	13.588	1.00	10.37	C
45	ATOM	2248	O	GLY A 294	82.108	72.110	12.940	1.00	8.84	O

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      ATOM   2249  N    GLU A 295     79.908  71.946  13.560  1.00  9.56          N
      ATOM   2250  CA   GLU A 295     79.588  70.801  12.739  1.00 10.45          C
      ATOM   2251  CB   GLU A 295     78.672  69.815  13.450  1.00 10.41          C
      ATOM   2252  CG   GLU A 295     78.214  68.681  12.515  1.00  9.73          C
 5    ATOM   2253  CD   GLU A 295     76.714  68.373  12.552  1.00 12.79          C
      ATOM   2254  OE1  GLU A 295     75.900  69.107  13.171  1.00 12.40          O
      ATOM   2255  OE2  GLU A 295     76.325  67.362  11.909  1.00 12.93          O
      ATOM   2256  C    GLU A 295     78.901  71.281  11.467  1.00  9.52          C
      ATOM   2257  O    GLU A 295     77.705  71.599  11.487  1.00  9.34          O
10    ATOM   2258  N    ALA A 296     79.692  71.360  10.393  1.00  8.43          N
      ATOM   2259  CA   ALA A 296     79.210  71.570   9.030  1.00 10.11          C
      ATOM   2260  CB   ALA A 296     79.970  72.714   8.353  1.00  9.64          C
      ATOM   2261  C    ALA A 296     79.409  70.251   8.284  1.00  9.91          C
      ATOM   2262  O    ALA A 296     80.539  69.874   7.984  1.00 11.06          O
15    ATOM   2263  N    PHE A 297     78.309  69.545   8.019  1.00 10.07          N
      ATOM   2264  CA   PHE A 297     78.357  68.157   7.504  1.00 10.08          C
      ATOM   2265  CB   PHE A 297     77.140  67.342   7.961  1.00 10.16          C
      ATOM   2266  CG   PHE A 297     77.341  65.851   7.936  1.00 11.39          C
      ATOM   2267  CD1  PHE A 297     77.927  65.211   6.851  1.00 11.69          C
20    ATOM   2268  CE1  PHE A 297     78.076  63.835   6.822  1.00 12.87          C
      ATOM   2269  CZ   PHE A 297     77.593  63.081   7.863  1.00 11.34          C
      ATOM   2270  CE2  PHE A 297     77.009  63.700   8.936  1.00 11.87          C
      ATOM   2271  CD2  PHE A 297     76.879  65.078   8.975  1.00 12.63          C
      ATOM   2272  C    PHE A 297     78.479  68.253   6.000  1.00  9.35          C
25    ATOM   2273  O    PHE A 297     77.481  68.241   5.255  1.00  7.99          O
      ATOM   2274  N    ASP A 298     79.734  68.362   5.561  1.00  9.67          N
      ATOM   2275  CA   ASP A 298     80.038  68.660   4.167  1.00  9.68          C
      ATOM   2276  CB   ASP A 298     79.778  70.150   3.934  1.00 10.36          C
      ATOM   2277  CG   ASP A 298     79.952  70.597   2.484  1.00 13.00          C
30    ATOM   2278  OD1  ASP A 298     80.669  69.928   1.694  1.00 14.93          O
      ATOM   2279  OD2  ASP A 298     79.395  71.666   2.141  1.00 12.78          O
      ATOM   2280  C    ASP A 298     81.511  68.282   3.964  1.00  9.95          C
      ATOM   2281  O    ASP A 298     82.378  68.683   4.741  1.00 10.40          O
      ATOM   2282  N    TYR A 299     81.779  67.466   2.950  1.00  9.57          N
35    ATOM   2283  CA   TYR A 299     83.139  66.995   2.653  1.00 11.03          C
      ATOM   2284  CB   TYR A 299     83.053  65.591   2.031  1.00 12.44          C
      ATOM   2285  CG   TYR A 299     82.544  64.590   3.060  1.00 11.99          C
      ATOM   2286  CD1  TYR A 299     83.360  64.170   4.084  1.00 12.22          C
      ATOM   2287  CE1  TYR A 299     82.914  63.285   5.045  1.00 11.45          C
40    ATOM   2288  CZ   TYR A 299     81.626  62.803   5.006  1.00 14.21          C
      ATOM   2289  OH   TYR A 299     81.241  61.901   5.984  1.00 17.09          O
      ATOM   2290  CE2  TYR A 299     80.768  63.207   3.997  1.00 13.87          C
      ATOM   2291  CD2  TYR A 299     81.237  64.107   3.026  1.00 13.67          C
      ATOM   2292  C    TYR A 299     83.995  67.938   1.809  1.00 11.50          C
45    ATOM   2293  O    TYR A 299     85.140  67.619   1.474  1.00 11.92          O
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	ATOM	2294	N	ASP	A	300	83.457	69.121	1.527	1.00 11.83	N
	ATOM	2295	CA	ASP	A	300	84.159	70.163	0.798	1.00 9.72	C
	ATOM	2296	CB	ASP	A	300	83.194	70.903	-0.112	1.00 10.78	C
	ATOM	2297	CG	ASP	A	300	83.924	71.912	-0.992	1.00 15.25	C
5	ATOM	2298	OD1	ASP	A	300	84.592	71.447	-1.917	1.00 17.17	O
	ATOM	2299	OD2	ASP	A	300	83.918	73.135	-0.703	1.00 16.54	O
	ATOM	2300	C	ASP	A	300	84.822	71.191	1.719	1.00 9.38	C
	ATOM	2301	O	ASP	A	300	84.124	71.947	2.455	1.00 8.06	O
	ATOM	2302	N	ALA	A	301	86.152	71.269	1.652	1.00 8.38	N
10	ATOM	2303	CA	ALA	A	301	86.925	72.136	2.569	1.00 8.68	C
	ATOM	2304	CB	ALA	A	301	88.423	71.973	2.308	1.00 8.56	C
	ATOM	2305	C	ALA	A	301	86.546	73.617	2.480	1.00 9.46	C
	ATOM	2306	O	ALA	A	301	86.364	74.303	3.499	1.00 9.71	O
	ATOM	2307	N	ALA	A	302	86.467	74.127	1.270	1.00 11.18	N
15	ATOM	2308	CA	ALA	A	302	86.122	75.529	1.036	1.00 11.02	C
	ATOM	2309	CB	ALA	A	302	86.191	75.844	-0.462	1.00 10.72	C
	ATOM	2310	C	ALA	A	302	84.739	75.900	1.608	1.00 12.21	C
	ATOM	2311	O	ALA	A	302	84.576	76.947	2.212	1.00 11.22	O
	ATOM	2312	N	ARG	A	303	83.731	75.055	1.412	1.00 13.60	N
20	ATOM	2313	CA	ARG	A	303	82.399	75.356	1.965	1.00 12.42	C
	ATOM	2314	CB	ARG	A	303	81.305	74.425	1.397	1.00 13.39	C
	ATOM	2315	CG	ARG	A	303	80.699	74.895	0.083	1.00 16.07	C
	ATOM	2316	CD	ARG	A	303	79.416	74.164	-0.301	1.00 14.66	C
	ATOM	2317	NE	ARG	A	303	79.670	72.733	-0.348	1.00 16.46	N
25	ATOM	2318	CZ	ARG	A	303	79.876	71.991	-1.440	1.00 14.22	C
	ATOM	2319	NH1	ARG	A	303	79.811	72.505	-2.665	1.00 15.11	N
	ATOM	2320	NH2	ARG	A	303	80.145	70.702	-1.294	1.00 12.11	N
	ATOM	2321	C	ARG	A	303	82.376	75.344	3.504	1.00 11.66	C
	ATOM	2322	O	ARG	A	303	81.738	76.190	4.091	1.00 12.84	O
30	ATOM	2323	N	ILE	A	304	83.035	74.399	4.170	1.00 9.76	N
	ATOM	2324	CA	ILE	A	304	83.008	74.409	5.624	1.00 9.85	C
	ATOM	2325	CB	ILE	A	304	83.284	73.014	6.263	1.00 9.85	C
	ATOM	2326	CG1	ILE	A	304	84.706	72.493	6.013	1.00 9.03	C
	ATOM	2327	CD1	ILE	A	304	85.056	71.286	6.873	1.00 7.52	C
35	ATOM	2328	CG2	ILE	A	304	82.282	71.965	5.745	1.00 9.80	C
	ATOM	2329	C	ILE	A	304	83.945	75.488	6.195	1.00 10.95	C
	ATOM	2330	O	ILE	A	304	83.711	76.000	7.314	1.00 9.86	O
	ATOM	2331	N	ALA	A	305	84.961	75.883	5.406	1.00 9.86	N
	ATOM	2332	CA	ALA	A	305	85.950	76.848	5.879	1.00 9.62	C
40	ATOM	2333	CB	ALA	A	305	87.108	76.978	4.878	1.00 8.53	C
	ATOM	2334	C	ALA	A	305	85.361	78.232	6.187	1.00 8.63	C
	ATOM	2335	O	ALA	A	305	85.946	79.000	6.948	1.00 7.54	O
	ATOM	2336	N	THR	A	306	84.252	78.574	5.548	1.00 9.00	N
	ATOM	2337	CA	THR	A	306	83.642	79.902	5.669	1.00 10.22	C
45	ATOM	2338	CB	THR	A	306	82.323	79.974	4.860	1.00 14.38	C

	ATOM	2339	OG1	THR A 306	81.466	78.879	5.265	1.00	21.19	O
	ATOM	2340	CG2	THR A 306	82.580	79.887	3.361	1.00	11.24	C
	ATOM	2341	C	THR A 306	83.358	80.293	7.132	1.00	10.35	C
	ATOM	2342	O	THR A 306	83.494	81.456	7.516	1.00	9.68	O
5	ATOM	2343	N	HIS A 307	83.002	79.300	7.947	1.00	8.78	N
	ATOM	2344	CA	HIS A 307	82.683	79.498	9.351	1.00	9.49	C
	ATOM	2345	CB	HIS A 307	82.091	78.195	9.919	1.00	8.87	C
	ATOM	2346	CG	HIS A 307	80.878	77.723	9.189	1.00	8.30	C
	ATOM	2347	ND1	HIS A 307	79.697	78.362	9.266	1.00	8.68	N
10	ATOM	2348	CE1	HIS A 307	78.783	77.731	8.498	1.00	7.50	C
	ATOM	2349	NE2	HIS A 307	79.384	76.691	7.898	1.00	8.42	N
	ATOM	2350	CD2	HIS A 307	80.685	76.646	8.309	1.00	9.11	C
	ATOM	2351	C	HIS A 307	83.871	79.903	10.166	1.00	9.45	C
	ATOM	2352	O	HIS A 307	83.705	80.474	11.242	1.00	11.07	O
15	ATOM	2353	N	THR A 308	85.081	79.646	9.652	1.00	9.41	N
	ATOM	2354	CA	THR A 308	86.318	79.958	10.351	1.00	9.31	C
	ATOM	2355	CB	THR A 308	87.501	79.029	9.955	1.00	9.37	C
	ATOM	2356	OG1	THR A 308	87.961	79.325	8.630	1.00	7.62	O
	ATOM	2357	CG2	THR A 308	87.113	77.525	10.036	1.00	6.91	C
20	ATOM	2358	C	THR A 308	86.752	81.411	10.137	1.00	10.18	C
	ATOM	2359	O	THR A 308	87.598	81.896	10.855	1.00	8.94	O
	ATOM	2360	N	LEU A 309	86.170	82.093	9.162	1.00	10.55	N
	ATOM	2361	CA	LEU A 309	86.743	83.343	8.688	1.00	11.94	C
	ATOM	2362	CB	LEU A 309	86.366	83.554	7.222	1.00	12.52	C
25	ATOM	2363	CG	LEU A 309	86.850	82.471	6.250	1.00	15.75	C
	ATOM	2364	CD1	LEU A 309	86.375	82.827	4.826	1.00	16.29	C
	ATOM	2365	CD2	LEU A 309	88.371	82.260	6.365	1.00	12.11	C
	ATOM	2366	C	LEU A 309	86.256	84.547	9.488	1.00	13.55	C
	ATOM	2367	O	LEU A 309	85.178	84.488	10.098	1.00	11.41	O
30	ATOM	2368	N	PRO A 310	87.032	85.658	9.464	1.00	14.42	N
	ATOM	2369	CA	PRO A 310	86.597	86.860	10.179	1.00	13.98	C
	ATOM	2370	CB	PRO A 310	87.711	87.881	9.887	1.00	16.41	C
	ATOM	2371	CG	PRO A 310	88.922	87.061	9.574	1.00	16.94	C
	ATOM	2372	CD	PRO A 310	88.389	85.810	8.893	1.00	16.27	C
35	ATOM	2373	C	PRO A 310	85.244	87.355	9.688	1.00	12.93	C
	ATOM	2374	O	PRO A 310	85.000	87.407	8.480	1.00	11.94	O
	ATOM	2375	N	GLY A 311	84.358	87.675	10.625	1.00	12.00	N
	ATOM	2376	CA	GLY A 311	83.024	88.172	10.296	1.00	11.69	C
	ATOM	2377	C	GLY A 311	82.001	87.082	10.013	1.00	12.30	C
40	ATOM	2378	O	GLY A 311	80.854	87.384	9.832	1.00	12.37	O
	ATOM	2379	N	HIS A 312	82.412	85.812	10.002	1.00	11.89	N
	ATOM	2380	CA	HIS A 312	81.531	84.718	9.611	1.00	12.94	C
	ATOM	2381	CB	HIS A 312	82.092	84.023	8.373	1.00	12.91	C
	ATOM	2382	CG	HIS A 312	81.940	84.839	7.129	1.00	17.78	C
45	ATOM	2383	ND1	HIS A 312	80.922	84.649	6.259	1.00	19.08	N

	ATOM	2384	CE1	HIS	A	312	81.031	85.530	5.238	1.00	21.50	C
	ATOM	2385	NE2	HIS	A	312	82.108	86.312	5.478	1.00	24.25	N
	ATOM	2386	CD2	HIS	A	312	82.693	85.905	6.636	1.00	18.49	C
	ATOM	2387	C	HIS	A	312	81.280	83.729	10.729	1.00	11.50	C
5	ATOM	2388	O	HIS	A	312	80.817	82.621	10.477	1.00	11.13	O
	ATOM	2389	N	GLY	A	313	81.528	84.172	11.963	1.00	10.71	N
	ATOM	2390	CA	GLY	A	313	81.391	83.368	13.158	1.00	11.15	C
	ATOM	2391	C	GLY	A	313	82.693	83.135	13.905	1.00	10.67	C
	ATOM	2392	O	GLY	A	313	82.700	83.087	15.125	1.00	11.53	O
10	ATOM	2393	N	GLU	A	314	83.785	82.962	13.175	1.00	10.32	N
	ATOM	2394	CA	GLU	A	314	85.125	82.880	13.757	1.00	12.38	C
	ATOM	2395	CB	GLU	A	314	85.483	84.221	14.445	1.00	14.49	C
	ATOM	2396	CG	GLU	A	314	85.600	85.376	13.446	1.00	17.46	C
	ATOM	2397	CD	GLU	A	314	85.534	86.784	14.058	1.00	20.63	C
15	ATOM	2398	OE1	GLU	A	314	85.541	86.931	15.290	1.00	24.13	O
	ATOM	2399	OE2	GLU	A	314	85.442	87.759	13.289	1.00	15.75	O
	ATOM	2400	C	GLU	A	314	85.251	81.690	14.700	1.00	10.85	C
	ATOM	2401	O	GLU	A	314	85.640	81.833	15.842	1.00	10.16	O
	ATOM	2402	N	THR	A	315	84.842	80.515	14.233	1.00	10.17	N
20	ATOM	2403	CA	THR	A	315	84.970	79.309	15.032	1.00	10.01	C
	ATOM	2404	CB	THR	A	315	83.609	78.646	15.383	1.00	10.24	C
	ATOM	2405	OG1	THR	A	315	82.962	78.136	14.202	1.00	11.04	O
	ATOM	2406	CG2	THR	A	315	82.663	79.635	16.098	1.00	9.54	C
	ATOM	2407	C	THR	A	315	85.846	78.365	14.214	1.00	11.39	C
25	ATOM	2408	O	THR	A	315	86.026	78.550	13.002	1.00	11.64	O
	ATOM	2409	N	SER	A	316	86.380	77.356	14.876	1.00	9.87	N
	ATOM	2410	CA	SER	A	316	86.924	76.215	14.178	1.00	9.57	C
	ATOM	2411	CB	SER	A	316	87.825	75.437	15.130	1.00	9.99	C
	ATOM	2412	OG	SER	A	316	88.293	74.240	14.532	1.00	13.22	O
30	ATOM	2413	C	SER	A	316	85.753	75.372	13.631	1.00	8.57	C
	ATOM	2414	O	SER	A	316	84.574	75.694	13.846	1.00	7.97	O
	ATOM	2415	N	VAL	A	317	86.073	74.347	12.857	1.00	8.01	N
	ATOM	2416	CA	VAL	A	317	85.083	73.392	12.378	1.00	8.11	C
	ATOM	2417	CB	VAL	A	317	84.653	73.640	10.913	1.00	8.46	C
35	ATOM	2418	CG1	VAL	A	317	83.855	74.952	10.742	1.00	6.89	C
	ATOM	2419	CG2	VAL	A	317	85.853	73.616	9.961	1.00	7.09	C
	ATOM	2420	C	VAL	A	317	85.635	71.955	12.523	1.00	9.18	C
	ATOM	2421	O	VAL	A	317	86.853	71.742	12.629	1.00	8.08	O
	ATOM	2422	N	LEU	A	318	84.721	70.982	12.515	1.00	9.42	N
40	ATOM	2423	CA	LEU	A	318	85.064	69.589	12.452	1.00	8.66	C
	ATOM	2424	CB	LEU	A	318	83.865	68.745	12.843	1.00	9.25	C
	ATOM	2425	CG	LEU	A	318	83.636	68.814	14.347	1.00	9.01	C
	ATOM	2426	CD1	LEU	A	318	82.147	68.709	14.755	1.00	8.12	C
	ATOM	2427	CD2	LEU	A	318	84.499	67.734	14.991	1.00	7.86	C
45	ATOM	2428	C	LEU	A	318	85.561	69.242	11.040	1.00	9.13	C

	ATOM	2429	O	LEU	A	318	84.936	69.608	10.032	1.00	8.59	O
	ATOM	2430	N	ASP	A	319	86.688	68.547	10.970	1.00	9.15	N
	ATOM	2431	CA	ASP	A	319	87.386	68.329	9.709	1.00	9.72	C
	ATOM	2432	CB	ASP	A	319	88.877	68.105	9.989	1.00	10.73	C
5	ATOM	2433	CG	ASP	A	319	89.750	68.169	8.730	1.00	11.92	C
	ATOM	2434	OD1	ASP	A	319	89.197	68.122	7.596	1.00	10.68	O
	ATOM	2435	OD2	ASP	A	319	91.003	68.292	8.894	1.00	11.40	O
	ATOM	2436	C	ASP	A	319	86.780	67.147	8.942	1.00	10.86	C
	ATOM	2437	O	ASP	A	319	87.364	66.057	8.884	1.00	11.13	O
10	ATOM	2438	N	PHE	A	320	85.638	67.383	8.293	1.00	10.86	N
	ATOM	2439	CA	PHE	A	320	85.007	66.332	7.492	1.00	9.39	C
	ATOM	2440	CB	PHE	A	320	83.595	66.739	7.045	1.00	10.08	C
	ATOM	2441	CG	PHE	A	320	82.541	66.502	8.101	1.00	9.82	C
	ATOM	2442	CD1	PHE	A	320	82.409	67.376	9.169	1.00	10.08	C
15	ATOM	2443	CE1	PHE	A	320	81.465	67.155	10.163	1.00	10.37	C
	ATOM	2444	CZ	PHE	A	320	80.620	66.064	10.093	1.00	10.49	C
	ATOM	2445	CE2	PHE	A	320	80.715	65.184	9.007	1.00	10.69	C
	ATOM	2446	CD2	PHE	A	320	81.689	65.409	8.026	1.00	10.64	C
	ATOM	2447	C	PHE	A	320	85.874	65.825	6.333	1.00	10.54	C
20	ATOM	2448	O	PHE	A	320	85.950	64.625	6.125	1.00	11.15	O
	ATOM	2449	N	PRO	A	321	86.558	66.728	5.598	1.00	10.61	N
	ATOM	2450	CA	PRO	A	321	87.447	66.257	4.533	1.00	9.85	C
	ATOM	2451	CB	PRO	A	321	88.059	67.547	3.996	1.00	9.33	C
	ATOM	2452	CG	PRO	A	321	87.001	68.576	4.260	1.00	10.73	C
25	ATOM	2453	CD	PRO	A	321	86.466	68.204	5.620	1.00	9.17	C
	ATOM	2454	C	PRO	A	321	88.527	65.269	4.989	1.00	10.60	C
	ATOM	2455	O	PRO	A	321	88.766	64.270	4.334	1.00	9.09	O
	ATOM	2456	N	MET	A	322	89.144	65.523	6.133	1.00	10.53	N
	ATOM	2457	CA	MET	A	322	90.122	64.605	6.663	1.00	9.54	C
30	ATOM	2458	CB	MET	A	322	90.867	65.253	7.824	1.00	9.97	C
	ATOM	2459	CG	MET	A	322	91.833	64.361	8.565	1.00	14.30	C
	ATOM	2460	SD	MET	A	322	93.096	63.690	7.471	1.00	18.22	S
	ATOM	2461	CE	MET	A	322	94.130	65.154	7.388	1.00	19.25	C
	ATOM	2462	C	MET	A	322	89.438	63.332	7.112	1.00	10.68	C
35	ATOM	2463	O	MET	A	322	90.005	62.250	6.978	1.00	9.25	O
	ATOM	2464	N	LYS	A	323	88.212	63.427	7.627	1.00	9.54	N
	ATOM	2465	CA	LYS	A	323	87.533	62.205	8.003	1.00	9.37	C
	ATOM	2466	CB	LYS	A	323	86.192	62.493	8.674	1.00	10.72	C
	ATOM	2467	CG	LYS	A	323	85.409	61.244	9.004	1.00	12.09	C
40	ATOM	2468	CD	LYS	A	323	84.308	60.996	7.996	1.00	13.58	C
	ATOM	2469	CE	LYS	A	323	84.082	59.527	7.716	1.00	17.41	C
	ATOM	2470	NZ	LYS	A	323	82.924	59.399	6.788	1.00	15.20	N
	ATOM	2471	C	LYS	A	323	87.344	61.281	6.807	1.00	8.95	C
	ATOM	2472	O	LYS	A	323	87.502	60.062	6.937	1.00	6.69	O
45	ATOM	2473	N	GLN	A	324	86.982	61.839	5.655	1.00	9.41	N

	ATOM	2474	CA	GLN A 324	86.791	61.018	4.437	1.00	10.60	C
	ATOM	2475	CB	GLN A 324	86.238	61.873	3.290	1.00	13.02	C
	ATOM	2476	CG	GLN A 324	85.877	61.138	1.997	1.00	18.08	C
	ATOM	2477	CD	GLN A 324	85.349	62.120	0.935	1.00	27.45	C
5	ATOM	2478	OE1	GLN A 324	86.076	63.007	0.482	1.00	34.72	O
	ATOM	2479	NE2	GLN A 324	84.091	61.979	0.557	1.00	31.23	N
	ATOM	2480	C	GLN A 324	88.106	60.390	4.008	1.00	9.18	C
	ATOM	2481	O	GLN A 324	88.135	59.235	3.578	1.00	9.76	O
	ATOM	2482	N	ALA A 325	89.188	61.152	4.120	1.00	8.67	N
10	ATOM	2483	CA	ALA A 325	90.533	60.633	3.831	1.00	9.60	C
	ATOM	2484	CB	ALA A 325	91.597	61.752	3.919	1.00	7.32	C
	ATOM	2485	C	ALA A 325	90.863	59.474	4.775	1.00	8.16	C
	ATOM	2486	O	ALA A 325	91.298	58.404	4.333	1.00	7.96	O
	ATOM	2487	N	MET A 326	90.599	59.663	6.059	1.00	9.11	N
15	ATOM	2488	CA	MET A 326	90.811	58.592	7.059	1.00	9.47	C
	ATOM	2489	CB	MET A 326	90.625	59.102	8.477	1.00	9.63	C
	ATOM	2490	CG	MET A 326	91.741	60.034	8.883	1.00	10.31	C
	ATOM	2491	SD	MET A 326	91.694	60.589	10.598	1.00	11.08	S
	ATOM	2492	CE	MET A 326	92.299	59.086	11.400	1.00	8.51	C
20	ATOM	2493	C	MET A 326	89.982	57.343	6.817	1.00	9.92	C
	ATOM	2494	O	MET A 326	90.504	56.216	6.914	1.00	9.99	O
	ATOM	2495	N	GLU A 327	88.727	57.521	6.425	1.00	11.43	N
	ATOM	2496	CA	GLU A 327	87.881	56.387	6.075	1.00	12.28	C
	ATOM	2497	CB	GLU A 327	86.449	56.841	5.753	1.00	14.88	C
25	ATOM	2498	CG	GLU A 327	85.539	55.675	5.407	1.00	22.11	C
	ATOM	2499	CD	GLU A 327	84.143	56.113	5.048	1.00	29.70	C
	ATOM	2500	OE1	GLU A 327	83.661	57.127	5.597	1.00	30.92	O
	ATOM	2501	OE2	GLU A 327	83.538	55.448	4.193	1.00	46.65	O
	ATOM	2502	C	GLU A 327	88.461	55.578	4.892	1.00	12.13	C
30	ATOM	2503	O	GLU A 327	88.486	54.347	4.926	1.00	11.15	O
	ATOM	2504	N	GLU A 328	88.907	56.268	3.854	1.00	10.41	N
	ATOM	2505	CA	GLU A 328	89.497	55.607	2.705	1.00	11.59	C
	ATOM	2506	CB	GLU A 328	89.628	56.596	1.548	1.00	13.52	C
	ATOM	2507	CG	GLU A 328	88.243	57.057	1.092	1.00	17.77	C
35	ATOM	2508	CD	GLU A 328	88.255	57.986	-0.107	1.00	22.00	C
	ATOM	2509	OE1	GLU A 328	89.326	58.226	-0.674	1.00	21.70	O
	ATOM	2510	OE2	GLU A 328	87.175	58.497	-0.467	1.00	27.21	O
	ATOM	2511	C	GLU A 328	90.837	54.924	3.024	1.00	10.91	C
	ATOM	2512	O	GLU A 328	91.116	53.811	2.544	1.00	9.33	O
40	ATOM	2513	N	VAL A 329	91.636	55.559	3.872	1.00	10.66	N
	ATOM	2514	CA	VAL A 329	92.971	55.067	4.172	1.00	9.49	C
	ATOM	2515	CB	VAL A 329	93.865	56.225	4.666	1.00	9.29	C
	ATOM	2516	CG1	VAL A 329	95.176	55.693	5.242	1.00	8.33	C
	ATOM	2517	CG2	VAL A 329	94.116	57.210	3.515	1.00	8.07	C
45	ATOM	2518	C	VAL A 329	92.999	53.892	5.166	1.00	10.93	C

	ATOM	2519	O	VAL A 329	93.745	52.937	4.975	1.00 13.97	O
	ATOM	2520	N	PHE A 330	92.216	53.993	6.235	1.00 10.30	N
	ATOM	2521	CA	PHE A 330	92.216	53.007	7.301	1.00 10.50	C
	ATOM	2522	CB	PHE A 330	92.300	53.736	8.663	1.00 10.10	C
5	ATOM	2523	CG	PHE A 330	93.515	54.616	8.780	1.00 9.79	C
	ATOM	2524	CD1	PHE A 330	94.783	54.057	8.743	1.00 9.81	C
	ATOM	2525	CE1	PHE A 330	95.923	54.840	8.827	1.00 8.98	C
	ATOM	2526	CZ	PHE A 330	95.791	56.201	8.941	1.00 9.58	C
	ATOM	2527	CE2	PHE A 330	94.535	56.770	8.980	1.00 9.73	C
10	ATOM	2528	CD2	PHE A 330	93.401	55.981	8.893	1.00 9.05	C
	ATOM	2529	C	PHE A 330	91.018	52.064	7.279	1.00 12.26	C
	ATOM	2530	O	PHE A 330	91.043	51.042	7.954	1.00 13.04	O
	ATOM	2531	N	GLY A 331	89.977	52.427	6.531	1.00 12.02	N
	ATOM	2532	CA	GLY A 331	88.811	51.589	6.370	1.00 13.60	C
15	ATOM	2533	C	GLY A 331	89.013	50.578	5.263	1.00 15.34	C
	ATOM	2534	O	GLY A 331	90.153	50.314	4.815	1.00 16.11	O
	ATOM	2535	N	ARG A 332	87.899	50.022	4.807	1.00 16.06	N
	ATOM	2536	CA	ARG A 332	87.940	48.910	3.877	1.00 18.06	C
	ATOM	2537	CB	ARG A 332	86.544	48.342	3.630	1.00 24.83	C
20	ATOM	2538	CG	ARG A 332	86.143	47.309	4.669	1.00 37.10	C
	ATOM	2539	CD	ARG A 332	84.849	46.605	4.285	1.00 48.85	C
	ATOM	2540	NE	ARG A 332	84.707	45.379	5.064	1.00 59.60	N
	ATOM	2541	CZ	ARG A 332	85.244	44.210	4.726	1.00 69.59	C
	ATOM	2542	NH1	ARG A 332	85.950	44.078	3.602	1.00 78.32	N
25	ATOM	2543	NH2	ARG A 332	85.070	43.158	5.512	1.00 75.92	N
	ATOM	2544	C	ARG A 332	88.597	49.241	2.548	1.00 15.39	C
	ATOM	2545	O	ARG A 332	89.214	48.388	1.976	1.00 13.38	O
	ATOM	2546	N	LYS A 333	88.475	50.464	2.048	1.00 14.25	N
	ATOM	2547	CA	LYS A 333	89.137	50.798	0.780	1.00 16.66	C
30	ATOM	2548	CB	LYS A 333	88.773	52.214	0.364	1.00 20.03	C
	ATOM	2549	CG	LYS A 333	89.086	52.561	−1.079	1.00 30.01	C
	ATOM	2550	CD	LYS A 333	88.438	53.900	−1.449	1.00 43.02	C
	ATOM	2551	CE	LYS A 333	88.714	54.319	−2.889	1.00 44.84	C
	ATOM	2552	NZ	LYS A 333	90.177	54.396	−3.107	1.00 44.14	N
35	ATOM	2553	C	LYS A 333	90.676	50.616	0.857	1.00 13.92	C
	ATOM	2554	O	LYS A 333	91.304	50.272	−0.117	1.00 11.72	O
	ATOM	2555	N	GLN A 334	91.266	50.808	2.029	1.00 10.94	N
	ATOM	2556	CA	GLN A 334	92.710	50.663	2.204	1.00 12.50	C
	ATOM	2557	CB	GLN A 334	93.165	49.183	2.116	1.00 14.64	C
40	ATOM	2558	CG	GLN A 334	92.677	48.272	3.251	1.00 14.64	C
	ATOM	2559	CD	GLN A 334	93.307	48.623	4.579	1.00 15.76	C
	ATOM	2560	OE1	GLN A 334	94.497	48.398	4.780	1.00 15.21	O
	ATOM	2561	NE2	GLN A 334	92.509	49.191	5.494	1.00 14.54	N
	ATOM	2562	C	GLN A 334	93.491	51.529	1.192	1.00 10.81	C
45	ATOM	2563	O	GLN A 334	94.433	51.069	0.572	1.00 9.71	O

	ATOM	2564	N	ALA A 335	93.103	52.776	1.032	1.00	10.60	N
	ATOM	2565	CA	ALA A 335	93.894	53.690	0.186	1.00	11.76	C
	ATOM	2566	CB	ALA A 335	93.136	55.015	-0.060	1.00	12.19	C
	ATOM	2567	C	ALA A 335	95.275	53.937	0.832	1.00	9.79	C
5	ATOM	2568	O	ALA A 335	95.458	53.776	2.039	1.00	9.13	O
	ATOM	2569	N	GLY A 336	96.267	54.247	0.011	1.00	9.47	N
	ATOM	2570	CA	GLY A 336	97.589	54.612	0.521	1.00	9.15	C
	ATOM	2571	C	GLY A 336	97.549	55.985	1.166	1.00	8.00	C
	ATOM	2572	O	GLY A 336	96.621	56.775	0.931	1.00	8.04	O
10	ATOM	2573	N	PHE A 337	98.585	56.278	1.948	1.00	7.05	N
	ATOM	2574	CA	PHE A 337	98.704	57.540	2.647	1.00	7.59	C
	ATOM	2575	CB	PHE A 337	99.975	57.594	3.487	1.00	7.16	C
	ATOM	2576	CG	PHE A 337	99.808	57.104	4.865	1.00	7.21	C
	ATOM	2577	CD1	PHE A 337	99.003	57.795	5.761	1.00	7.38	C
15	ATOM	2578	CE1	PHE A 337	98.864	57.374	7.066	1.00	8.33	C
	ATOM	2579	CZ	PHE A 337	99.567	56.259	7.505	1.00	8.60	C
	ATOM	2580	CE2	PHE A 337	100.398	55.564	6.619	1.00	8.77	C
	ATOM	2581	CD2	PHE A 337	100.508	55.990	5.308	1.00	8.62	C
	ATOM	2582	C	PHE A 337	98.696	58.776	1.757	1.00	7.99	C
20	ATOM	2583	O	PHE A 337	98.430	59.861	2.268	1.00	7.70	O
	ATOM	2584	N	GLU A 338	98.992	58.618	0.467	1.00	8.15	N
	ATOM	2585	CA	GLU A 338	98.899	59.729	-0.491	1.00	9.74	C
	ATOM	2586	CB	GLU A 338	99.244	59.294	-1.947	1.00	9.63	C
	ATOM	2587	CG	GLU A 338	98.362	58.191	-2.537	1.00	9.65	C
25	ATOM	2588	CD	GLU A 338	98.856	56.762	-2.257	1.00	10.53	C
	ATOM	2589	OE1	GLU A 338	99.721	56.570	-1.362	1.00	10.81	O
	ATOM	2590	OE2	GLU A 338	98.390	55.817	-2.944	1.00	10.79	O
	ATOM	2591	C	GLU A 338	97.513	60.415	-0.436	1.00	10.37	C
	ATOM	2592	O	GLU A 338	97.409	61.601	-0.684	1.00	10.60	O
30	ATOM	2593	N	ARG A 339	96.468	59.666	-0.110	1.00	10.40	N
	ATOM	2594	CA	ARG A 339	95.116	60.199	0.001	1.00	10.06	C
	ATOM	2595	CB	ARG A 339	94.153	59.043	0.312	1.00	11.83	C
	ATOM	2596	CG	ARG A 339	92.681	59.396	0.462	1.00	13.18	C
	ATOM	2597	CD	ARG A 339	92.134	60.106	-0.771	1.00	14.10	C
35	ATOM	2598	NE	ARG A 339	90.753	60.596	-0.578	1.00	13.98	N
	ATOM	2599	CZ	ARG A 339	90.417	61.759	-0.005	1.00	13.41	C
	ATOM	2600	NH1	ARG A 339	91.332	62.597	0.458	1.00	13.50	N
	ATOM	2601	NH2	ARG A 339	89.139	62.104	0.075	1.00	14.68	N
	ATOM	2602	C	ARG A 339	95.008	61.304	1.078	1.00	11.01	C
40	ATOM	2603	O	ARG A 339	94.088	62.127	1.045	1.00	10.77	O
	ATOM	2604	N	MET A 340	95.966	61.358	2.006	1.00	10.31	N
	ATOM	2605	CA	MET A 340	96.020	62.457	2.963	1.00	9.26	C
	ATOM	2606	CB	MET A 340	96.993	62.146	4.099	1.00	9.11	C
	ATOM	2607	CG	MET A 340	96.646	60.889	4.879	1.00	10.01	C
45	ATOM	2608	SD	MET A 340	94.987	60.980	5.573	1.00	12.13	S

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      ATOM  2609  CE   MET A 340      95.008  59.506   6.613  1.00 10.09          C
      ATOM  2610  C    MET A 340      96.427  63.803   2.338  1.00  9.36          C
      ATOM  2611  O    MET A 340      96.074  64.848   2.842  1.00  8.38          O
      ATOM  2612  N    ILE A 341      97.157  63.781   1.235  1.00 11.09          N
 5    ATOM  2613  CA   ILE A 341      97.748  65.000   0.686  1.00 10.39          C
      ATOM  2614  CB   ILE A 341      98.657  64.687  -0.527  1.00 10.79          C
      ATOM  2615  CG1  ILE A 341      99.852  63.876  -0.052  1.00 11.35          C
      ATOM  2616  CD1  ILE A 341     100.648  63.174  -1.145  1.00 11.56          C
      ATOM  2617  CG2  ILE A 341      99.130  65.981  -1.238  1.00 10.01          C
10    ATOM  2618  C    ILE A 341      96.722  66.097   0.380  1.00 10.90          C
      ATOM  2619  O    ILE A 341      96.892  67.243   0.799  1.00 12.31          O
      ATOM  2620  N    PRO A 342      95.629  65.756  -0.302  1.00 12.28          N
      ATOM  2621  CA   PRO A 342      94.676  66.832  -0.590  1.00 12.47          C
      ATOM  2622  CB   PRO A 342      93.843  66.256  -1.741  1.00 14.17          C
15    ATOM  2623  CG   PRO A 342      93.910  64.782  -1.539  1.00 13.44          C
      ATOM  2624  CD   PRO A 342      95.301  64.519  -1.033  1.00 12.37          C
      ATOM  2625  C    PRO A 342      93.771  67.220   0.601  1.00 11.11          C
      ATOM  2626  O    PRO A 342      93.086  68.223   0.518  1.00  9.19          O
      ATOM  2627  N    ALA A 343      93.799  66.462   1.705  1.00 10.31          N
20    ATOM  2628  CA   ALA A 343      92.963  66.766   2.872  1.00  9.59          C
      ATOM  2629  CB   ALA A 343      92.467  65.479   3.543  1.00  8.88          C
      ATOM  2630  C    ALA A 343      93.700  67.643   3.886  1.00 10.02          C
      ATOM  2631  O    ALA A 343      93.063  68.311   4.708  1.00 10.02          O
      ATOM  2632  N    LEU A 344      95.034  67.664   3.865  1.00  9.70          N
25    ATOM  2633  CA   LEU A 344      95.772  68.381   4.934  1.00  8.81          C
      ATOM  2634  CB   LEU A 344      97.255  67.973   4.998  1.00  8.59          C
      ATOM  2635  CG   LEU A 344      97.518  66.577   5.587  1.00  8.97          C
      ATOM  2636  CD1  LEU A 344      98.847  66.032   5.058  1.00  8.21          C
      ATOM  2637  CD2  LEU A 344      97.450  66.546   7.108  1.00  7.43          C
30    ATOM  2638  C    LEU A 344      95.657  69.916   4.874  1.00  9.98          C
      ATOM  2639  O    LEU A 344      95.549  70.562   5.911  1.00  8.75          O
      ATOM  2640  N    HIS A 345      95.711  70.505   3.678  1.00  9.35          N
      ATOM  2641  CA   HIS A 345      95.587  71.942   3.535  1.00  9.92          C
      ATOM  2642  CB   HIS A 345      94.129  72.401   3.757  1.00 10.02          C
35    ATOM  2643  CG   HIS A 345      93.179  71.894   2.699  1.00 11.67          C
      ATOM  2644  ND1  HIS A 345      93.205  72.350   1.424  1.00 12.62          N
      ATOM  2645  CE1  HIS A 345      92.256  71.709   0.692  1.00 13.33          C
      ATOM  2646  NE2  HIS A 345      91.648  70.814   1.496  1.00 14.96          N
      ATOM  2647  CD2  HIS A 345      92.202  70.899   2.742  1.00 12.33          C
40    ATOM  2648  C    HIS A 345      96.551  72.703   4.428  1.00  9.82          C
      ATOM  2649  O    HIS A 345      96.178  73.689   5.069  1.00  8.43          O
      ATOM  2650  N    LEU A 346      97.816  72.289   4.423  1.00  9.30          N
      ATOM  2651  CA   LEU A 346      98.818  72.912   5.300  1.00 10.80          C
      ATOM  2652  CB   LEU A 346     100.117  72.093   5.298  1.00 10.45          C
45    ATOM  2653  CG   LEU A 346      99.976  70.661   5.826  1.00 11.00          C
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	ATOM	2654	CD1	LEU	A	346	101.354	70.006	5.726	1.00	8.88	C
	ATOM	2655	CD2	LEU	A	346	99.373	70.612	7.255	1.00	8.53	C
	ATOM	2656	C	LEU	A	346	99.139	74.368	4.902	1.00	11.13	C
	ATOM	2657	O	LEU	A	346	99.466	75.186	5.758	1.00	12.08	O
5	ATOM	2658	N	THR	A	347	99.068	74.668	3.610	1.00	10.80	N
	ATOM	2659	CA	THR	A	347	99.282	76.010	3.112	1.00	11.97	C
	ATOM	2660	CB	THR	A	347	100.670	76.166	2.491	1.00	13.64	C
	ATOM	2661	OG1	THR	A	347	100.818	75.232	1.414	1.00	13.71	O
	ATOM	2662	CG2	THR	A	347	101.794	75.970	3.528	1.00	11.95	C
10	ATOM	2663	C	THR	A	347	98.234	76.304	2.045	1.00	13.99	C
	ATOM	2664	O	THR	A	347	97.624	75.386	1.488	1.00	12.36	O
	ATOM	2665	N	GLY	A	348	97.988	77.590	1.800	1.00	15.02	N
	ATOM	2666	CA	GLY	A	348	97.083	78.010	0.745	1.00	15.65	C
	ATOM	2667	C	GLY	A	348	95.579	77.924	1.069	1.00	19.22	C
15	ATOM	2668	O	GLY	A	348	94.776	78.001	0.171	1.00	17.83	O
	ATOM	2669	N	GLY	A	349	95.173	77.792	2.333	1.00	18.00	N
	ATOM	2670	CA	GLY	A	349	93.734	77.951	2.676	1.00	14.01	C
	ATOM	2671	C	GLY	A	349	93.073	76.615	2.480	1.00	14.38	C
	ATOM	2672	O	GLY	A	349	93.752	75.667	2.099	1.00	17.92	O
20	ATOM	2673	N	PRO	A	350	91.737	76.537	2.633	1.00	12.78	N
	ATOM	2674	CA	PRO	A	350	90.787	77.659	2.748	1.00	11.55	C
	ATOM	2675	CB	PRO	A	350	89.556	77.130	2.031	1.00	12.62	C
	ATOM	2676	CG	PRO	A	350	89.586	75.643	2.346	1.00	13.72	C
	ATOM	2677	CD	PRO	A	350	91.061	75.279	2.260	1.00	13.72	C
25	ATOM	2678	C	PRO	A	350	90.440	78.055	4.177	1.00	10.05	C
	ATOM	2679	O	PRO	A	350	89.797	79.087	4.398	1.00	9.27	O
	ATOM	2680	N	TYR	A	351	90.862	77.244	5.135	1.00	9.71	N
	ATOM	2681	CA	TYR	A	351	90.567	77.499	6.539	1.00	10.28	C
	ATOM	2682	CB	TYR	A	351	90.875	76.267	7.384	1.00	10.43	C
30	ATOM	2683	CG	TYR	A	351	90.321	74.951	6.885	1.00	11.04	C
	ATOM	2684	CD1	TYR	A	351	89.002	74.613	7.113	1.00	10.28	C
	ATOM	2685	CE1	TYR	A	351	88.485	73.407	6.679	1.00	10.77	C
	ATOM	2686	CZ	TYR	A	351	89.287	72.508	6.017	1.00	11.60	C
	ATOM	2687	OH	TYR	A	351	88.757	71.315	5.623	1.00	10.91	O
35	ATOM	2688	CE2	TYR	A	351	90.616	72.818	5.757	1.00	11.66	C
	ATOM	2689	CD2	TYR	A	351	91.122	74.042	6.190	1.00	10.88	C
	ATOM	2690	C	TYR	A	351	91.384	78.653	7.097	1.00	10.89	C
	ATOM	2691	O	TYR	A	351	92.554	78.838	6.698	1.00	12.30	O
	ATOM	2692	N	ALA	A	352	90.819	79.392	8.057	1.00	9.49	N
40	ATOM	2693	CA	ALA	A	352	91.595	80.444	8.729	1.00	10.18	C
	ATOM	2694	CB	ALA	A	352	90.810	81.124	9.847	1.00	8.72	C
	ATOM	2695	C	ALA	A	352	92.863	79.803	9.282	1.00	11.77	C
	ATOM	2696	O	ALA	A	352	93.935	80.370	9.171	1.00	11.42	O
	ATOM	2697	N	ASN	A	353	92.752	78.613	9.878	1.00	10.81	N
45	ATOM	2698	CA	ASN	A	353	93.946	77.953	10.423	1.00	9.81	C

	ATOM	2699	CB	ASN A 353	94.346	78.587	11.759	1.00	10.38	C
	ATOM	2700	CG	ASN A 353	95.666	78.059	12.290	1.00	10.94	C
	ATOM	2701	OD1	ASN A 353	95.939	76.857	12.206	1.00	10.93	O
	ATOM	2702	ND2	ASN A 353	96.494	78.954	12.874	1.00	8.59	N
5	ATOM	2703	C	ASN A 353	93.701	76.475	10.528	1.00	8.44	C
	ATOM	2704	O	ASN A 353	92.907	76.019	11.361	1.00	10.00	O
	ATOM	2705	N	PRO A 354	94.354	75.697	9.661	1.00	8.94	N
	ATOM	2706	CA	PRO A 354	94.054	74.251	9.635	1.00	8.55	C
	ATOM	2707	CB	PRO A 354	94.814	73.777	8.414	1.00	8.43	C
10	ATOM	2708	CG	PRO A 354	96.007	74.682	8.355	1.00	8.58	C
	ATOM	2709	CD	PRO A 354	95.475	76.039	8.758	1.00	8.26	C
	ATOM	2710	C	PRO A 354	94.518	73.521	10.889	1.00	8.60	C
	ATOM	2711	O	PRO A 354	94.028	72.431	11.192	1.00	8.91	O
	ATOM	2712	N	TYR A 355	95.429	74.128	11.645	1.00	8.49	N
15	ATOM	2713	CA	TYR A 355	95.945	73.520	12.889	1.00	7.59	C
	ATOM	2714	CB	TYR A 355	97.283	74.172	13.277	1.00	7.82	C
	ATOM	2715	CG	TYR A 355	98.365	73.932	12.243	1.00	7.26	C
	ATOM	2716	CD1	TYR A 355	99.166	72.802	12.299	1.00	8.70	C
	ATOM	2717	CE1	TYR A 355	100.141	72.558	11.356	1.00	8.41	C
20	ATOM	2718	CZ	TYR A 355	100.321	73.451	10.338	1.00	8.87	C
	ATOM	2719	OH	TYR A 355	101.272	73.201	9.390	1.00	8.82	O
	ATOM	2720	CE2	TYR A 355	99.522	74.584	10.250	1.00	8.37	C
	ATOM	2721	CD2	TYR A 355	98.554	74.801	11.207	1.00	7.94	C
	ATOM	2722	C	TYR A 355	94.928	73.573	14.058	1.00	8.97	C
25	ATOM	2723	O	TYR A 355	95.127	72.918	15.095	1.00	8.72	O
	ATOM	2724	N	GLU A 356	93.824	74.298	13.866	1.00	9.38	N
	ATOM	2725	CA	GLU A 356	92.786	74.426	14.891	1.00	10.40	C
	ATOM	2726	CB	GLU A 356	92.372	75.889	15.031	1.00	11.74	C
	ATOM	2727	CG	GLU A 356	93.511	76.789	15.465	1.00	14.48	C
30	ATOM	2728	CD	GLU A 356	93.179	78.287	15.344	1.00	17.27	C
	ATOM	2729	OE1	GLU A 356	92.031	78.661	14.974	1.00	18.33	O
	ATOM	2730	OE2	GLU A 356	94.097	79.084	15.586	1.00	14.75	O
	ATOM	2731	C	GLU A 356	91.545	73.584	14.592	1.00	9.45	C
	ATOM	2732	O	GLU A 356	90.577	73.580	15.362	1.00	10.71	O
35	ATOM	2733	N	LEU A 357	91.567	72.856	13.488	1.00	9.76	N
	ATOM	2734	CA	LEU A 357	90.419	72.017	13.127	1.00	8.67	C
	ATOM	2735	CB	LEU A 357	90.563	71.482	11.717	1.00	8.92	C
	ATOM	2736	CG	LEU A 357	90.652	72.544	10.624	1.00	9.86	C
	ATOM	2737	CD1	LEU A 357	90.900	71.810	9.301	1.00	10.02	C
40	ATOM	2738	CD2	LEU A 357	89.411	73.427	10.599	1.00	9.32	C
	ATOM	2739	C	LEU A 357	90.306	70.837	14.078	1.00	9.42	C
	ATOM	2740	O	LEU A 357	91.325	70.301	14.551	1.00	8.12	O
	ATOM	2741	N	ALA A 358	89.063	70.443	14.359	1.00	9.05	N
	ATOM	2742	CA	ALA A 358	88.783	69.275	15.207	1.00	8.40	C
45	ATOM	2743	CB	ALA A 358	87.441	69.448	15.877	1.00	8.38	C

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     ATOM   2744  C   ALA A 358     88.776  68.079  14.272  1.00   9.28           C
     ATOM   2745  O   ALA A 358     87.914  67.989  13.357  1.00   9.07           O
     ATOM   2746  N   THR A 359     89.745  67.186  14.445  1.00   9.68           N
     ATOM   2747  CA  THR A 359     89.871  66.034  13.554  1.00   8.81           C
  5  ATOM   2748  CB  THR A 359     91.347  65.763  13.184  1.00   8.14           C
     ATOM   2749  OG1 THR A 359     92.120  65.685  14.377  1.00   8.36           O
     ATOM   2750  CG2 THR A 359     91.922  66.886  12.295  1.00   8.45           C
     ATOM   2751  C   THR A 359     89.215  64.776  14.152  1.00   8.41           C
     ATOM   2752  O   THR A 359     89.174  64.575  15.377  1.00   9.75           O
 10  ATOM   2753  N   PHE A 360     88.696  63.931  13.272  1.00   8.08           N
     ATOM   2754  CA  PHE A 360     87.965  62.713  13.634  1.00   7.27           C
     ATOM   2755  CB  PHE A 360     86.542  63.070  14.107  1.00   7.53           C
     ATOM   2756  CG  PHE A 360     85.627  63.576  13.005  1.00   8.76           C
     ATOM   2757  CD1 PHE A 360     85.772  64.853  12.472  1.00   9.54           C
 15  ATOM   2758  CE1 PHE A 360     84.940  65.302  11.459  1.00   9.36           C
     ATOM   2759  CZ  PHE A 360     83.921  64.491  10.976  1.00   9.69           C
     ATOM   2760  CE2 PHE A 360     83.752  63.231  11.506  1.00   9.12           C
     ATOM   2761  CD2 PHE A 360     84.598  62.787  12.523  1.00   9.65           C
     ATOM   2762  C   PHE A 360     87.922  61.769  12.425  1.00   7.67           C
 20  ATOM   2763  O   PHE A 360     88.170  62.194  11.276  1.00   7.78           O
     ATOM   2764  N   TYR A 361     87.609  60.498  12.668  1.00   7.49           N
     ATOM   2765  CA  TYR A 361     87.405  59.524  11.599  1.00   7.70           C
     ATOM   2766  CB  TYR A 361     88.494  58.425  11.591  1.00   8.98           C
     ATOM   2767  CG  TYR A 361     88.562  57.653  12.867  1.00   9.92           C
 25  ATOM   2768  CD1 TYR A 361     87.638  56.658  13.140  1.00   9.78           C
     ATOM   2769  CE1 TYR A 361     87.670  55.964  14.326  1.00   9.23           C
     ATOM   2770  CZ  TYR A 361     88.631  56.253  15.252  1.00  11.11           C
     ATOM   2771  OH  TYR A 361     88.674  55.559  16.424  1.00   9.75           O
     ATOM   2772  CE2 TYR A 361     89.580  57.240  15.015  1.00  10.68           C
 30  ATOM   2773  CD2 TYR A 361     89.540  57.930  13.820  1.00  10.41           C
     ATOM   2774  C   TYR A 361     86.008  58.900  11.611  1.00   8.19           C
     ATOM   2775  O   TYR A 361     85.647  58.252  10.666  1.00   7.67           O
     ATOM   2776  N   ASP A 362     85.234  59.057  12.686  1.00   8.73           N
     ATOM   2777  CA  ASP A 362     83.824  58.657  12.646  1.00   8.35           C
 35  ATOM   2778  CB  ASP A 362     83.653  57.128  12.753  1.00   8.07           C
     ATOM   2779  CG  ASP A 362     84.086  56.555  14.113  1.00   8.16           C
     ATOM   2780  OD1 ASP A 362     84.234  57.344  15.073  1.00   9.60           O
     ATOM   2781  OD2 ASP A 362     84.268  55.295  14.204  1.00   7.55           O
     ATOM   2782  C   ASP A 362     83.094  59.398  13.755  1.00   8.22           C
 40  ATOM   2783  O   ASP A 362     83.690  60.184  14.497  1.00   8.44           O
     ATOM   2784  N   ASN A 363     81.797  59.191  13.826  1.00   8.18           N
     ATOM   2785  CA  ASN A 363     80.986  59.838  14.845  1.00   9.19           C
     ATOM   2786  CB  ASN A 363     80.909  61.380  14.651  1.00   8.52           C
     ATOM   2787  CG  ASN A 363     80.095  61.816  13.415  1.00   9.77           C
 45  ATOM   2788  OD1 ASN A 363     79.273  61.067  12.890  1.00   9.07           O
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	ATOM	2789	ND2	ASN	A	363	80.352	63.063	12.944	1.00	9.67	N
	ATOM	2790	C	ASN	A	363	79.624	59.146	14.955	1.00	7.68	C
	ATOM	2791	O	ASN	A	363	79.439	58.048	14.427	1.00	8.21	O
	ATOM	2792	N	HIS	A	364	78.701	59.804	15.637	1.00	8.34	N
5	ATOM	2793	CA	HIS	A	364	77.354	59.308	15.913	1.00	8.10	C
	ATOM	2794	CB	HIS	A	364	76.786	59.985	17.176	1.00	7.63	C
	ATOM	2795	CG	HIS	A	364	76.772	61.502	17.124	1.00	8.17	C
	ATOM	2796	ND1	HIS	A	364	77.735	62.229	16.507	1.00	8.37	N
	ATOM	2797	CE1	HIS	A	364	77.454	63.538	16.646	1.00	8.63	C
10	ATOM	2798	NE2	HIS	A	364	76.343	63.653	17.371	1.00	7.82	N
	ATOM	2799	CD2	HIS	A	364	75.886	62.415	17.664	1.00	8.46	C
	ATOM	2800	C	HIS	A	364	76.371	59.448	14.799	1.00	8.51	C
	ATOM	2801	O	HIS	A	364	75.255	58.965	14.915	1.00	9.11	O
	ATOM	2802	N	ASP	A	365	76.741	60.115	13.712	1.00	9.46	N
15	ATOM	2803	CA	ASP	A	365	75.817	60.414	12.593	1.00	9.11	C
	ATOM	2804	CB	ASP	A	365	75.830	61.915	12.323	1.00	10.88	C
	ATOM	2805	CG	ASP	A	365	75.312	62.724	13.500	1.00	10.65	C
	ATOM	2806	OD1	ASP	A	365	74.346	62.279	14.153	1.00	9.96	O
	ATOM	2807	OD2	ASP	A	365	75.844	63.818	13.718	1.00	11.29	O
20	ATOM	2808	C	ASP	A	365	76.192	59.734	11.274	1.00	9.75	C
	ATOM	2809	O	ASP	A	365	75.760	60.176	10.189	1.00	11.96	O
	ATOM	2810	N	MET	A	366	77.034	58.714	11.372	1.00	9.99	N
	ATOM	2811	CA	MET	A	366	77.556	57.964	10.237	1.00	10.18	C
	ATOM	2812	CB	MET	A	366	78.713	58.741	9.578	1.00	9.75	C
25	ATOM	2813	CG	MET	A	366	79.959	58.872	10.461	1.00	11.62	C
	ATOM	2814	SD	MET	A	366	81.295	59.914	9.803	1.00	13.99	S
	ATOM	2815	CE	MET	A	366	80.479	61.530	9.682	1.00	8.71	C
	ATOM	2816	C	MET	A	366	78.049	56.598	10.762	1.00	9.78	C
	ATOM	2817	O	MET	A	366	78.186	56.414	11.992	1.00	12.65	O
30	ATOM	2818	N	PRO	A	367	78.325	55.653	9.862	1.00	9.51	N
	ATOM	2819	CA	PRO	A	367	78.852	54.387	10.374	1.00	10.78	C
	ATOM	2820	CB	PRO	A	367	79.045	53.527	9.101	1.00	12.65	C
	ATOM	2821	CG	PRO	A	367	78.001	54.079	8.125	1.00	13.10	C
	ATOM	2822	CD	PRO	A	367	77.978	55.576	8.420	1.00	10.75	C
35	ATOM	2823	C	PRO	A	367	80.160	54.582	11.122	1.00	11.09	C
	ATOM	2824	O	PRO	A	367	80.975	55.408	10.731	1.00	10.60	O
	ATOM	2825	N	ARG	A	368	80.349	53.859	12.216	1.00	9.20	N
	ATOM	2826	CA	ARG	A	368	81.663	53.831	12.827	1.00	9.49	C
	ATOM	2827	CB	ARG	A	368	81.643	53.025	14.110	1.00	9.30	C
40	ATOM	2828	CG	ARG	A	368	81.025	53.784	15.274	1.00	10.19	C
	ATOM	2829	CD	ARG	A	368	80.882	52.871	16.469	1.00	10.27	C
	ATOM	2830	NE	ARG	A	368	80.243	53.454	17.672	1.00	9.66	N
	ATOM	2831	CZ	ARG	A	368	80.903	53.947	18.717	1.00	9.05	C
	ATOM	2832	NH1	ARG	A	368	82.245	54.025	18.713	1.00	10.32	N
45	ATOM	2833	NH2	ARG	A	368	80.231	54.339	19.787	1.00	8.12	N

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      ATOM   2834   C    ARG A 368      82.663  53.249  11.845  1.00 11.61          C
      ATOM   2835   O    ARG A 368      82.279  52.520  10.912  1.00 11.13          O
      ATOM   2836   N    LEU A 369      83.943  53.540  12.074  1.00 13.78          N
      ATOM   2837   CA   LEU A 369      85.014  53.049  11.196  1.00 12.69          C
  5   ATOM   2838   CB   LEU A 369      86.382  53.395  11.783  1.00 10.93          C
      ATOM   2839   CG   LEU A 369      87.618  53.010  10.941  1.00 12.41          C
      ATOM   2840   CD1  LEU A 369      87.665  53.862   9.662  1.00 11.24          C
      ATOM   2841   CD2  LEU A 369      88.881  53.165  11.794  1.00 10.18          C
      ATOM   2842   C    LEU A 369      84.897  51.539  11.041  1.00 13.30          C
 10   ATOM   2843   O    LEU A 369      84.695  50.826  12.030  1.00 12.35          O
      ATOM   2844   N    ASP A 370      84.991  51.063   9.800  1.00 12.59          N
      ATOM   2845   CA   ASP A 370      84.883  49.637   9.504  1.00 12.43          C
      ATOM   2846   CB   ASP A 370      83.975  49.453   8.284  1.00 13.60          C
      ATOM   2847   CG   ASP A 370      83.785  47.969   7.870  1.00 17.03          C
 15   ATOM   2848   OD1  ASP A 370      84.111  47.032   8.611  1.00 17.52          O
      ATOM   2849   OD2  ASP A 370      83.322  47.754   6.752  1.00 19.77          O
      ATOM   2850   C    ASP A 370      86.314  49.112   9.286  1.00 13.54          C
      ATOM   2851   O    ASP A 370      86.820  49.088   8.175  1.00 11.76          O
      ATOM   2852   N    ALA A 371      86.967  48.720  10.375  1.00 13.86          N
 20   ATOM   2853   CA   ALA A 371      88.379  48.397  10.352  1.00 13.56          C
      ATOM   2854   CB   ALA A 371      89.208  49.607  10.786  1.00 15.22          C
      ATOM   2855   C    ALA A 371      88.647  47.237  11.284  1.00 13.93          C
      ATOM   2856   O    ALA A 371      87.898  47.002  12.234  1.00 12.26          O
      ATOM   2857   N    SER A 372      89.720  46.514  10.984  1.00 12.45          N
 25   ATOM   2858   CA   SER A 372      90.307  45.555  11.892  1.00 11.87          C
      ATOM   2859   CB   SER A 372      91.462  44.823  11.180  1.00 11.70          C
      ATOM   2860   OG   SER A 372      92.501  45.791  10.948  1.00 11.05          O
      ATOM   2861   C    SER A 372      90.908  46.311  13.099  1.00 12.28          C
      ATOM   2862   O    SER A 372      90.999  47.544  13.102  1.00 10.61          O
 30   ATOM   2863   N    ASP A 373      91.346  45.560  14.108  1.00 12.03          N
      ATOM   2864   CA   ASP A 373      91.992  46.153  15.276  1.00 13.25          C
      ATOM   2865   CB   ASP A 373      92.475  45.078  16.247  1.00 13.20          C
      ATOM   2866   CG   ASP A 373      91.370  44.539  17.148  1.00 14.89          C
      ATOM   2867   OD1  ASP A 373      90.166  44.703  16.853  1.00 12.62          O
 35   ATOM   2868   OD2  ASP A 373      91.736  43.978  18.190  1.00 13.86          O
      ATOM   2869   C    ASP A 373      93.198  46.988  14.842  1.00 12.53          C
      ATOM   2870   O    ASP A 373      93.423  48.093  15.337  1.00 10.18          O
      ATOM   2871   N    GLU A 374      93.959  46.427  13.921  1.00 11.93          N
      ATOM   2872   CA   GLU A 374      95.127  47.082  13.354  1.00 11.52          C
 40   ATOM   2873   CB   GLU A 374      95.789  46.152  12.336  1.00 14.06          C
      ATOM   2874   CG   GLU A 374      96.440  44.888  12.889  1.00 17.40          C
      ATOM   2875   CD   GLU A 374      95.456  43.815  13.375  1.00 23.88          C
      ATOM   2876   OE1  GLU A 374      94.275  43.768  12.949  1.00 21.21          O
      ATOM   2877   OE2  GLU A 374      95.874  43.018  14.222  1.00 29.19          O
 45   ATOM   2878   C    GLU A 374      94.777  48.408  12.683  1.00 11.68          C
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     ATOM   2879  O   GLU A 374      95.514  49.379  12.804  1.00 13.01           O
     ATOM   2880  N   GLY A 375      93.653  48.458  11.971  1.00  9.99           N
     ATOM   2881  CA  GLY A 375      93.163  49.687  11.351  1.00 10.09           C
     ATOM   2882  C   GLY A 375      92.830  50.784  12.365  1.00 10.49           C
  5  ATOM   2883  O   GLY A 375      93.176  51.939  12.163  1.00 10.04           O
     ATOM   2884  N   PHE A 376      92.158  50.427  13.452  1.00 10.02           N
     ATOM   2885  CA  PHE A 376      91.932  51.386  14.536  1.00 10.75           C
     ATOM   2886  CB  PHE A 376      91.070  50.792  15.656  1.00  8.72           C
     ATOM   2887  CG  PHE A 376      89.603  50.807  15.347  1.00  8.79           C
 10  ATOM   2888  CD1 PHE A 376      88.999  49.749  14.705  1.00  9.04           C
     ATOM   2889  CE1 PHE A 376      87.652  49.776  14.390  1.00  9.80           C
     ATOM   2890  CZ  PHE A 376      86.894  50.874  14.744  1.00 10.46           C
     ATOM   2891  CE2 PHE A 376      87.487  51.922  15.413  1.00  9.77           C
     ATOM   2892  CD2 PHE A 376      88.831  51.886  15.703  1.00  8.64           C
 15  ATOM   2893  C   PHE A 376      93.267  51.884  15.092  1.00  8.86           C
     ATOM   2894  O   PHE A 376      93.442  53.081  15.344  1.00  9.11           O
     ATOM   2895  N   ILE A 377      94.204  50.971  15.298  1.00  8.28           N
     ATOM   2896  CA  ILE A 377      95.513  51.362  15.839  1.00  9.19           C
     ATOM   2897  CB  ILE A 377      96.411  50.113  16.082  1.00  8.69           C
 20  ATOM   2898  CG1 ILE A 377      95.916  49.352  17.324  1.00  9.02           C
     ATOM   2899  CD1 ILE A 377      96.440  47.927  17.475  1.00  9.66           C
     ATOM   2900  CG2 ILE A 377      97.866  50.532  16.255  1.00  8.80           C
     ATOM   2901  C   ILE A 377      96.200  52.391  14.910  1.00  9.14           C
     ATOM   2902  O   ILE A 377      96.706  53.421  15.366  1.00  9.95           O
 25  ATOM   2903  N   ASP A 378      96.205  52.098  13.611  1.00  9.15           N
     ATOM   2904  CA  ASP A 378      96.789  52.992  12.601  1.00 10.39           C
     ATOM   2905  CB  ASP A 378      96.760  52.329  11.205  1.00 10.75           C
     ATOM   2906  CG  ASP A 378      97.653  51.067  11.113  1.00 11.43           C
     ATOM   2907  OD1 ASP A 378      98.628  50.988  11.883  1.00  9.90           O
 30  ATOM   2908  OD2 ASP A 378      97.370  50.167  10.263  1.00 12.74           O
     ATOM   2909  C   ASP A 378      96.065  54.361  12.564  1.00 10.57           C
     ATOM   2910  O   ASP A 378      96.704  55.399  12.441  1.00  9.95           O
     ATOM   2911  N   ALA A 379      94.735  54.346  12.693  1.00  9.88           N
     ATOM   2912  CA  ALA A 379      93.926  55.555  12.618  1.00  8.95           C
 35  ATOM   2913  CB  ALA A 379      92.416  55.217  12.669  1.00  8.20           C
     ATOM   2914  C   ALA A 379      94.300  56.446  13.773  1.00  8.88           C
     ATOM   2915  O   ALA A 379      94.473  57.640  13.601  1.00  9.55           O
     ATOM   2916  N   HIS A 380      94.404  55.870  14.967  1.00  8.76           N
     ATOM   2917  CA  HIS A 380      94.764  56.664  16.139  1.00  9.21           C
 40  ATOM   2918  CB  HIS A 380      94.550  55.894  17.423  1.00  8.88           C
     ATOM   2919  CG  HIS A 380      93.110  55.551  17.684  1.00  9.44           C
     ATOM   2920  ND1 HIS A 380      92.734  54.366  18.184  1.00  8.74           N
     ATOM   2921  CE1 HIS A 380      91.374  54.332  18.275  1.00 10.92           C
     ATOM   2922  NE2 HIS A 380      90.894  55.509  17.846  1.00 10.69           N
 45  ATOM   2923  CD2 HIS A 380      91.941  56.283  17.464  1.00  9.96           C
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      ATOM   2924  C    HIS A 380      96.188  57.175  16.044  1.00  8.44           C
      ATOM   2925  O    HIS A 380      96.453  58.294  16.454  1.00  9.30           O
      ATOM   2926  N    ASN A 381      97.097  56.384  15.495  1.00  7.47           N
      ATOM   2927  CA   ASN A 381      98.466  56.834  15.340  1.00  8.52           C
 5    ATOM   2928  CB   ASN A 381      99.370  55.705  14.773  1.00  8.35           C
      ATOM   2929  CG   ASN A 381      99.708  54.645  15.818  1.00  8.34           C
      ATOM   2930  OD1  ASN A 381      99.577  54.900  17.015  1.00  8.06           O
      ATOM   2931  ND2  ASN A 381     100.163  53.449  15.374  1.00  7.82           N
      ATOM   2932  C    ASN A 381      98.520  58.093  14.459  1.00  8.41           C
10    ATOM   2933  O    ASN A 381      99.241  59.036  14.745  1.00  8.56           O
      ATOM   2934  N    TRP A 382      97.741  58.109  13.385  1.00  9.15           N
      ATOM   2935  CA   TRP A 382      97.636  59.315  12.526  1.00  8.80           C
      ATOM   2936  CB   TRP A 382      96.884  58.963  11.248  1.00  8.39           C
      ATOM   2937  CG   TRP A 382      96.581  60.147  10.375  1.00  8.03           C
15    ATOM   2938  CD1  TRP A 382      95.403  60.848  10.284  1.00  9.01           C
      ATOM   2939  NE1  TRP A 382      95.516  61.892   9.374  1.00  8.56           N
      ATOM   2940  CE2  TRP A 382      96.754  61.914   8.845  1.00  8.18           C
      ATOM   2941  CD2  TRP A 382      97.500  60.815   9.452  1.00  8.04           C
      ATOM   2942  CE3  TRP A 382      98.818  60.608   9.074  1.00  8.37           C
20    ATOM   2943  CZ3  TRP A 382      99.390  61.482   8.143  1.00  8.26           C
      ATOM   2944  CH2  TRP A 382      98.647  62.518   7.551  1.00  7.81           C
      ATOM   2945  CZ2  TRP A 382      97.326  62.757   7.894  1.00  8.30           C
      ATOM   2946  C    TRP A 382      96.945  60.481  13.227  1.00  8.48           C
      ATOM   2947  O    TRP A 382      97.400  61.622  13.177  1.00  8.06           O
25    ATOM   2948  N    LEU A 383      95.807  60.208  13.852  1.00  8.56           N
      ATOM   2949  CA   LEU A 383      94.972  61.257  14.448  1.00  8.01           C
      ATOM   2950  CB   LEU A 383      93.716  60.621  15.076  1.00  7.16           C
      ATOM   2951  CG   LEU A 383      92.510  61.501  15.385  1.00  8.24           C
      ATOM   2952  CD1  LEU A 383      91.842  62.030  14.103  1.00  7.28           C
30    ATOM   2953  CD2  LEU A 383      91.496  60.788  16.288  1.00  7.85           C
      ATOM   2954  C    LEU A 383      95.748  62.039  15.513  1.00  8.74           C
      ATOM   2955  O    LEU A 383      95.588  63.255  15.631  1.00  9.24           O
      ATOM   2956  N    PHE A 384      96.605  61.332  16.258  1.00  7.95           N
      ATOM   2957  CA   PHE A 384      97.345  61.920  17.384  1.00  8.10           C
35    ATOM   2958  CB   PHE A 384      97.443  60.918  18.555  1.00  7.93           C
      ATOM   2959  CG   PHE A 384      96.180  60.831  19.337  1.00  8.31           C
      ATOM   2960  CD1  PHE A 384      95.173  59.968  18.951  1.00  8.85           C
      ATOM   2961  CE1  PHE A 384      93.963  59.940  19.650  1.00  9.55           C
      ATOM   2962  CZ   PHE A 384      93.766  60.776  20.724  1.00  8.55           C
40    ATOM   2963  CE2  PHE A 384      94.770  61.640  21.113  1.00  8.59           C
      ATOM   2964  CD2  PHE A 384      95.956  61.674  20.415  1.00  8.78           C
      ATOM   2965  C    PHE A 384      98.705  62.486  17.004  1.00  8.54           C
      ATOM   2966  O    PHE A 384      99.399  63.021  17.872  1.00  8.69           O
      ATOM   2967  N    THR A 385      99.063  62.415  15.716  1.00  8.38           N
45    ATOM   2968  CA   THR A 385     100.333  62.984  15.243  1.00  7.85           C
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	ATOM	2969	CB	THR	A	385	101.325	61.911	14.740	1.00	7.61	C
	ATOM	2970	OG1	THR	A	385	100.730	61.155	13.682	1.00	8.05	O
	ATOM	2971	CG2	THR	A	385	101.765	60.997	15.869	1.00	6.91	C
	ATOM	2972	C	THR	A	385	100.211	64.042	14.146	1.00	8.32	C
5	ATOM	2973	O	THR	A	385	101.047	64.951	14.085	1.00	8.72	O
	ATOM	2974	N	ALA	A	386	99.204	63.910	13.285	1.00	8.50	N
	ATOM	2975	CA	ALA	A	386	98.920	64.854	12.205	1.00	8.68	C
	ATOM	2976	CB	ALA	A	386	98.028	64.195	11.144	1.00	7.78	C
	ATOM	2977	C	ALA	A	386	98.217	66.098	12.741	1.00	8.58	C
10	ATOM	2978	O	ALA	A	386	97.604	66.057	13.797	1.00	9.11	O
	ATOM	2979	N	ARG	A	387	98.256	67.170	11.958	1.00	7.88	N
	ATOM	2980	CA	ARG	A	387	97.813	68.483	12.414	1.00	8.17	C
	ATOM	2981	CB	ARG	A	387	98.098	69.506	11.322	1.00	9.24	C
	ATOM	2982	CG	ARG	A	387	97.347	69.207	10.029	1.00	11.67	C
15	ATOM	2983	CD	ARG	A	387	96.192	70.133	9.906	1.00	11.85	C
	ATOM	2984	NE	ARG	A	387	95.311	69.859	8.768	1.00	11.11	N
	ATOM	2985	CZ	ARG	A	387	94.113	69.285	8.840	1.00	10.57	C
	ATOM	2986	NH1	ARG	A	387	93.655	68.759	9.982	1.00	9.60	N
	ATOM	2987	NH2	ARG	A	387	93.364	69.211	7.751	1.00	10.59	N
20	ATOM	2988	C	ARG	A	387	96.325	68.495	12.797	1.00	7.95	C
	ATOM	2989	O	ARG	A	387	95.512	67.835	12.171	1.00	7.47	O
	ATOM	2990	N	GLY	A	388	95.983	69.278	13.818	1.00	7.52	N
	ATOM	2991	CA	GLY	A	388	94.614	69.385	14.283	1.00	7.75	C
	ATOM	2992	C	GLY	A	388	94.475	68.905	15.720	1.00	8.33	C
25	ATOM	2993	O	GLY	A	388	95.469	68.534	16.369	1.00	10.59	O
	ATOM	2994	N	ILE	A	389	93.230	68.903	16.188	1.00	7.79	N
	ATOM	2995	CA	ILE	A	389	92.862	68.622	17.562	1.00	7.45	C
	ATOM	2996	CB	ILE	A	389	92.061	69.790	18.178	1.00	7.55	C
	ATOM	2997	CG1	ILE	A	389	92.809	71.138	17.985	1.00	8.63	C
30	ATOM	2998	CD1	ILE	A	389	92.093	72.405	18.531	1.00	6.90	C
	ATOM	2999	CG2	ILE	A	389	91.710	69.462	19.643	1.00	8.04	C
	ATOM	3000	C	ILE	A	389	92.014	67.367	17.524	1.00	7.61	C
	ATOM	3001	O	ILE	A	389	90.896	67.387	16.999	1.00	8.70	O
	ATOM	3002	N	PRO	A	390	92.541	66.249	18.026	1.00	8.53	N
35	ATOM	3003	CA	PRO	A	390	91.890	64.949	17.796	1.00	8.74	C
	ATOM	3004	CB	PRO	A	390	92.970	63.945	18.193	1.00	9.38	C
	ATOM	3005	CG	PRO	A	390	93.792	64.682	19.194	1.00	9.41	C
	ATOM	3006	CD	PRO	A	390	93.839	66.097	18.692	1.00	8.91	C
	ATOM	3007	C	PRO	A	390	90.653	64.742	18.668	1.00	8.66	C
40	ATOM	3008	O	PRO	A	390	90.660	65.121	19.813	1.00	7.91	O
	ATOM	3009	N	VAL	A	391	89.625	64.133	18.085	1.00	9.23	N
	ATOM	3010	CA	VAL	A	391	88.380	63.770	18.742	1.00	8.84	C
	ATOM	3011	CB	VAL	A	391	87.182	64.547	18.206	1.00	9.48	C
	ATOM	3012	CG1	VAL	A	391	85.918	64.148	19.026	1.00	8.02	C
45	ATOM	3013	CG2	VAL	A	391	87.473	66.063	18.250	1.00	9.25	C

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     ATOM   3014  C   VAL A 391      88.129  62.293  18.503  1.00  9.69          C
     ATOM   3015  O   VAL A 391      88.115  61.851  17.345  1.00 10.62          O
     ATOM   3016  N   VAL A 392      87.953  61.523  19.583  1.00  8.65          N
     ATOM   3017  CA  VAL A 392      87.690  60.084  19.472  1.00  8.29          C
  5  ATOM   3018  CB  VAL A 392      88.797  59.266  20.178  1.00  8.70          C
     ATOM   3019  CG1 VAL A 392      88.464  57.773  20.224  1.00  7.24          C
     ATOM   3020  CG2 VAL A 392      90.160  59.487  19.464  1.00  7.11          C
     ATOM   3021  C   VAL A 392      86.318  59.801  20.076  1.00  8.78          C
     ATOM   3022  O   VAL A 392      86.003  60.260  21.176  1.00  6.91          O
 10  ATOM   3023  N   TYR A 393      85.505  59.072  19.325  1.00  7.24          N
     ATOM   3024  CA  TYR A 393      84.132  58.760  19.703  1.00  6.81          C
     ATOM   3025  CB  TYR A 393      83.357  58.425  18.420  1.00  6.91          C
     ATOM   3026  CG  TYR A 393      81.884  58.134  18.514  1.00  7.60          C
     ATOM   3027  CD1 TYR A 393      81.064  58.829  19.374  1.00  7.48          C
 15  ATOM   3028  CE1 TYR A 393      79.708  58.555  19.447  1.00  7.52          C
     ATOM   3029  CZ  TYR A 393      79.162  57.600  18.604  1.00  8.60          C
     ATOM   3030  OH  TYR A 393      77.816  57.317  18.677  1.00  8.86          O
     ATOM   3031  CE2 TYR A 393      79.958  56.909  17.721  1.00  8.31          C
     ATOM   3032  CD2 TYR A 393      81.301  57.167  17.676  1.00  7.64          C
 20  ATOM   3033  C   TYR A 393      84.153  57.586  20.671  1.00  7.01          C
     ATOM   3034  O   TYR A 393      84.895  56.602  20.461  1.00  7.64          O
     ATOM   3035  N   TYR A 394      83.352  57.677  21.736  1.00  6.60          N
     ATOM   3036  CA  TYR A 394      83.415  56.677  22.835  1.00  7.13          C
     ATOM   3037  CB  TYR A 394      82.275  56.888  23.858  1.00  7.04          C
 25  ATOM   3038  CG  TYR A 394      80.931  56.373  23.424  1.00  7.20          C
     ATOM   3039  CD1 TYR A 394      80.135  57.102  22.546  1.00  7.20          C
     ATOM   3040  CE1 TYR A 394      78.912  56.619  22.135  1.00  7.49          C
     ATOM   3041  CZ  TYR A 394      78.459  55.388  22.589  1.00  7.57          C
     ATOM   3042  OH  TYR A 394      77.224  54.883  22.155  1.00  7.40          O
 30  ATOM   3043  CE2 TYR A 394      79.229  54.645  23.479  1.00  7.52          C
     ATOM   3044  CD2 TYR A 394      80.458  55.143  23.885  1.00  8.12          C
     ATOM   3045  C   TYR A 394      83.391  55.264  22.307  1.00  6.88          C
     ATOM   3046  O   TYR A 394      82.624  54.944  21.408  1.00  6.13          O
     ATOM   3047  N   GLY A 395      84.237  54.419  22.866  1.00  7.42          N
 35  ATOM   3048  CA  GLY A 395      84.254  53.018  22.479  1.00  8.26          C
     ATOM   3049  C   GLY A 395      85.251  52.654  21.398  1.00  8.44          C
     ATOM   3050  O   GLY A 395      85.594  51.475  21.215  1.00  8.15          O
     ATOM   3051  N   SER A 396      85.711  53.658  20.662  1.00  9.10          N
     ATOM   3052  CA  SER A 396      86.706  53.441  19.629  1.00  9.33          C
 40  ATOM   3053  CB  SER A 396      87.121  54.760  19.022  1.00  8.64          C
     ATOM   3054  OG  SER A 396      86.037  55.357  18.348  1.00  9.74          O
     ATOM   3055  C   SER A 396      87.961  52.742  20.155  1.00  9.75          C
     ATOM   3056  O   SER A 396      88.654  52.066  19.411  1.00  9.65          O
     ATOM   3057  N   GLU A 397      88.258  52.961  21.424  1.00 10.33          N
 45  ATOM   3058  CA  GLU A 397      89.432  52.388  22.073  1.00 11.40          C
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	ATOM	3059	CB	GLU	A	397	89.641	53.011	23.474	1.00	11.29	C
	ATOM	3060	CG	GLU	A	397	88.551	52.770	24.523	1.00	12.39	C
	ATOM	3061	CD	GLU	A	397	87.385	53.748	24.508	1.00	11.96	C
	ATOM	3062	OE1	GLU	A	397	87.086	54.341	23.452	1.00	13.51	O
5	ATOM	3063	OE2	GLU	A	397	86.726	53.892	25.570	1.00	13.49	O
	ATOM	3064	C	GLU	A	397	89.403	50.844	22.125	1.00	11.34	C
	ATOM	3065	O	GLU	A	397	90.374	50.224	22.572	1.00	11.52	O
	ATOM	3066	N	MET	A	398	88.288	50.245	21.712	1.00	10.06	N
	ATOM	3067	CA	MET	A	398	88.184	48.796	21.499	1.00	10.02	C
10	ATOM	3068	CB	MET	A	398	87.437	48.128	22.672	1.00	12.71	C
	ATOM	3069	CG	MET	A	398	85.964	48.528	22.786	1.00	12.53	C
	ATOM	3070	SD	MET	A	398	85.029	47.544	23.997	1.00	16.23	S
	ATOM	3071	CE	MET	A	398	84.659	46.047	23.032	1.00	14.44	C
	ATOM	3072	C	MET	A	398	87.455	48.473	20.207	1.00	9.47	C
15	ATOM	3073	O	MET	A	398	87.041	47.335	19.997	1.00	8.75	O
	ATOM	3074	N	GLY	A	399	87.271	49.465	19.333	1.00	9.52	N
	ATOM	3075	CA	GLY	A	399	86.505	49.261	18.110	1.00	9.21	C
	ATOM	3076	C	GLY	A	399	85.090	48.803	18.401	1.00	7.96	C
	ATOM	3077	O	GLY	A	399	84.568	47.957	17.694	1.00	8.09	O
20	ATOM	3078	N	PHE	A	400	84.483	49.386	19.440	1.00	7.58	N
	ATOM	3079	CA	PHE	A	400	83.107	49.084	19.861	1.00	8.56	C
	ATOM	3080	CB	PHE	A	400	82.767	49.963	21.061	1.00	9.59	C
	ATOM	3081	CG	PHE	A	400	81.358	49.810	21.604	1.00	9.31	C
	ATOM	3082	CD1	PHE	A	400	80.966	48.659	22.265	1.00	11.80	C
25	ATOM	3083	CE1	PHE	A	400	79.695	48.552	22.820	1.00	11.61	C
	ATOM	3084	CZ	PHE	A	400	78.810	49.615	22.714	1.00	11.48	C
	ATOM	3085	CE2	PHE	A	400	79.188	50.765	22.071	1.00	11.37	C
	ATOM	3086	CD2	PHE	A	400	80.464	50.861	21.530	1.00	10.30	C
	ATOM	3087	C	PHE	A	400	82.153	49.387	18.722	1.00	9.36	C
30	ATOM	3088	O	PHE	A	400	82.151	50.511	18.218	1.00	8.65	O
	ATOM	3089	N	MET	A	401	81.350	48.397	18.319	1.00	9.03	N
	ATOM	3090	CA	MET	A	401	80.299	48.602	17.296	1.00	9.83	C
	ATOM	3091	CB	MET	A	401	79.216	49.567	17.806	1.00	11.64	C
	ATOM	3092	CG	MET	A	401	78.416	49.024	18.991	1.00	13.59	C
35	ATOM	3093	SD	MET	A	401	77.307	47.646	18.569	1.00	17.07	S
	ATOM	3094	CE	MET	A	401	78.174	46.251	19.273	1.00	21.13	C
	ATOM	3095	C	MET	A	401	80.905	49.108	15.988	1.00	9.89	C
	ATOM	3096	O	MET	A	401	80.275	49.872	15.216	1.00	9.34	O
	ATOM	3097	N	ARG	A	402	82.128	48.656	15.716	1.00	9.32	N
40	ATOM	3098	CA	ARG	A	402	82.829	49.061	14.503	1.00	9.24	C
	ATOM	3099	CB	ARG	A	402	84.162	48.336	14.382	1.00	9.99	C
	ATOM	3100	CG	ARG	A	402	84.055	46.823	14.315	1.00	10.89	C
	ATOM	3101	CD	ARG	A	402	85.424	46.171	14.380	1.00	10.30	C
	ATOM	3102	NE	ARG	A	402	85.985	46.226	15.733	1.00	10.74	N
45	ATOM	3103	CZ	ARG	A	402	87.217	45.848	16.064	1.00	12.31	C

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      ATOM   3104   NH1 ARG A 402      88.111   45.453   15.137   1.00 14.64        N
      ATOM   3105   NH2 ARG A 402      87.580   45.897   17.330   1.00 12.67        N
      ATOM   3106   C   ARG A 402      81.962   48.772   13.300   1.00  8.71        C
      ATOM   3107   O   ARG A 402      81.260   47.770   13.255   1.00 10.20        O
  5   ATOM   3108   N   GLY A 403      81.980   49.662   12.331   1.00  8.92        N
      ATOM   3109   CA  GLY A 403      81.199   49.458   11.162   1.00  9.36        C
      ATOM   3110   C   GLY A 403      79.717   49.743   11.273   1.00  9.18        C
      ATOM   3111   O   GLY A 403      79.048   49.718   10.265   1.00 10.53        O
      ATOM   3112   N   ARG A 404      79.177   50.032   12.450   1.00 11.12        N
 10   ATOM   3113   CA  ARG A 404      77.711   50.091   12.601   1.00 11.58        C
      ATOM   3114   CB  ARG A 404      77.268   49.569   13.951   1.00 10.97        C
      ATOM   3115   CG  ARG A 404      77.811   48.205   14.320   1.00 14.19        C
      ATOM   3116   CD  ARG A 404      77.059   47.080   13.693   1.00 15.25        C
      ATOM   3117   NE  ARG A 404      77.652   45.769   13.974   1.00 17.42        N
 15   ATOM   3118   CZ  ARG A 404      77.110   44.616   13.569   1.00 16.10        C
      ATOM   3119   NH1 ARG A 404      75.943   44.593   12.937   1.00 15.16        N
      ATOM   3120   NH2 ARG A 404      77.735   43.479   13.794   1.00 14.11        N
      ATOM   3121   C   ARG A 404      77.156   51.490   12.419   1.00 13.21        C
      ATOM   3122   O   ARG A 404      77.733   52.441   12.927   1.00 11.53        O
 20   ATOM   3123   N   PRO A 405      76.001   51.611   11.730   1.00 12.40        N
      ATOM   3124   CA  PRO A 405      75.357   52.898   11.519   1.00 12.75        C
      ATOM   3125   CB  PRO A 405      74.593   52.660   10.208   1.00 13.94        C
      ATOM   3126   CG  PRO A 405      74.145   51.261   10.328   1.00 15.91        C
      ATOM   3127   CD  PRO A 405      75.258   50.526   11.060   1.00 13.75        C
 25   ATOM   3128   C   PRO A 405      74.373   53.284   12.629   1.00 11.38        C
      ATOM   3129   O   PRO A 405      73.994   52.445   13.492   1.00  9.44        O
      ATOM   3130   N   GLU A 406      73.962   54.540   12.646   1.00 11.11        N
      ATOM   3131   CA  GLU A 406      72.835   54.921   13.495   1.00 11.92        C
      ATOM   3132   CB  GLU A 406      72.447   56.398   13.339   1.00 11.86        C
 30   ATOM   3133   CG  GLU A 406      71.359   56.796   14.344   1.00 13.35        C
      ATOM   3134   CD  GLU A 406      70.896   58.242   14.262   1.00 17.58        C
      ATOM   3135   OE1 GLU A 406      71.185   58.921   13.258   1.00 18.39        O
      ATOM   3136   OE2 GLU A 406      70.248   58.705   15.230   1.00 14.63        O
      ATOM   3137   C   GLU A 406      71.636   54.026   13.143   1.00 10.51        C
 35   ATOM   3138   O   GLU A 406      71.390   53.760   11.972   1.00  9.65        O
      ATOM   3139   N   HIS A 407      70.909   53.600   14.176   1.00 11.75        N
      ATOM   3140   CA  HIS A 407      69.770   52.662   14.105   1.00 10.58        C
      ATOM   3141   CB  HIS A 407      68.723   53.082   13.058   1.00 10.81        C
      ATOM   3142   CG  HIS A 407      68.307   54.536   13.170   1.00 11.70        C
 40   ATOM   3143   ND1 HIS A 407      68.332   55.385   12.116   1.00 13.69        N
      ATOM   3144   CE1 HIS A 407      67.968   56.616   12.521   1.00 13.15        C
      ATOM   3145   NE2 HIS A 407      67.697   56.560   13.831   1.00 12.12        N
      ATOM   3146   CD2 HIS A 407      67.907   55.289   14.265   1.00 12.01        C
      ATOM   3147   C   HIS A 407      70.207   51.235   13.911   1.00 11.19        C
 45   ATOM   3148   O   HIS A 407      69.374   50.349   13.786   1.00 11.04        O
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      ATOM   3149   N    GLY A 408       71.516   50.990   13.910   1.00   9.43         N
      ATOM   3150   CA   GLY A 408       72.052   49.635   13.812   1.00   9.69         C
      ATOM   3151   C    GLY A 408       73.146   49.337   14.829   1.00   9.07         C
      ATOM   3152   O    GLY A 408       73.943   48.396   14.651   1.00   8.47         O
 5    ATOM   3153   N    GLY A 409       73.225   50.156   15.879   1.00   9.25         N
      ATOM   3154   CA   GLY A 409       74.146   49.869   16.983   1.00   9.82         C
      ATOM   3155   C    GLY A 409       75.266   50.867   17.219   1.00   9.83         C
      ATOM   3156   O    GLY A 409       75.963   50.763   18.219   1.00  11.53         O
      ATOM   3157   N    ASN A 410       75.431   51.836   16.319   1.00   9.21         N
10    ATOM   3158   CA   ASN A 410       76.487   52.863   16.431   1.00   9.27         C
      ATOM   3159   CB   ASN A 410       76.248   53.961   15.375   1.00   8.73         C
      ATOM   3160   CG   ASN A 410       77.062   55.217   15.614   1.00  10.22         C
      ATOM   3161   OD1  ASN A 410       76.945   55.853   16.674   1.00  10.70         O
      ATOM   3162   ND2  ASN A 410       77.864   55.630   14.595   1.00   9.57         N
15    ATOM   3163   C    ASN A 410       76.507   53.459   17.823   1.00   9.80         C
      ATOM   3164   O    ASN A 410       77.570   53.617   18.437   1.00   9.69         O
      ATOM   3165   N    ARG A 411       75.313   53.769   18.323   1.00   8.55         N
      ATOM   3166   CA   ARG A 411       75.152   54.507   19.587   1.00   9.67         C
      ATOM   3167   CB   ARG A 411       74.069   55.560   19.401   1.00  10.14         C
20    ATOM   3168   CG   ARG A 411       74.368   56.565   18.305   1.00   9.41         C
      ATOM   3169   CD   ARG A 411       73.169   57.449   18.073   1.00   9.64         C
      ATOM   3170   NE   ARG A 411       73.414   58.495   17.074   1.00   8.16         N
      ATOM   3171   CZ   ARG A 411       72.728   59.634   17.005   1.00   8.73         C
      ATOM   3172   NH1  ARG A 411       71.739   59.888   17.850   1.00   8.48         N
25    ATOM   3173   NH2  ARG A 411       73.014   60.532   16.079   1.00   9.18         N
      ATOM   3174   C    ARG A 411       74.797   53.621   20.801   1.00   8.76         C
      ATOM   3175   O    ARG A 411       74.301   54.097   21.818   1.00   8.13         O
      ATOM   3176   N    ASN A 412       75.067   52.336   20.712   1.00   8.92         N
      ATOM   3177   CA   ASN A 412       74.708   51.429   21.798   1.00   9.01         C
30    ATOM   3178   CB   ASN A 412       74.914   49.949   21.388   1.00   9.99         C
      ATOM   3179   CG   ASN A 412       73.736   49.390   20.568   1.00  10.79         C
      ATOM   3180   OD1  ASN A 412       72.828   50.126   20.188   1.00  10.43         O
      ATOM   3181   ND2  ASN A 412       73.742   48.073   20.329   1.00  10.06         N
      ATOM   3182   C    ASN A 412       75.428   51.771   23.113   1.00   9.19         C
35    ATOM   3183   O    ASN A 412       76.485   52.412   23.118   1.00   8.19         O
      ATOM   3184   N    TYR A 413       74.786   51.377   24.218   1.00   9.36         N
      ATOM   3185   CA   TYR A 413       75.240   51.660   25.564   1.00   9.55         C
      ATOM   3186   CB   TYR A 413       74.164   51.225   26.583   1.00  10.00         C
      ATOM   3187   CG   TYR A 413       74.551   51.420   28.013   1.00  10.43         C
40    ATOM   3188   CD1  TYR A 413       74.396   52.644   28.634   1.00  10.31         C
      ATOM   3189   CE1  TYR A 413       74.767   52.825   29.955   1.00  10.24         C
      ATOM   3190   CZ   TYR A 413       75.292   51.769   30.667   1.00  10.83         C
      ATOM   3191   OH   TYR A 413       75.686   51.949   31.966   1.00   9.63         O
      ATOM   3192   CE2  TYR A 413       75.461   50.545   30.069   1.00  11.66         C
45    ATOM   3193   CD2  TYR A 413       75.093   50.370   28.751   1.00  11.76         C
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	ATOM	3194	C	TYR A 413	76.541	50.937	25.823	1.00	8.78	C
	ATOM	3195	O	TYR A 413	76.666	49.767	25.526	1.00	8.26	O
	ATOM	3196	N	PHE A 414	77.525	51.643	26.374	1.00	9.51	N
	ATOM	3197	CA	PHE A 414	78.899	51.112	26.523	1.00	8.44	C
5	ATOM	3198	CB	PHE A 414	79.878	52.264	26.303	1.00	8.41	C
	ATOM	3199	CG	PHE A 414	81.332	51.867	26.226	1.00	7.71	C
	ATOM	3200	CD1	PHE A 414	81.790	51.031	25.238	1.00	8.09	C
	ATOM	3201	CE1	PHE A 414	83.137	50.696	25.155	1.00	8.79	C
	ATOM	3202	CZ	PHE A 414	84.043	51.211	26.046	1.00	8.29	C
10	ATOM	3203	CE2	PHE A 414	83.599	52.059	27.046	1.00	9.45	C
	ATOM	3204	CD2	PHE A 414	82.244	52.383	27.128	1.00	8.59	C
	ATOM	3205	C	PHE A 414	79.053	50.487	27.899	1.00	8.90	C
	ATOM	3206	O	PHE A 414	79.303	49.293	28.038	1.00	8.60	O
	ATOM	3207	N	GLY A 415	78.864	51.292	28.939	1.00	10.68	N
15	ATOM	3208	CA	GLY A 415	78.755	50.759	30.307	1.00	11.20	C
	ATOM	3209	C	GLY A 415	80.077	50.315	30.904	1.00	11.49	C
	ATOM	3210	O	GLY A 415	81.134	50.334	30.244	1.00	9.66	O
	ATOM	3211	N	THR A 416	80.011	49.889	32.157	1.00	12.37	N
	ATOM	3212	CA	THR A 416	81.176	49.297	32.815	1.00	12.28	C
20	ATOM	3213	CB	THR A 416	80.869	48.975	34.282	1.00	12.76	C
	ATOM	3214	OG1	THR A 416	79.677	48.206	34.307	1.00	11.49	O
	ATOM	3215	CG2	THR A 416	80.666	50.284	35.113	1.00	12.14	C
	ATOM	3216	C	THR A 416	81.610	48.015	32.106	1.00	12.64	C
	ATOM	3217	O	THR A 416	82.780	47.681	32.124	1.00	13.25	O
25	ATOM	3218	N	GLU A 417	80.693	47.318	31.445	1.00	12.00	N
	ATOM	3219	CA	GLU A 417	81.080	46.178	30.594	1.00	15.75	C
	ATOM	3220	CB	GLU A 417	79.853	45.442	30.043	1.00	21.97	C
	ATOM	3221	CG	GLU A 417	79.130	44.614	31.097	1.00	30.92	C
	ATOM	3222	CD	GLU A 417	78.104	43.632	30.520	1.00	41.78	C
30	ATOM	3223	OE1	GLU A 417	77.862	43.612	29.286	1.00	41.73	O
	ATOM	3224	OE2	GLU A 417	77.530	42.864	31.324	1.00	54.62	O
	ATOM	3225	C	GLU A 417	81.959	46.579	29.418	1.00	12.75	C
	ATOM	3226	O	GLU A 417	82.930	45.894	29.104	1.00	12.24	O
	ATOM	3227	N	GLY A 418	81.603	47.667	28.730	1.00	10.82	N
35	ATOM	3228	CA	GLY A 418	82.473	48.196	27.668	1.00	10.01	C
	ATOM	3229	C	GLY A 418	83.852	48.571	28.189	1.00	10.14	C
	ATOM	3230	O	GLY A 418	84.883	48.261	27.564	1.00	11.11	O
	ATOM	3231	N	ILE A 419	83.873	49.257	29.329	1.00	10.51	N
	ATOM	3232	CA	ILE A 419	85.131	49.682	29.955	1.00	11.23	C
40	ATOM	3233	CB	ILE A 419	84.879	50.478	31.241	1.00	12.65	C
	ATOM	3234	CG1	ILE A 419	84.409	51.890	30.885	1.00	13.62	C
	ATOM	3235	CD1	ILE A 419	83.646	52.570	31.993	1.00	14.41	C
	ATOM	3236	CG2	ILE A 419	86.141	50.538	32.127	1.00	11.69	C
	ATOM	3237	C	ILE A 419	86.035	48.488	30.232	1.00	12.04	C
45	ATOM	3238	O	ILE A 419	87.226	48.547	29.924	1.00	9.88	O

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      ATOM   3239  N    ALA A 420    85.454  47.406  30.768  1.00 12.10      N
      ATOM   3240  CA   ALA A 420    86.203  46.175  31.100  1.00 14.98      C
      ATOM   3241  CB   ALA A 420    85.335  45.171  31.892  1.00 13.23      C
      ATOM   3242  C    ALA A 420    86.735  45.541  29.827  1.00 14.21      C
   5  ATOM   3243  O    ALA A 420    87.912  45.168  29.737  1.00 13.95      O
      ATOM   3244  N    ALA A 421    85.878  45.462  28.820  1.00 14.06      N
      ATOM   3245  CA   ALA A 421    86.292  44.905  27.541  1.00 13.64      C
      ATOM   3246  CB   ALA A 421    85.087  44.736  26.612  1.00 13.35      C
      ATOM   3247  C    ALA A 421    87.401  45.760  26.903  1.00 14.05      C
  10  ATOM   3248  O    ALA A 421    88.346  45.227  26.345  1.00 15.44      O
      ATOM   3249  N    ALA A 422    87.319  47.082  27.036  1.00 14.54      N
      ATOM   3250  CA   ALA A 422    88.318  47.973  26.427  1.00 14.27      C
      ATOM   3251  CB   ALA A 422    87.825  49.423  26.405  1.00 10.31      C
      ATOM   3252  C    ALA A 422    89.682  47.872  27.112  1.00 14.26      C
  15  ATOM   3253  O    ALA A 422    90.720  47.955  26.458  1.00 13.78      O
      ATOM   3254  N    LYS A 423    89.686  47.668  28.422  1.00 16.41      N
      ATOM   3255  CA   LYS A 423    90.952  47.552  29.158  1.00 17.57      C
      ATOM   3256  CB   LYS A 423    90.733  47.489  30.673  1.00 18.04      C
      ATOM   3257  CG   LYS A 423    90.364  48.829  31.291  1.00 20.96      C
  20  ATOM   3258  CD   LYS A 423    90.145  48.702  32.782  1.00 22.90      C
      ATOM   3259  CE   LYS A 423    89.713  50.010  33.396  1.00 29.43      C
      ATOM   3260  NZ   LYS A 423    89.573  49.913  34.876  1.00 35.53      N
      ATOM   3261  C    LYS A 423    91.729  46.325  28.717  1.00 17.71      C
      ATOM   3262  O    LYS A 423    92.921  46.244  28.948  1.00 18.10      O
  25  ATOM   3263  N    ALA A 424    91.055  45.370  28.090  1.00 18.81      N
      ATOM   3264  CA   ALA A 424    91.709  44.156  27.629  1.00 17.13      C
      ATOM   3265  CB   ALA A 424    90.792  42.946  27.888  1.00 17.01      C
      ATOM   3266  C    ALA A 424    92.084  44.241  26.152  1.00 19.84      C
      ATOM   3267  O    ALA A 424    92.621  43.292  25.613  1.00 19.77      O
  30  ATOM   3268  N    SER A 425    91.775  45.359  25.485  1.00 17.11      N
      ATOM   3269  CA   SER A 425    92.008  45.493  24.047  1.00 15.39      C
      ATOM   3270  CB   SER A 425    90.935  46.401  23.432  1.00 17.94      C
      ATOM   3271  OG   SER A 425    91.178  46.615  22.057  1.00 14.67      O
      ATOM   3272  C    SER A 425    93.375  46.088  23.701  1.00 12.91      C
  35  ATOM   3273  O    SER A 425    93.788  47.099  24.289  1.00 12.79      O
      ATOM   3274  N    PRO A 426    94.073  45.498  22.723  1.00 14.11      N
      ATOM   3275  CA   PRO A 426    95.335  46.127  22.274  1.00 14.44      C
      ATOM   3276  CB   PRO A 426    95.945  45.104  21.293  1.00 16.99      C
      ATOM   3277  CG   PRO A 426    94.858  44.108  20.994  1.00 24.47      C
  40  ATOM   3278  CD   PRO A 426    93.852  44.158  22.129  1.00 18.07      C
      ATOM   3279  C    PRO A 426    95.153  47.485  21.590  1.00 12.29      C
      ATOM   3280  O    PRO A 426    96.106  48.262  21.517  1.00 10.83      O
      ATOM   3281  N    ILE A 427    93.947  47.777  21.093  1.00 10.87      N
      ATOM   3282  CA   ILE A 427    93.651  49.111  20.544  1.00  9.18      C
  45  ATOM   3283  CB   ILE A 427    92.228  49.216  19.927  1.00  8.07      C
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     ATOM   3284  CG1 ILE A 427      92.028  48.155  18.839  1.00  8.24           C
     ATOM   3285  CD1 ILE A 427      90.563  47.951  18.430  1.00  8.25           C
     ATOM   3286  CG2 ILE A 427      91.976  50.608  19.376  1.00  6.93           C
     ATOM   3287  C   ILE A 427      93.813  50.155  21.634  1.00  8.85           C
  5  ATOM   3288  O   ILE A 427      94.454  51.173  21.434  1.00  9.48           O
     ATOM   3289  N   ARG A 428      93.294  49.886  22.823  1.00  8.60           N
     ATOM   3290  CA  ARG A 428      93.400  50.866  23.894  1.00  8.95           C
     ATOM   3291  CB  ARG A 428      92.500  50.479  25.056  1.00 10.81           C
     ATOM   3292  CG  ARG A 428      92.422  51.559  26.136  1.00 11.59           C
 10  ATOM   3293  CD  ARG A 428      91.447  51.164  27.240  1.00 12.02           C
     ATOM   3294  NE  ARG A 428      91.350  52.213  28.252  1.00 12.91           N
     ATOM   3295  CZ  ARG A 428      92.020  52.236  29.398  1.00 13.84           C
     ATOM   3296  NH1 ARG A 428      92.856  51.263  29.698  1.00 14.05           N
     ATOM   3297  NH2 ARG A 428      91.835  53.234  30.258  1.00 14.78           N
 15  ATOM   3298  C   ARG A 428      94.849  51.122  24.363  1.00  9.27           C
     ATOM   3299  O   ARG A 428      95.228  52.266  24.663  1.00  8.53           O
     ATOM   3300  N   ALA A 429      95.663  50.069  24.391  1.00  9.95           N
     ATOM   3301  CA  ALA A 429      97.056  50.169  24.807  1.00 11.02           C
     ATOM   3302  CB  ALA A 429      97.705  48.757  24.946  1.00 11.56           C
 20  ATOM   3303  C   ALA A 429      97.837  51.028  23.809  1.00 10.12           C
     ATOM   3304  O   ALA A 429      98.608  51.895  24.214  1.00  9.00           O
     ATOM   3305  N   ALA A 430      97.619  50.792  22.512  1.00  8.74           N
     ATOM   3306  CA  ALA A 430      98.286  51.579  21.459  1.00  9.32           C
     ATOM   3307  CB  ALA A 430      98.092  50.932  20.081  1.00  7.90           C
 25  ATOM   3308  C   ALA A 430      97.794  53.037  21.466  1.00  9.63           C
     ATOM   3309  O   ALA A 430      98.571  53.965  21.245  1.00 10.12           O
     ATOM   3310  N   LEU A 431      96.505  53.239  21.720  1.00  9.43           N
     ATOM   3311  CA  LEU A 431      95.941  54.610  21.769  1.00  9.39           C
     ATOM   3312  CB  LEU A 431      94.422  54.577  21.980  1.00  8.79           C
 30  ATOM   3313  CG  LEU A 431      93.674  55.877  22.294  1.00 10.37           C
     ATOM   3314  CD1 LEU A 431      93.855  56.860  21.155  1.00 10.80           C
     ATOM   3315  CD2 LEU A 431      92.191  55.572  22.517  1.00 10.19           C
     ATOM   3316  C   LEU A 431      96.590  55.393  22.902  1.00  9.89           C
     ATOM   3317  O   LEU A 431      97.041  56.529  22.713  1.00  8.92           O
 35  ATOM   3318  N   THR A 432      96.634  54.765  24.075  1.00  9.59           N
     ATOM   3319  CA  THR A 432      97.269  55.343  25.242  1.00  9.93           C
     ATOM   3320  CB  THR A 432      97.247  54.365  26.429  1.00 10.14           C
     ATOM   3321  OG1 THR A 432      95.881  54.127  26.769  1.00  8.71           O
     ATOM   3322  CG2 THR A 432      98.019  54.934  27.635  1.00 10.34           C
 40  ATOM   3323  C   THR A 432      98.696  55.768  24.965  1.00 10.79           C
     ATOM   3324  O   THR A 432      99.088  56.864  25.351  1.00 10.03           O
     ATOM   3325  N   ARG A 433      99.468  54.916  24.300  1.00 11.71           N
     ATOM   3326  CA  ARG A 433     100.872  55.225  24.053  1.00 12.68           C
     ATOM   3327  CB  ARG A 433     101.629  54.062  23.396  1.00 16.53           C
 45  ATOM   3328  CG  ARG A 433     102.155  53.002  24.374  1.00 23.81           C
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	ATOM	3329	CD	ARG A 433	102.820	51.822	23.651	1.00 27.35		C
	ATOM	3330	NE	ARG A 433	101.846	50.739	23.405	1.00 40.17		N
	ATOM	3331	CZ	ARG A 433	101.725	50.034	22.279	1.00 38.69		C
	ATOM	3332	NH1	ARG A 433	102.512	50.262	21.224	1.00 54.11		N
5	ATOM	3333	NH2	ARG A 433	100.800	49.089	22.199	1.00 29.01		N
	ATOM	3334	C	ARG A 433	101.003	56.474	23.188	1.00 11.20		C
	ATOM	3335	O	ARG A 433	101.728	57.383	23.547	1.00 10.17		O
	ATOM	3336	N	ILE A 434	100.320	56.514	22.042	1.00 10.54		N
	ATOM	3337	CA	ILE A 434	100.474	57.664	21.136	1.00 9.22		C
10	ATOM	3338	CB	ILE A 434	100.008	57.353	19.680	1.00 8.85		C
	ATOM	3339	CG1	ILE A 434	100.583	58.386	18.710	1.00 9.47		C
	ATOM	3340	CD1	ILE A 434	102.113	58.485	18.712	1.00 8.53		C
	ATOM	3341	CG2	ILE A 434	98.482	57.213	19.569	1.00 8.39		C
	ATOM	3342	C	ILE A 434	99.815	58.935	21.711	1.00 10.10		C
15	ATOM	3343	O	ILE A 434	100.351	60.047	21.564	1.00 10.27		O
	ATOM	3344	N	ALA A 435	98.665	58.784	22.377	1.00 9.56		N
	ATOM	3345	CA	ALA A 435	97.962	59.938	22.968	1.00 8.34		C
	ATOM	3346	CB	ALA A 435	96.551	59.546	23.477	1.00 7.35		C
	ATOM	3347	C	ALA A 435	98.779	60.590	24.056	1.00 8.51		C
20	ATOM	3348	O	ALA A 435	98.835	61.827	24.143	1.00 9.31		O
	ATOM	3349	N	GLN A 436	99.441	59.790	24.879	1.00 9.61		N
	ATOM	3350	CA	GLN A 436	100.296	60.347	25.919	1.00 11.37		C
	ATOM	3351	CB	GLN A 436	100.699	59.282	26.971	1.00 14.19		C
	ATOM	3352	CG	GLN A 436	99.515	58.768	27.816	1.00 16.35		C
25	ATOM	3353	CD	GLN A 436	98.955	59.800	28.825	1.00 22.66		C
	ATOM	3354	OE1	GLN A 436	99.375	60.978	28.861	1.00 25.03		O
	ATOM	3355	NE2	GLN A 436	97.980	59.366	29.636	1.00 24.58		N
	ATOM	3356	C	GLN A 436	101.546	61.037	25.307	1.00 12.28		C
	ATOM	3357	O	GLN A 436	102.025	62.050	25.850	1.00 11.97		O
30	ATOM	3358	N	VAL A 437	102.059	60.513	24.192	1.00 10.31		N
	ATOM	3359	CA	VAL A 437	103.124	61.222	23.447	1.00 9.13		C
	ATOM	3360	CB	VAL A 437	103.704	60.387	22.288	1.00 10.04		C
	ATOM	3361	CG1	VAL A 437	104.592	61.244	21.390	1.00 9.42		C
	ATOM	3362	CG2	VAL A 437	104.483	59.182	22.836	1.00 10.83		C
35	ATOM	3363	C	VAL A 437	102.639	62.605	22.973	1.00 8.86		C
	ATOM	3364	O	VAL A 437	103.320	63.602	23.212	1.00 8.87		O
	ATOM	3365	N	ARG A 438	101.441	62.702	22.379	1.00 8.39		N
	ATOM	3366	CA	ARG A 438	100.914	64.002	21.944	1.00 8.28		C
	ATOM	3367	CB	ARG A 438	99.553	63.855	21.250	1.00 8.00		C
40	ATOM	3368	CG	ARG A 438	99.075	65.152	20.619	1.00 9.42		C
	ATOM	3369	CD	ARG A 438	97.660	65.039	20.072	1.00 8.50		C
	ATOM	3370	NE	ARG A 438	97.240	66.241	19.353	1.00 8.96		N
	ATOM	3371	CZ	ARG A 438	96.840	67.380	19.917	1.00 8.98		C
	ATOM	3372	NH1	ARG A 438	96.806	67.526	21.232	1.00 11.49		N
45	ATOM	3373	NH2	ARG A 438	96.445	68.379	19.162	1.00 9.76		N

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        ATOM    3374  C    ARG A 438    100.762  64.940  23.154  1.00   9.49       C
        ATOM    3375  O    ARG A 438    101.134  66.103  23.108  1.00   7.66       O
        ATOM    3376  N    ALA A 439    100.202  64.405  24.243  1.00   9.79       N
        ATOM    3377  CA   ALA A 439     99.893  65.231  25.406  1.00  10.72       C
    5   ATOM    3378  CB   ALA A 439     99.141  64.419  26.476  1.00  10.49       C
        ATOM    3379  C    ALA A 439    101.166  65.845  25.991  1.00  11.63       C
        ATOM    3380  O    ALA A 439    101.091  66.875  26.602  1.00   9.51       O
        ATOM    3381  N    ALA A 440    102.326  65.218  25.794  1.00  10.51       N
        ATOM    3382  CA   ALA A 440    103.597  65.766  26.279  1.00  11.02       C
   10   ATOM    3383  CB   ALA A 440    104.458  64.652  26.889  1.00  10.64       C
        ATOM    3384  C    ALA A 440    104.416  66.526  25.216  1.00  10.53       C
        ATOM    3385  O    ALA A 440    105.501  66.993  25.519  1.00  10.60       O
        ATOM    3386  N    SER A 441    103.906  66.683  23.998  1.00  10.76       N
        ATOM    3387  CA   SER A 441    104.695  67.246  22.879  1.00  10.42       C
   15   ATOM    3388  CB   SER A 441    104.815  66.223  21.732  1.00  11.33       C
        ATOM    3389  OG   SER A 441    105.390  66.801  20.538  1.00   9.86       O
        ATOM    3390  C    SER A 441    104.028  68.493  22.321  1.00  10.28       C
        ATOM    3391  O    SER A 441    102.993  68.395  21.663  1.00   9.49       O
        ATOM    3392  N    PRO A 442    104.631  69.664  22.547  1.00  11.42       N
   20   ATOM    3393  CA   PRO A 442    104.121  70.887  21.926  1.00  11.27       C
        ATOM    3394  CB   PRO A 442    105.070  71.968  22.430  1.00  13.81       C
        ATOM    3395  CG   PRO A 442    105.690  71.414  23.661  1.00  16.52       C
        ATOM    3396  CD   PRO A 442    105.736  69.929  23.484  1.00  14.07       C
        ATOM    3397  C    PRO A 442    104.142  70.839  20.426  1.00   9.13       C
   25   ATOM    3398  O    PRO A 442    103.254  71.388  19.787  1.00   9.98       O
        ATOM    3399  N    ALA A 443    105.163  70.202  19.856  1.00   8.71       N
        ATOM    3400  CA   ALA A 443    105.228  70.013  18.402  1.00   8.33       C
        ATOM    3401  CB   ALA A 443    106.525  69.325  18.013  1.00   7.21       C
        ATOM    3402  C    ALA A 443    104.034  69.251  17.860  1.00   7.70       C
   30   ATOM    3403  O    ALA A 443    103.437  69.661  16.878  1.00   6.78       O
        ATOM    3404  N    LEU A 444    103.687  68.125  18.483  1.00   7.83       N
        ATOM    3405  CA   LEU A 444    102.546  67.318  18.001  1.00   8.98       C
        ATOM    3406  CB   LEU A 444    102.543  65.917  18.631  1.00   9.75       C
        ATOM    3407  CG   LEU A 444    103.683  64.943  18.311  1.00   9.68       C
   35   ATOM    3408  CD1  LEU A 444    103.319  63.530  18.766  1.00   8.68       C
        ATOM    3409  CD2  LEU A 444    103.926  64.924  16.809  1.00   7.72       C
        ATOM    3410  C    LEU A 444    101.201  68.010  18.296  1.00  10.38       C
        ATOM    3411  O    LEU A 444    100.196  67.754  17.621  1.00  10.11       O
        ATOM    3412  N    GLN A 445    101.177  68.889  19.292  1.00   9.45       N
   40   ATOM    3413  CA   GLN A 445     99.938  69.615  19.622  1.00   9.74       C
        ATOM    3414  CB   GLN A 445    100.027  70.197  21.040  1.00  10.47       C
        ATOM    3415  CG   GLN A 445     99.956  69.140  22.147  1.00  11.24       C
        ATOM    3416  CD   GLN A 445    100.441  69.657  23.483  1.00  11.90       C
        ATOM    3417  OE1  GLN A 445    100.443  70.857  23.716  1.00  11.93       O
   45   ATOM    3418  NE2  GLN A 445    100.841  68.750  24.376  1.00  11.74       N
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	ATOM	3419	C	GLN A 445	99.647	70.741	18.626	1.00	9.80	C
	ATOM	3420	O	GLN A 445	98.516	70.888	18.142	1.00	10.73	O
	ATOM	3421	N	ARG A 446	100.680	71.502	18.292	1.00	8.91	N
	ATOM	3422	CA	ARG A 446	100.507	72.783	17.632	1.00	8.84	C
5	ATOM	3423	CB	ARG A 446	100.285	73.874	18.676	1.00	8.99	C
	ATOM	3424	CG	ARG A 446	101.481	74.092	19.587	1.00	12.37	C
	ATOM	3425	CD	ARG A 446	101.339	75.297	20.550	1.00	13.03	C
	ATOM	3426	NE	ARG A 446	100.342	75.023	21.586	1.00	10.64	N
	ATOM	3427	CZ	ARG A 446	99.090	75.447	21.581	1.00	12.57	C
10	ATOM	3428	NH1	ARG A 446	98.618	76.178	20.593	1.00	13.47	N
	ATOM	3429	NH2	ARG A 446	98.273	75.111	22.579	1.00	16.12	N
	ATOM	3430	C	ARG A 446	101.648	73.214	16.704	1.00	8.88	C
	ATOM	3431	O	ARG A 446	101.640	74.350	16.216	1.00	8.87	O
	ATOM	3432	N	GLY A 447	102.584	72.319	16.415	1.00	8.14	N
15	ATOM	3433	CA	GLY A 447	103.690	72.651	15.559	1.00	9.16	C
	ATOM	3434	C	GLY A 447	103.279	72.667	14.105	1.00	8.98	C
	ATOM	3435	O	GLY A 447	102.307	72.011	13.721	1.00	8.78	O
	ATOM	3436	N	LEU A 448	104.020	73.423	13.300	1.00	8.43	N
	ATOM	3437	CA	LEU A 448	103.860	73.373	11.856	1.00	9.00	C
20	ATOM	3438	CB	LEU A 448	104.858	74.315	11.165	1.00	8.58	C
	ATOM	3439	CG	LEU A 448	104.576	75.795	11.379	1.00	9.35	C
	ATOM	3440	CD1	LEU A 448	105.818	76.659	11.023	1.00	7.31	C
	ATOM	3441	CD2	LEU A 448	103.334	76.189	10.581	1.00	6.84	C
	ATOM	3442	C	LEU A 448	104.124	71.928	11.378	1.00	8.70	C
25	ATOM	3443	O	LEU A 448	104.971	71.223	11.942	1.00	9.89	O
	ATOM	3444	N	GLN A 449	103.399	71.494	10.362	1.00	8.17	N
	ATOM	3445	CA	GLN A 449	103.636	70.205	9.729	1.00	7.61	C
	ATOM	3446	CB	GLN A 449	102.329	69.446	9.527	1.00	7.18	C
	ATOM	3447	CG	GLN A 449	102.507	68.040	8.926	1.00	6.89	C
30	ATOM	3448	CD	GLN A 449	101.274	67.190	9.103	1.00	7.36	C
	ATOM	3449	OE1	GLN A 449	100.531	67.327	10.121	1.00	8.33	O
	ATOM	3450	NE2	GLN A 449	101.034	66.284	8.150	1.00	7.23	N
	ATOM	3451	C	GLN A 449	104.356	70.369	8.397	1.00	7.73	C
	ATOM	3452	O	GLN A 449	103.955	71.193	7.558	1.00	10.39	O
35	ATOM	3453	N	LEU A 450	105.424	69.601	8.213	1.00	7.59	N
	ATOM	3454	CA	LEU A 450	106.077	69.487	6.897	1.00	8.52	C
	ATOM	3455	CB	LEU A 450	107.499	70.024	6.941	1.00	8.31	C
	ATOM	3456	CG	LEU A 450	107.671	71.496	7.301	1.00	8.49	C
	ATOM	3457	CD1	LEU A 450	109.155	71.752	7.571	1.00	7.66	C
40	ATOM	3458	CD2	LEU A 450	107.091	72.398	6.211	1.00	8.71	C
	ATOM	3459	C	LEU A 450	106.087	68.028	6.452	1.00	8.12	C
	ATOM	3460	O	LEU A 450	106.672	67.176	7.119	1.00	8.15	O
	ATOM	3461	N	ASN A 451	105.422	67.740	5.343	1.00	8.05	N
	ATOM	3462	CA	ASN A 451	105.323	66.383	4.835	1.00	8.39	C
45	ATOM	3463	CB	ASN A 451	104.189	66.272	3.804	1.00	8.84	C

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	ATOM	3464	CG	ASN A 451	102.826	66.555	4.397	1.00	8.85	C
	ATOM	3465	OD1	ASN A 451	102.612	66.390	5.602	1.00	10.53	O
	ATOM	3466	ND2	ASN A 451	101.893	67.002	3.555	1.00	8.66	N
	ATOM	3467	C	ASN A 451	106.617	65.923	4.168	1.00	9.39	C
5	ATOM	3468	O	ASN A 451	107.200	66.659	3.399	1.00	7.88	O
	ATOM	3469	N	LEU A 452	107.040	64.691	4.457	1.00	8.89	N
	ATOM	3470	CA	LEU A 452	108.214	64.099	3.842	1.00	10.73	C
	ATOM	3471	CB	LEU A 452	109.203	63.640	4.900	1.00	9.84	C
	ATOM	3472	CG	LEU A 452	109.802	64.737	5.795	1.00	12.35	C
10	ATOM	3473	CD1	LEU A 452	110.541	64.105	6.968	1.00	12.21	C
	ATOM	3474	CD2	LEU A 452	110.732	65.628	4.984	1.00	9.86	C
	ATOM	3475	C	LEU A 452	107.838	62.928	2.942	1.00	10.79	C
	ATOM	3476	O	LEU A 452	108.383	62.794	1.843	1.00	11.51	O
	ATOM	3477	N	GLU A 453	106.938	62.070	3.416	1.00	8.44	N
15	ATOM	3478	CA	GLU A 453	106.483	60.925	2.630	1.00	8.57	C
	ATOM	3479	CB	GLU A 453	107.396	59.702	2.844	1.00	8.80	C
	ATOM	3480	CG	GLU A 453	106.949	58.484	2.047	1.00	9.90	C
	ATOM	3481	CD	GLU A 453	107.862	57.254	2.128	1.00	10.82	C
	ATOM	3482	OE1	GLU A 453	108.834	57.219	2.904	1.00	12.72	O
20	ATOM	3483	OE2	GLU A 453	107.576	56.293	1.377	1.00	15.14	O
	ATOM	3484	C	GLU A 453	105.066	60.577	3.051	1.00	7.83	C
	ATOM	3485	O	GLU A 453	104.782	60.470	4.232	1.00	7.09	O
	ATOM	3486	N	LEU A 454	104.178	60.443	2.081	1.00	8.64	N
	ATOM	3487	CA	LEU A 454	102.808	59.973	2.310	1.00	9.02	C
25	ATOM	3488	CB	LEU A 454	101.852	61.162	2.398	1.00	9.84	C
	ATOM	3489	CG	LEU A 454	101.953	62.009	3.654	1.00	9.51	C
	ATOM	3490	CD1	LEU A 454	101.219	63.340	3.440	1.00	11.30	C
	ATOM	3491	CD2	LEU A 454	101.411	61.251	4.860	1.00	8.61	C
	ATOM	3492	C	LEU A 454	102.512	59.116	1.078	1.00	9.20	C
30	ATOM	3493	O	LEU A 454	102.124	59.616	0.031	1.00	8.58	O
	ATOM	3494	N	GLN A 455	102.767	57.827	1.191	1.00	9.05	N
	ATOM	3495	CA	GLN A 455	102.848	56.968	0.030	1.00	9.12	C
	ATOM	3496	CB	GLN A 455	104.235	57.129	-0.599	1.00	9.92	C
	ATOM	3497	CG	GLN A 455	104.454	56.334	-1.868	1.00	12.29	C
35	ATOM	3498	CD	GLN A 455	105.791	56.637	-2.564	1.00	11.72	C
	ATOM	3499	OE1	GLN A 455	105.850	56.679	-3.784	1.00	13.34	O
	ATOM	3500	NE2	GLN A 455	106.850	56.824	-1.794	1.00	12.93	N
	ATOM	3501	C	GLN A 455	102.630	55.544	0.493	1.00	8.61	C
	ATOM	3502	O	GLN A 455	103.356	55.051	1.350	1.00	7.56	O
40	ATOM	3503	N	GLY A 456	101.607	54.899	-0.041	1.00	9.28	N
	ATOM	3504	CA	GLY A 456	101.355	53.490	0.267	1.00	9.96	C
	ATOM	3505	C	GLY A 456	101.128	53.318	1.753	1.00	9.93	C
	ATOM	3506	O	GLY A 456	100.357	54.060	2.369	1.00	10.32	O
	ATOM	3507	N	ASN A 457	101.840	52.377	2.337	1.00	9.51	N
45	ATOM	3508	CA	ASN A 457	101.719	52.098	3.753	1.00	11.18	C

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      ATOM   3509  CB   ASN A 457    102.118  50.640    4.018  1.00 11.06           C
      ATOM   3510  CG   ASN A 457    101.092  49.650    3.480  1.00 10.38           C
      ATOM   3511  OD1  ASN A 457    101.446  48.646    2.872  1.00 13.80           O
      ATOM   3512  ND2  ASN A 457     99.857  49.946    3.670  1.00  7.53           N
   5  ATOM   3513  C    ASN A 457    102.536  53.015    4.665  1.00 10.84           C
      ATOM   3514  O    ASN A 457    102.499  52.839    5.876  1.00 10.92           O
      ATOM   3515  N    ARG A 458    103.218  54.001    4.091  1.00  9.12           N
      ATOM   3516  CA   ARG A 458    104.253  54.747    4.781  1.00  9.92           C
      ATOM   3517  CB   ARG A 458    105.590  54.605    4.015  1.00 10.01           C
  10  ATOM   3518  CG   ARG A 458    106.094  53.171    3.862  1.00 12.11           C
      ATOM   3519  CD   ARG A 458    107.144  53.017    2.739  1.00 11.48           C
      ATOM   3520  NE   ARG A 458    108.249  53.944    2.968  1.00 10.95           N
      ATOM   3521  CZ   ARG A 458    109.373  53.652    3.616  1.00 13.00           C
      ATOM   3522  NH1  ARG A 458    109.606  52.422    4.081  1.00 11.48           N
  15  ATOM   3523  NH2  ARG A 458    110.316  54.593    3.753  1.00 12.75           N
      ATOM   3524  C    ARG A 458    103.888  56.231    4.906  1.00  9.10           C
      ATOM   3525  O    ARG A 458    103.423  56.834    3.947  1.00 10.94           O
      ATOM   3526  N    ALA A 459    104.098  56.798    6.089  1.00  8.77           N
      ATOM   3527  CA   ALA A 459    104.010  58.251    6.327  1.00  8.88           C
  20  ATOM   3528  CB   ALA A 459    102.760  58.619    7.089  1.00  7.78           C
      ATOM   3529  C    ALA A 459    105.241  58.726    7.096  1.00  9.20           C
      ATOM   3530  O    ALA A 459    105.692  58.073    8.044  1.00  9.88           O
      ATOM   3531  N    ALA A 460    105.779  59.872    6.695  1.00  9.71           N
      ATOM   3532  CA   ALA A 460    106.843  60.537    7.442  1.00  8.98           C
  25  ATOM   3533  CB   ALA A 460    108.218  60.141    6.902  1.00  7.69           C
      ATOM   3534  C    ALA A 460    106.614  62.060    7.331  1.00  9.17           C
      ATOM   3535  O    ALA A 460    106.328  62.573    6.244  1.00  8.73           O
      ATOM   3536  N    PHE A 461    106.693  62.767    8.458  1.00  7.86           N
      ATOM   3537  CA   PHE A 461    106.517  64.207    8.465  1.00  7.58           C
  30  ATOM   3538  CB   PHE A 461    105.049  64.579    8.296  1.00  8.14           C
      ATOM   3539  CG   PHE A 461    104.111  63.965    9.316  1.00  8.08           C
      ATOM   3540  CD1  PHE A 461    103.459  62.771    9.063  1.00  9.21           C
      ATOM   3541  CE1  PHE A 461    102.552  62.228    9.988  1.00  9.07           C
      ATOM   3542  CZ   PHE A 461    102.279  62.906   11.149  1.00  8.95           C
  35  ATOM   3543  CE2  PHE A 461    102.917  64.095   11.420  1.00  9.15           C
      ATOM   3544  CD2  PHE A 461    103.817  64.631   10.493  1.00  8.86           C
      ATOM   3545  C    PHE A 461    107.110  64.813    9.731  1.00  7.51           C
      ATOM   3546  O    PHE A 461    107.298  64.110   10.721  1.00  7.73           O
      ATOM   3547  N    TYR A 462    107.487  66.089    9.660  1.00  7.26           N
  40  ATOM   3548  CA   TYR A 462    107.939  66.832   10.828  1.00  7.73           C
      ATOM   3549  CB   TYR A 462    109.029  67.861   10.475  1.00  8.20           C
      ATOM   3550  CG   TYR A 462    110.324  67.288    9.935  1.00  8.39           C
      ATOM   3551  CD1  TYR A 462    111.122  66.451   10.705  1.00  8.74           C
      ATOM   3552  CE1  TYR A 462    112.308  65.951   10.208  1.00  9.16           C
  45  ATOM   3553  CZ   TYR A 462    112.731  66.300    8.962  1.00  9.89           C
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        ATOM   3554  OH  TYR A 462      113.894  65.795   8.465  1.00  9.19          O
        ATOM   3555  CE2 TYR A 462      111.973  67.146   8.181  1.00  9.88          C
        ATOM   3556  CD2 TYR A 462      110.788  67.640   8.681  1.00  9.71          C
        ATOM   3557  C   TYR A 462      106.754  67.580  11.438  1.00  7.62          C
 5      ATOM   3558  O   TYR A 462      105.818  67.962  10.730  1.00  7.10          O
        ATOM   3559  N   ARG A 463      106.797  67.767  12.755  1.00  6.76          N
        ATOM   3560  CA  ARG A 463      106.007  68.772  13.438  1.00  6.89          C
        ATOM   3561  CB  ARG A 463      105.019  68.159  14.422  1.00  7.03          C
        ATOM   3562  CG  ARG A 463      103.964  67.236  13.814  1.00  7.68          C
10      ATOM   3563  CD  ARG A 463      103.052  67.950  12.831  1.00  7.20          C
        ATOM   3564  NE  ARG A 463      102.264  69.023  13.464  1.00  7.15          N
        ATOM   3565  CZ  ARG A 463      101.142  68.855  14.151  1.00  7.38          C
        ATOM   3566  NH1 ARG A 463      100.630  67.640  14.360  1.00  8.84          N
        ATOM   3567  NH2 ARG A 463      100.535  69.908  14.660  1.00  7.17          N
15      ATOM   3568  C   ARG A 463      107.014  69.643  14.172  1.00  6.74          C
        ATOM   3569  O   ARG A 463      107.906  69.115  14.824  1.00  7.05          O
        ATOM   3570  N   VAL A 464      106.906  70.958  14.025  1.00  6.88          N
        ATOM   3571  CA  VAL A 464      107.875  71.887  14.601  1.00  8.03          C
        ATOM   3572  CB  VAL A 464      108.817  72.497  13.536  1.00  7.08          C
20      ATOM   3573  CG1 VAL A 464      109.893  73.329  14.217  1.00  6.33          C
        ATOM   3574  CG2 VAL A 464      109.469  71.395  12.710  1.00  7.39          C
        ATOM   3575  C   VAL A 464      107.219  73.028  15.366  1.00  8.00          C
        ATOM   3576  O   VAL A 464      106.409  73.742  14.831  1.00  7.76          O
        ATOM   3577  N   TYR A 465      107.584  73.165  16.633  1.00  8.64          N
25      ATOM   3578  CA  TYR A 465      107.122  74.276  17.471  1.00  9.47          C
        ATOM   3579  CB  TYR A 465      106.258  73.752  18.600  1.00 10.60          C
        ATOM   3580  CG  TYR A 465      105.753  74.825  19.541  1.00 11.90          C
        ATOM   3581  CD1 TYR A 465      104.732  75.670  19.151  1.00 13.84          C
        ATOM   3582  CE1 TYR A 465      104.254  76.663  19.993  1.00 14.60          C
30      ATOM   3583  CZ  TYR A 465      104.779  76.792  21.257  1.00 13.31          C
        ATOM   3584  OH  TYR A 465      104.254  77.782  22.030  1.00 16.79          O
        ATOM   3585  CE2 TYR A 465      105.806  75.977  21.684  1.00 11.86          C
        ATOM   3586  CD2 TYR A 465      106.295  74.991  20.825  1.00 12.53          C
        ATOM   3587  C   TYR A 465      108.320  74.983  18.079  1.00  9.77          C
35      ATOM   3588  O   TYR A 465      109.147  74.354  18.740  1.00 11.56          O
        ATOM   3589  N   GLN A 466      108.391  76.283  17.871  1.00 10.07          N
        ATOM   3590  CA  GLN A 466      109.439  77.128  18.468  1.00 10.77          C
        ATOM   3591  CB  GLN A 466      110.612  77.330  17.505  1.00 10.07          C
        ATOM   3592  CG  GLN A 466      111.717  78.268  18.002  1.00 10.39          C
40      ATOM   3593  CD  GLN A 466      112.976  78.111  17.142  1.00 12.11          C
        ATOM   3594  OE1 GLN A 466      113.598  77.051  17.154  1.00 12.62          O
        ATOM   3595  NE2 GLN A 466      113.314  79.136  16.361  1.00 10.16          N
        ATOM   3596  C   GLN A 466      108.820  78.484  18.834  1.00 10.05          C
        ATOM   3597  O   GLN A 466      108.450  79.264  17.963  1.00  9.79          O
45      ATOM   3598  N   HIS A 467      108.721  78.749  20.126  1.00 11.10          N
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      ATOM   3599  CA   HIS A 467     108.041  79.942  20.617  1.00 13.74           C
      ATOM   3600  CB   HIS A 467     106.521  79.793  20.415  1.00 14.41           C
      ATOM   3601  CG   HIS A 467     105.732  81.007  20.819  1.00 15.26           C
      ATOM   3602  ND1  HIS A 467     105.904  82.213  20.230  1.00 15.80           N
   5  ATOM   3603  CE1  HIS A 467     105.081  83.117  20.823  1.00 17.11           C
      ATOM   3604  NE2  HIS A 467     104.388  82.486  21.798  1.00 15.48           N
      ATOM   3605  CD2  HIS A 467     104.760  81.187  21.825  1.00 16.55           C
      ATOM   3606  C    HIS A 467     108.363  80.097  22.076  1.00 14.42           C
      ATOM   3607  O    HIS A 467     108.351  79.098  22.827  1.00 14.47           O
  10  ATOM   3608  N    ASP A 468     108.659  81.329  22.499  1.00 17.70           N
      ATOM   3609  CA   ASP A 468     108.890  81.657  23.942  1.00 22.07           C
      ATOM   3610  CB   ASP A 468     107.587  81.581  24.745  1.00 26.48           C
      ATOM   3611  CG   ASP A 468     106.657  82.741  24.468  1.00 42.65           C
      ATOM   3612  OD1  ASP A 468     107.077  83.711  23.780  1.00 43.62           O
  15  ATOM   3613  OD2  ASP A 468     105.500  82.676  24.953  1.00 44.61           O
      ATOM   3614  C    ASP A 468     109.903  80.749  24.623  1.00 20.64           C
      ATOM   3615  O    ASP A 468     109.624  80.195  25.680  1.00 26.80           O
      ATOM   3616  N    GLY A 469     111.064  80.569  24.007  1.00 19.35           N
      ATOM   3617  CA   GLY A 469     112.078  79.708  24.574  1.00 18.61           C
  20  ATOM   3618  C    GLY A 469     111.811  78.209  24.559  1.00 17.77           C
      ATOM   3619  O    GLY A 469     112.649  77.459  25.032  1.00 24.81           O
      ATOM   3620  N    VAL A 470     110.662  77.754  24.047  1.00 15.70           N
      ATOM   3621  CA   VAL A 470     110.409  76.323  23.886  1.00 14.21           C
      ATOM   3622  CB   VAL A 470     108.949  75.970  24.204  1.00 17.62           C
  25  ATOM   3623  CG1  VAL A 470     108.680  74.490  23.966  1.00 17.53           C
      ATOM   3624  CG2  VAL A 470     108.629  76.377  25.641  1.00 20.01           C
      ATOM   3625  C    VAL A 470     110.718  75.980  22.427  1.00 13.68           C
      ATOM   3626  O    VAL A 470     110.289  76.704  21.520  1.00 13.92           O
      ATOM   3627  N    HIS A 471     111.478  74.909  22.201  1.00 11.87           N
  30  ATOM   3628  CA   HIS A 471     111.801  74.482  20.838  1.00 11.99           C
      ATOM   3629  CB   HIS A 471     113.095  75.096  20.336  1.00 12.32           C
      ATOM   3630  CG   HIS A 471     114.213  75.114  21.342  1.00 13.48           C
      ATOM   3631  ND1  HIS A 471     114.667  74.004  21.956  1.00 13.35           N
      ATOM   3632  CE1  HIS A 471     115.671  74.348  22.782  1.00 16.30           C
  35  ATOM   3633  NE2  HIS A 471     115.861  75.671  22.685  1.00 14.13           N
      ATOM   3634  CD2  HIS A 471     114.989  76.171  21.809  1.00 15.06           C
      ATOM   3635  C    HIS A 471     111.835  72.995  20.698  1.00 12.91           C
      ATOM   3636  O    HIS A 471     112.680  72.312  21.313  1.00 12.73           O
      ATOM   3637  N    GLN A 472     110.902  72.465  19.900  1.00  9.92           N
  40  ATOM   3638  CA   GLN A 472     110.824  71.025  19.710  1.00 10.20           C
      ATOM   3639  CB   GLN A 472     109.733  70.401  20.602  1.00  9.95           C
      ATOM   3640  CG   GLN A 472     109.721  68.875  20.534  1.00 10.88           C
      ATOM   3641  CD   GLN A 472     108.632  68.239  21.380  1.00 10.47           C
      ATOM   3642  OE1  GLN A 472     107.426  68.462  21.156  1.00  8.61           O
  45  ATOM   3643  NE2  GLN A 472     109.046  67.401  22.331  1.00  7.85           N
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     ATOM   3644  C    GLN A 472    110.607  70.692  18.240  1.00 11.45        C
     ATOM   3645  O    GLN A 472    109.686  71.230  17.602  1.00 10.08        O
     ATOM   3646  N    ILE A 473    111.473  69.830  17.701  1.00 10.13        N
     ATOM   3647  CA   ILE A 473    111.311  69.305  16.352  1.00 10.91        C
  5  ATOM   3648  CB   ILE A 473    112.593  69.498  15.494  1.00 12.38        C
     ATOM   3649  CG1  ILE A 473    113.011  70.960  15.449  1.00 12.96        C
     ATOM   3650  CD1  ILE A 473    114.480  71.192  15.089  1.00 15.54        C
     ATOM   3651  CG2  ILE A 473    112.369  68.961  14.083  1.00 13.05        C
     ATOM   3652  C    ILE A 473    110.984  67.814  16.477  1.00 10.90        C
 10  ATOM   3653  O    ILE A 473    111.742  67.053  17.106  1.00 12.78        O
     ATOM   3654  N    ALA A 474    109.837  67.413  15.931  1.00 10.30        N
     ATOM   3655  CA   ALA A 474    109.392  66.012  15.953  1.00  9.91        C
     ATOM   3656  CB   ALA A 474    108.010  65.886  16.576  1.00  7.86        C
     ATOM   3657  C    ALA A 474    109.383  65.424  14.551  1.00  9.44        C
 15  ATOM   3658  O    ALA A 474    108.960  66.082  13.593  1.00 10.72        O
     ATOM   3659  N    LEU A 475    109.879  64.205  14.441  1.00  8.79        N
     ATOM   3660  CA   LEU A 475    109.812  63.405  13.222  1.00  7.97        C
     ATOM   3661  CB   LEU A 475    111.190  62.896  12.834  1.00  7.16        C
     ATOM   3662  CG   LEU A 475    111.248  61.869  11.682  1.00  7.43        C
 20  ATOM   3663  CD1  LEU A 475    110.660  62.450  10.390  1.00  6.53        C
     ATOM   3664  CD2  LEU A 475    112.690  61.417  11.452  1.00  6.30        C
     ATOM   3665  C    LEU A 475    108.906  62.230  13.500  1.00  8.86        C
     ATOM   3666  O    LEU A 475    109.220  61.394  14.372  1.00  9.58        O
     ATOM   3667  N    VAL A 476    107.794  62.150  12.766  1.00  9.42        N
 25  ATOM   3668  CA   VAL A 476    106.803  61.098  12.963  1.00  7.93        C
     ATOM   3669  CB   VAL A 476    105.379  61.686  12.999  1.00  8.69        C
     ATOM   3670  CG1  VAL A 476    104.310  60.581  13.034  1.00  6.98        C
     ATOM   3671  CG2  VAL A 476    105.220  62.653  14.164  1.00  7.14        C
     ATOM   3672  C    VAL A 476    106.921  60.140  11.795  1.00  9.09        C
 30  ATOM   3673  O    VAL A 476    106.947  60.580  10.632  1.00  9.05        O
     ATOM   3674  N    LEU A 477    107.013  58.842  12.103  1.00  8.19        N
     ATOM   3675  CA   LEU A 477    107.026  57.787  11.108  1.00  7.85        C
     ATOM   3676  CB   LEU A 477    108.360  57.035  11.113  1.00  7.10        C
     ATOM   3677  CG   LEU A 477    109.662  57.837  11.136  1.00  7.47        C
 35  ATOM   3678  CD1  LEU A 477    110.856  56.885  11.282  1.00  7.28        C
     ATOM   3679  CD2  LEU A 477    109.829  58.741   9.897  1.00  6.57        C
     ATOM   3680  C    LEU A 477    105.882  56.807  11.375  1.00  9.01        C
     ATOM   3681  O    LEU A 477    105.751  56.303  12.495  1.00  9.23        O
     ATOM   3682  N    LEU A 478    105.074  56.531  10.339  1.00  8.76        N
 40  ATOM   3683  CA   LEU A 478    103.941  55.620  10.444  1.00  8.70        C
     ATOM   3684  CB   LEU A 478    102.614  56.382  10.265  1.00  8.48        C
     ATOM   3685  CG   LEU A 478    102.349  57.590  11.188  1.00  9.45        C
     ATOM   3686  CD1  LEU A 478    101.102  58.392  10.793  1.00  8.74        C
     ATOM   3687  CD2  LEU A 478    102.188  57.125  12.614  1.00  9.75        C
 45  ATOM   3688  C    LEU A 478    104.055  54.495   9.410  1.00  8.94        C
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	ATOM	3689	O	LEU A 478	104.468	54.719	8.255	1.00	8.93	O
	ATOM	3690	N	ASN A 479	103.660	53.296	9.826	1.00	8.49	N
	ATOM	3691	CA	ASN A 479	103.580	52.136	8.974	1.00	8.70	C
	ATOM	3692	CB	ASN A 479	104.713	51.185	9.333	1.00	10.04	C
5	ATOM	3693	CG	ASN A 479	104.643	49.865	8.581	1.00	10.21	C
	ATOM	3694	OD1	ASN A 479	103.847	49.701	7.652	1.00	8.10	O
	ATOM	3695	ND2	ASN A 479	105.494	48.916	8.980	1.00	9.01	N
	ATOM	3696	C	ASN A 479	102.208	51.476	9.205	1.00	10.92	C
	ATOM	3697	O	ASN A 479	101.954	50.865	10.278	1.00	10.14	O
10	ATOM	3698	N	LYS A 480	101.313	51.632	8.235	1.00	9.12	N
	ATOM	3699	CA	LYS A 480	99.965	51.066	8.337	1.00	9.96	C
	ATOM	3700	CB	LYS A 480	98.905	52.061	7.801	1.00	10.03	C
	ATOM	3701	CG	LYS A 480	98.904	52.249	6.286	1.00	10.64	C
	ATOM	3702	CD	LYS A 480	97.837	53.234	5.751	1.00	10.86	C
15	ATOM	3703	CE	LYS A 480	97.583	53.015	4.250	1.00	11.36	C
	ATOM	3704	NZ	LYS A 480	96.412	52.109	3.973	1.00	13.64	N
	ATOM	3705	C	LYS A 480	99.852	49.725	7.601	1.00	10.86	C
	ATOM	3706	O	LYS A 480	98.736	49.272	7.333	1.00	10.55	O
	ATOM	3707	N	GLY A 481	100.987	49.111	7.254	1.00	9.20	N
20	ATOM	3708	CA	GLY A 481	100.996	47.815	6.584	1.00	10.33	C
	ATOM	3709	C	GLY A 481	101.345	46.666	7.520	1.00	11.31	C
	ATOM	3710	O	GLY A 481	101.498	46.848	8.747	1.00	12.10	O
	ATOM	3711	N	ASP A 482	101.483	45.489	6.927	1.00	12.13	N
	ATOM	3712	CA	ASP A 482	101.528	44.225	7.659	1.00	14.92	C
25	ATOM	3713	CB	ASP A 482	100.811	43.119	6.868	1.00	17.05	C
	ATOM	3714	CG	ASP A 482	99.280	43.268	6.895	1.00	18.25	C
	ATOM	3715	OD1	ASP A 482	98.728	43.944	7.780	1.00	17.35	O
	ATOM	3716	OD2	ASP A 482	98.627	42.699	6.016	1.00	21.98	O
	ATOM	3717	C	ASP A 482	102.953	43.774	7.941	1.00	15.43	C
30	ATOM	3718	O	ASP A 482	103.142	42.827	8.689	1.00	13.49	O
	ATOM	3719	N	ALA A 483	103.937	44.424	7.326	1.00	15.02	N
	ATOM	3720	CA	ALA A 483	105.342	44.073	7.545	1.00	17.79	C
	ATOM	3721	CB	ALA A 483	105.964	43.459	6.279	1.00	14.25	C
	ATOM	3722	C	ALA A 483	106.091	45.329	7.971	1.00	15.42	C
35	ATOM	3723	O	ALA A 483	105.643	46.442	7.687	1.00	14.23	O
	ATOM	3724	N	PRO A 484	107.237	45.159	8.638	1.00	16.34	N
	ATOM	3725	CA	PRO A 484	108.015	46.319	9.059	1.00	14.26	C
	ATOM	3726	CB	PRO A 484	109.237	45.692	9.768	1.00	15.32	C
	ATOM	3727	CG	PRO A 484	108.774	44.314	10.192	1.00	18.54	C
40	ATOM	3728	CD	PRO A 484	107.864	43.883	9.068	1.00	17.52	C
	ATOM	3729	C	PRO A 484	108.493	47.175	7.875	1.00	14.36	C
	ATOM	3730	O	PRO A 484	108.743	46.645	6.808	1.00	12.69	O
	ATOM	3731	N	GLU A 485	108.632	48.480	8.082	1.00	12.15	N
	ATOM	3732	CA	GLU A 485	109.123	49.399	7.059	1.00	13.43	C
45	ATOM	3733	CB	GLU A 485	108.047	50.429	6.747	1.00	13.80	C

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      ATOM   3734   CG  GLU A 485      106.862  49.835  6.021  1.00 14.56        C
      ATOM   3735   CD  GLU A 485      107.147  49.536  4.564  1.00 16.23        C
      ATOM   3736   OE1 GLU A 485      108.189  49.985  4.037  1.00 13.54        O
      ATOM   3737   OE2 GLU A 485      106.298  48.863  3.949  1.00 20.24        O
   5  ATOM   3738   C   GLU A 485      110.365  50.132  7.542  1.00 12.82        C
      ATOM   3739   O   GLU A 485      110.428  50.513  8.711  1.00 13.04        O
      ATOM   3740   N   HIS A 486      111.336  50.300  6.645  1.00 12.11        N
      ATOM   3741   CA AHIS A 486      112.585  50.984  6.945  0.50 12.85        C
      ATOM   3742   CA BHIS A 486      112.593  51.005  6.966  0.50 12.63        C
  10  ATOM   3743   CB AHIS A 486      113.742  50.184  6.352  0.50 14.74        C
      ATOM   3744   CB BHIS A 486      113.837  50.256  6.460  0.50 14.15        C
      ATOM   3745   CG AHIS A 486      113.795  48.744  6.826  0.50 16.29        C
      ATOM   3746   CG BHIS A 486      115.164  50.829  6.980  0.50 15.34        C
      ATOM   3747   ND1AHIS A 486      113.154  47.740  6.184  0.50 17.98        N
  15  ATOM   3748   ND1BHIS A 486      115.935  51.678  6.246  0.50 15.67        N
      ATOM   3749   CE1AHIS A 486      113.374  46.583  6.829  0.50 17.75        C
      ATOM   3750   CE1BHIS A 486      117.025  52.030  6.964  0.50 14.82        C
      ATOM   3751   NE2AHIS A 486      114.158  46.841  7.885  0.50 19.45        N
      ATOM   3752   NE2BHIS A 486      116.963  51.392  8.162  0.50 16.80        N
  20  ATOM   3753   CD2AHIS A 486      114.431  48.164  7.919  0.50 17.74        C
      ATOM   3754   CD2BHIS A 486      115.828  50.657  8.211  0.50 14.06        C
      ATOM   3755   C   HIS A 486      112.536  52.389  6.388  1.00 12.98        C
      ATOM   3756   O   HIS A 486      112.129  52.586  5.236  1.00 12.49        O
      ATOM   3757   N   PHE A 487      112.911  53.376  7.200  1.00 11.23        N
  25  ATOM   3758   CA  PHE A 487      112.912  54.779  6.793  1.00 10.68        C
      ATOM   3759   CB  PHE A 487      112.022  55.643  7.725  1.00  9.60        C
      ATOM   3760   CG  PHE A 487      110.548  55.402  7.559  1.00  9.63        C
      ATOM   3761   CD1 PHE A 487      109.929  54.307  8.168  1.00 10.45        C
      ATOM   3762   CE1 PHE A 487      108.568  54.073  7.978  1.00 10.69        C
  30  ATOM   3763   CZ  PHE A 487      107.812  54.946  7.200  1.00 10.79        C
      ATOM   3764   CE2 PHE A 487      108.415  56.036  6.611  1.00  9.55        C
      ATOM   3765   CD2 PHE A 487      109.773  56.245  6.783  1.00  9.44        C
      ATOM   3766   C   PHE A 487      114.371  55.281  6.848  1.00 10.89        C
      ATOM   3767   O   PHE A 487      115.100  54.924  7.753  1.00 10.54        O
  35  ATOM   3768   N   ALA A 488      114.766  56.084  5.864  1.00 10.91        N
      ATOM   3769   CA  ALA A 488      116.055  56.780  5.855  1.00 12.54        C
      ATOM   3770   CB  ALA A 488      116.984  56.210  4.789  1.00 11.00        C
      ATOM   3771   C   ALA A 488      115.721  58.229  5.569  1.00 12.80        C
      ATOM   3772   O   ALA A 488      115.445  58.587  4.428  1.00 14.24        O
  40  ATOM   3773   N   VAL A 489      115.681  59.057  6.617  1.00 11.73        N
      ATOM   3774   CA  VAL A 489      115.214  60.438  6.488  1.00 11.05        C
      ATOM   3775   CB  VAL A 489      114.159  60.787  7.578  1.00 11.13        C
      ATOM   3776   CG1 VAL A 489      113.767  62.266  7.524  1.00  9.30        C
      ATOM   3777   CG2 VAL A 489      112.935  59.885  7.423  1.00 11.83        C
  45  ATOM   3778   C   VAL A 489      116.409  61.366  6.587  1.00 10.27        C
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	ATOM	3779	O	VAL	A	489	117.234	61.237	7.474	1.00	11.04	O
	ATOM	3780	N	GLN	A	490	116.474	62.317	5.683	1.00	10.58	N
	ATOM	3781	CA	GLN	A	490	117.583	63.256	5.612	1.00	10.03	C
	ATOM	3782	CB	GLN	A	490	118.698	62.663	4.740	1.00	12.01	C
5	ATOM	3783	CG	GLN	A	490	120.005	63.467	4.833	1.00	11.32	C
	ATOM	3784	CD	GLN	A	490	121.224	62.666	4.434	1.00	10.88	C
	ATOM	3785	OE1	GLN	A	490	121.163	61.443	4.255	1.00	11.57	O
	ATOM	3786	NE2	GLN	A	490	122.341	63.348	4.285	1.00	11.90	N
	ATOM	3787	C	GLN	A	490	117.155	64.627	5.066	1.00	10.17	C
10	ATOM	3788	O	GLN	A	490	117.786	65.631	5.362	1.00	8.72	O
	ATOM	3789	N	THR	A	491	116.085	64.699	4.279	1.00	9.58	N
	ATOM	3790	CA	THR	A	491	115.626	66.000	3.792	1.00	11.73	C
	ATOM	3791	CB	THR	A	491	114.481	65.858	2.753	1.00	13.80	C
	ATOM	3792	OG1	THR	A	491	115.010	65.226	1.570	1.00	18.48	O
15	ATOM	3793	CG2	THR	A	491	113.911	67.234	2.351	1.00	12.80	C
	ATOM	3794	C	THR	A	491	115.198	66.859	4.981	1.00	10.05	C
	ATOM	3795	O	THR	A	491	114.442	66.420	5.827	1.00	10.42	O
	ATOM	3796	N	MET	A	492	115.729	68.071	5.031	1.00	9.45	N
	ATOM	3797	CA	MET	A	492	115.485	69.015	6.112	1.00	11.41	C
20	ATOM	3798	CB	MET	A	492	114.053	69.579	6.012	1.00	10.69	C
	ATOM	3799	CG	MET	A	492	113.800	70.374	4.730	1.00	10.20	C
	ATOM	3800	SD	MET	A	492	112.164	71.124	4.680	1.00	12.67	S
	ATOM	3801	CE	MET	A	492	111.091	69.704	4.563	1.00	11.26	C
	ATOM	3802	C	MET	A	492	115.748	68.465	7.523	1.00	10.13	C
25	ATOM	3803	O	MET	A	492	115.215	68.985	8.491	1.00	10.70	O
	ATOM	3804	N	LEU	A	493	116.595	67.453	7.640	1.00	9.99	N
	ATOM	3805	CA	LEU	A	493	116.859	66.830	8.927	1.00	10.70	C
	ATOM	3806	CB	LEU	A	493	117.301	65.371	8.749	1.00	11.02	C
	ATOM	3807	CG	LEU	A	493	117.551	64.643	10.085	1.00	11.96	C
30	ATOM	3808	CD1	LEU	A	493	116.226	64.224	10.715	1.00	10.78	C
	ATOM	3809	CD2	LEU	A	493	118.482	63.443	9.853	1.00	13.60	C
	ATOM	3810	C	LEU	A	493	117.966	67.606	9.642	1.00	11.06	C
	ATOM	3811	O	LEU	A	493	119.067	67.744	9.122	1.00	10.71	O
	ATOM	3812	N	GLN	A	494	117.685	68.095	10.839	1.00	9.75	N
35	ATOM	3813	CA	GLN	A	494	118.670	68.858	11.592	1.00	9.84	C
	ATOM	3814	CB	GLN	A	494	117.982	69.838	12.523	1.00	10.66	C
	ATOM	3815	CG	GLN	A	494	118.942	70.688	13.357	1.00	11.22	C
	ATOM	3816	CD	GLN	A	494	118.237	71.903	13.930	1.00	11.78	C
	ATOM	3817	OE1	GLN	A	494	117.596	72.661	13.193	1.00	9.17	O
40	ATOM	3818	NE2	GLN	A	494	118.373	72.115	15.241	1.00	10.94	N
	ATOM	3819	C	GLN	A	494	119.533	67.879	12.405	1.00	9.56	C
	ATOM	3820	O	GLN	A	494	119.001	67.073	13.177	1.00	8.81	O
	ATOM	3821	N	PRO	A	495	120.856	67.935	12.223	1.00	8.63	N
	ATOM	3822	CA	PRO	A	495	121.741	67.115	13.035	1.00	9.61	C
45	ATOM	3823	CB	PRO	A	495	123.150	67.572	12.592	1.00	9.42	C

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      ATOM   3824   CG   PRO A 495      122.956   68.053   11.194   1.00   9.16          C
      ATOM   3825   CD   PRO A 495      121.616   68.731   11.230   1.00   9.72          C
      ATOM   3826   C    PRO A 495      121.548   67.360   14.510   1.00  10.17          C
      ATOM   3827   O    PRO A 495      121.250   68.481   14.914   1.00  11.25          O
 5    ATOM   3828   N    GLY A 496      121.702   66.312   15.308   1.00  10.49          N
      ATOM   3829   CA   GLY A 496      121.533   66.412   16.733   1.00  11.03          C
      ATOM   3830   C    GLY A 496      121.206   65.089   17.392   1.00  12.19          C
      ATOM   3831   O    GLY A 496      121.296   64.004   16.774   1.00  11.67          O
      ATOM   3832   N    ARG A 497      120.821   65.183   18.659   1.00  12.78          N
10    ATOM   3833   CA   ARG A 497      120.500   64.001   19.430   1.00  14.38          C
      ATOM   3834   CB   ARG A 497      121.150   64.096   20.820   1.00  17.05          C
      ATOM   3835   CG   ARG A 497      122.660   64.292   20.741   1.00  17.85          C
      ATOM   3836   CD   ARG A 497      123.314   64.179   22.110   1.00  20.04          C
      ATOM   3837   NE   ARG A 497      124.776   64.253   22.074   1.00  18.23          N
15    ATOM   3838   CZ   ARG A 497      125.496   65.361   22.285   1.00  19.00          C
      ATOM   3839   NH1  ARG A 497      124.891   66.515   22.517   1.00  21.56          N
      ATOM   3840   NH2  ARG A 497      126.838   65.329   22.273   1.00  15.13          N
      ATOM   3841   C    ARG A 497      119.005   63.833   19.496   1.00  13.31          C
      ATOM   3842   O    ARG A 497      118.332   64.522   20.247   1.00  17.01          O
20    ATOM   3843   N    TRP A 498      118.493   62.910   18.690   1.00  12.85          N
      ATOM   3844   CA   TRP A 498      117.061   62.667   18.564   1.00  13.09          C
      ATOM   3845   CB   TRP A 498      116.732   62.305   17.139   1.00  10.29          C
      ATOM   3846   CG   TRP A 498      116.891   63.411   16.133   1.00   8.66          C
      ATOM   3847   CD1  TRP A 498      118.063   63.884   15.559   1.00   8.76          C
25    ATOM   3848   NE1  TRP A 498      117.802   64.876   14.656   1.00   8.86          N
      ATOM   3849   CE2  TRP A 498      116.460   65.087   14.578   1.00   8.51          C
      ATOM   3850   CD2  TRP A 498      115.824   64.159   15.502   1.00   8.53          C
      ATOM   3851   CE3  TRP A 498      114.443   64.163   15.619   1.00   9.16          C
      ATOM   3852   CZ3  TRP A 498      113.720   65.054   14.845   1.00   9.25          C
30    ATOM   3853   CH2  TRP A 498      114.357   65.938   13.955   1.00   8.63          C
      ATOM   3854   CZ2  TRP A 498      115.732   65.973   13.819   1.00   8.09          C
      ATOM   3855   C    TRP A 498      116.627   61.527   19.454   1.00  16.40          C
      ATOM   3856   O    TRP A 498      117.265   60.478   19.445   1.00  24.22          O
      ATOM   3857   N    HIS A 499      115.546   61.707   20.207   1.00  15.34          N
35    ATOM   3858   CA   HIS A 499      115.081   60.697   21.196   1.00  17.77          C
      ATOM   3859   CB   HIS A 499      114.972   61.300   22.618   1.00  21.46          C
      ATOM   3860   CG   HIS A 499      116.269   61.968   23.121   1.00  36.41          C
      ATOM   3861   ND1  HIS A 499      117.129   61.359   23.981   1.00  40.93          N
      ATOM   3862   CE1  HIS A 499      118.172   62.188   24.239   1.00  39.20          C
40    ATOM   3863   NE2  HIS A 499      117.983   63.330   23.545   1.00  36.63          N
      ATOM   3864   CD2  HIS A 499      116.823   63.236   22.852   1.00  34.57          C
      ATOM   3865   C    HIS A 499      113.751   60.145   20.771   1.00  15.91          C
      ATOM   3866   O    HIS A 499      112.801   60.901   20.495   1.00  13.95          O
      ATOM   3867   N    ASP A 500      113.658   58.826   20.693   1.00  17.76          N
45    ATOM   3868   CA   ASP A 500      112.422   58.140   20.353   1.00  21.93          C
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	ATOM	3869	CB	ASP	A	500	112.692	56.641	20.136	1.00	30.24	C
	ATOM	3870	CG	ASP	A	500	111.423	55.828	19.818	1.00	33.18	C
	ATOM	3871	OD1	ASP	A	500	110.286	56.318	19.959	1.00	43.09	O
	ATOM	3872	OD2	ASP	A	500	111.582	54.675	19.391	1.00	42.81	O
5	ATOM	3873	C	ASP	A	500	111.492	58.312	21.539	1.00	20.91	C
	ATOM	3874	O	ASP	A	500	111.796	57.809	22.591	1.00	22.20	O
	ATOM	3875	N	ALA	A	501	110.374	59.008	21.363	1.00	14.99	N
	ATOM	3876	CA	ALA	A	501	109.471	59.304	22.477	1.00	17.10	C
	ATOM	3877	CB	ALA	A	501	108.385	60.274	22.036	1.00	14.69	C
10	ATOM	3878	C	ALA	A	501	108.830	58.076	23.139	1.00	22.71	C
	ATOM	3879	O	ALA	A	501	108.475	58.154	24.303	1.00	35.66	O
	ATOM	3880	N	ILE	A	502	108.632	56.983	22.410	1.00	31.51	N
	ATOM	3881	CA	ILE	A	502	107.991	55.756	22.969	1.00	43.49	C
	ATOM	3882	CB	ILE	A	502	106.961	55.114	22.023	1.00	43.64	C
15	ATOM	3883	CG1	ILE	A	502	105.735	56.028	21.853	1.00	44.63	C
	ATOM	3884	CD1	ILE	A	502	105.095	55.971	20.474	1.00	35.62	C
	ATOM	3885	CG2	ILE	A	502	106.552	53.733	22.560	1.00	42.82	C
	ATOM	3886	C	ILE	A	502	109.023	54.694	23.328	1.00	46.88	C
	ATOM	3887	O	ILE	A	502	109.152	54.354	24.509	1.00	51.64	O
20	ATOM	3888	N	GLY	A	503	109.755	54.174	22.330	1.00	49.47	N
	ATOM	3889	CA	GLY	A	503	111.057	53.524	22.605	1.00	42.47	C
	ATOM	3890	C	GLY	A	503	111.819	54.511	23.491	1.00	41.75	C
	ATOM	3891	O	GLY	A	503	111.240	55.476	23.989	1.00	52.49	O
	ATOM	3892	N	GLY	A	504	113.095	54.297	23.733	1.00	33.97	N
25	ATOM	3893	CA	GLY	A	504	113.853	55.252	24.542	1.00	36.81	C
	ATOM	3894	C	GLY	A	504	115.188	55.666	23.959	1.00	35.32	C
	ATOM	3895	O	GLY	A	504	115.831	56.598	24.454	1.00	44.34	O
	ATOM	3896	N	GLU	A	505	115.603	54.992	22.898	1.00	43.81	N
	ATOM	3897	CA	GLU	A	505	116.913	55.246	22.295	1.00	48.17	C
30	ATOM	3898	CB	GLU	A	505	117.241	54.250	21.160	1.00	54.81	C
	ATOM	3899	CG	GLU	A	505	116.119	53.974	20.174	1.00	56.61	C
	ATOM	3900	CD	GLU	A	505	115.051	53.045	20.748	1.00	79.51	C
	ATOM	3901	OE1	GLU	A	505	115.304	51.822	20.841	1.00	93.44	O
	ATOM	3902	OE2	GLU	A	505	113.963	53.544	21.129	1.00	59.14	O
35	ATOM	3903	C	GLU	A	505	117.085	56.684	21.798	1.00	42.11	C
	ATOM	3904	O	GLU	A	505	116.139	57.351	21.354	1.00	39.97	O
	ATOM	3905	N	THR	A	506	118.317	57.137	21.939	1.00	36.27	N
	ATOM	3906	CA	THR	A	506	118.814	58.333	21.326	1.00	32.81	C
	ATOM	3907	CB	THR	A	506	119.746	59.040	22.299	1.00	35.17	C
40	ATOM	3908	OG1	THR	A	506	118.999	59.308	23.486	1.00	47.17	O
	ATOM	3909	CG2	THR	A	506	120.294	60.360	21.719	1.00	34.36	C
	ATOM	3910	C	THR	A	506	119.550	57.949	20.052	1.00	25.53	C
	ATOM	3911	O	THR	A	506	120.446	57.110	20.060	1.00	23.32	O
	ATOM	3912	N	LEU	A	507	119.133	58.529	18.944	1.00	20.16	N
45	ATOM	3913	CA	LEU	A	507	119.884	58.446	17.709	1.00	17.44	C

	ATOM	3914	CB	LEU	A	507	118.953	58.184	16.525	1.00	18.20	C
	ATOM	3915	CG	LEU	A	507	118.249	56.821	16.361	1.00	18.08	C
	ATOM	3916	CD1	LEU	A	507	117.469	56.808	15.050	1.00	14.73	C
	ATOM	3917	CD2	LEU	A	507	119.205	55.620	16.388	1.00	21.65	C
5	ATOM	3918	C	LEU	A	507	120.613	59.788	17.561	1.00	16.84	C
	ATOM	3919	O	LEU	A	507	119.981	60.845	17.537	1.00	15.02	O
	ATOM	3920	N	THR	A	508	121.941	59.738	17.498	1.00	15.75	N
	ATOM	3921	CA	THR	A	508	122.741	60.915	17.258	1.00	14.58	C
	ATOM	3922	CB	THR	A	508	124.084	60.861	17.997	1.00	14.89	C
10	ATOM	3923	OG1	THR	A	508	123.816	60.897	19.393	1.00	13.50	O
	ATOM	3924	CG2	THR	A	508	124.981	62.070	17.606	1.00	12.67	C
	ATOM	3925	C	THR	A	508	122.991	61.000	15.776	1.00	14.73	C
	ATOM	3926	O	THR	A	508	123.641	60.127	15.202	1.00	13.99	O
	ATOM	3927	N	ILE	A	509	122.481	62.055	15.155	1.00	13.45	N
15	ATOM	3928	CA	ILE	A	509	122.656	62.225	13.732	1.00	13.06	C
	ATOM	3929	CB	ILE	A	509	121.335	62.623	13.045	1.00	13.81	C
	ATOM	3930	CG1	ILE	A	509	120.222	61.628	13.419	1.00	13.63	C
	ATOM	3931	CD1	ILE	A	509	120.483	60.175	13.027	1.00	12.00	C
	ATOM	3932	CG2	ILE	A	509	121.561	62.728	11.532	1.00	14.78	C
20	ATOM	3933	C	ILE	A	509	123.699	63.303	13.482	1.00	11.43	C
	ATOM	3934	O	ILE	A	509	123.563	64.418	13.971	1.00	11.35	O
	ATOM	3935	N	GLN	A	510	124.739	62.930	12.744	1.00	10.14	N
	ATOM	3936	CA	GLN	A	510	125.805	63.825	12.332	1.00	10.29	C
	ATOM	3937	CB	GLN	A	510	127.129	63.049	12.223	1.00	11.16	C
25	ATOM	3938	CG	GLN	A	510	127.611	62.468	13.546	1.00	11.25	C
	ATOM	3939	CD	GLN	A	510	129.004	61.863	13.472	1.00	12.20	C
	ATOM	3940	OE1	GLN	A	510	129.725	62.031	12.503	1.00	12.77	O
	ATOM	3941	NE2	GLN	A	510	129.393	61.184	14.530	1.00	11.54	N
	ATOM	3942	C	GLN	A	510	125.487	64.436	10.981	1.00	9.89	C
30	ATOM	3943	O	GLN	A	510	124.807	63.805	10.149	1.00	10.54	O
	ATOM	3944	N	ALA	A	511	126.006	65.641	10.752	1.00	9.74	N
	ATOM	3945	CA	ALA	A	511	125.795	66.352	9.485	1.00	11.00	C
	ATOM	3946	CB	ALA	A	511	126.543	67.704	9.468	1.00	9.61	C
	ATOM	3947	C	ALA	A	511	126.209	65.478	8.294	1.00	10.27	C
35	ATOM	3948	O	ALA	A	511	127.285	64.861	8.297	1.00	9.35	O
	ATOM	3949	N	GLY	A	512	125.359	65.439	7.274	1.00	9.80	N
	ATOM	3950	CA	GLY	A	512	125.614	64.654	6.091	1.00	9.49	C
	ATOM	3951	C	GLY	A	512	125.026	63.260	6.153	1.00	11.41	C
	ATOM	3952	O	GLY	A	512	125.016	62.552	5.135	1.00	14.08	O
40	ATOM	3953	N	GLU	A	513	124.490	62.864	7.311	1.00	12.38	N
	ATOM	3954	CA	GLU	A	513	123.914	61.529	7.484	1.00	14.25	C
	ATOM	3955	CB	GLU	A	513	124.493	60.822	8.721	1.00	18.94	C
	ATOM	3956	CG	GLU	A	513	126.007	60.915	8.911	1.00	26.20	C
	ATOM	3957	CD	GLU	A	513	126.795	60.076	7.930	1.00	37.25	C
45	ATOM	3958	OE1	GLU	A	513	126.248	59.070	7.430	1.00	40.40	O

	ATOM	3959	OE2	GLU	A	513	127.975	60.418	7.671	1.00	45.26	O
	ATOM	3960	C	GLU	A	513	122.385	61.579	7.642	1.00	12.91	C
	ATOM	3961	O	GLU	A	513	121.811	62.605	7.946	1.00	13.81	O
	ATOM	3962	N	ALA	A	514	121.769	60.415	7.504	1.00	11.39	N
5	ATOM	3963	CA	ALA	A	514	120.333	60.222	7.574	1.00	11.17	C
	ATOM	3964	CB	ALA	A	514	119.896	59.309	6.433	1.00	10.91	C
	ATOM	3965	C	ALA	A	514	119.979	59.583	8.907	1.00	10.60	C
	ATOM	3966	O	ALA	A	514	120.807	58.914	9.524	1.00	9.46	O
	ATOM	3967	N	LEU	A	515	118.738	59.792	9.329	1.00	10.57	N
10	ATOM	3968	CA	LEU	A	515	118.141	59.089	10.460	1.00	10.43	C
	ATOM	3969	CB	LEU	A	515	117.087	59.965	11.154	1.00	10.29	C
	ATOM	3970	CG	LEU	A	515	116.529	59.410	12.461	1.00	11.73	C
	ATOM	3971	CD1	LEU	A	515	116.065	60.553	13.357	1.00	11.08	C
	ATOM	3972	CD2	LEU	A	515	115.395	58.389	12.259	1.00	11.49	C
15	ATOM	3973	C	LEU	A	515	117.498	57.831	9.909	1.00	10.90	C
	ATOM	3974	O	LEU	A	515	116.594	57.915	9.073	1.00	10.60	O
	ATOM	3975	N	HIS	A	516	117.970	56.678	10.370	1.00	10.55	N
	ATOM	3976	CA	HIS	A	516	117.477	55.372	9.940	1.00	12.62	C
	ATOM	3977	CB	HIS	A	516	118.649	54.398	9.694	1.00	13.48	C
20	ATOM	3978	CG	HIS	A	516	119.533	54.803	8.567	1.00	17.52	C
	ATOM	3979	ND1	HIS	A	516	119.294	54.427	7.296	1.00	20.78	N
	ATOM	3980	CE1	HIS	A	516	120.228	54.955	6.496	1.00	19.23	C
	ATOM	3981	NE2	HIS	A	516	121.070	55.667	7.251	1.00	18.35	N
	ATOM	3982	CD2	HIS	A	516	120.660	55.605	8.535	1.00	18.79	C
25	ATOM	3983	C	HIS	A	516	116.669	54.795	11.054	1.00	14.02	C
	ATOM	3984	O	HIS	A	516	117.119	54.815	12.203	1.00	13.21	O
	ATOM	3985	N	ALA	A	517	115.510	54.241	10.719	1.00	13.02	N
	ATOM	3986	CA	ALA	A	517	114.621	53.630	11.713	1.00	14.34	C
	ATOM	3987	CB	ALA	A	517	113.734	54.691	12.370	1.00	13.42	C
30	ATOM	3988	C	ALA	A	517	113.748	52.589	11.037	1.00	14.00	C
	ATOM	3989	O	ALA	A	517	113.249	52.800	9.929	1.00	14.94	O
	ATOM	3990	N	GLU	A	518	113.536	51.485	11.723	1.00	13.79	N
	ATOM	3991	CA	GLU	A	518	112.557	50.505	11.336	1.00	15.60	C
	ATOM	3992	CB	GLU	A	518	113.122	49.104	11.582	1.00	20.75	C
35	ATOM	3993	CG	GLU	A	518	112.350	47.992	10.896	1.00	26.36	C
	ATOM	3994	CD	GLU	A	518	112.955	46.628	11.199	1.00	31.68	C
	ATOM	3995	OE1	GLU	A	518	114.174	46.471	10.994	1.00	36.57	O
	ATOM	3996	OE2	GLU	A	518	112.223	45.728	11.660	1.00	30.59	O
	ATOM	3997	C	GLU	A	518	111.282	50.708	12.160	1.00	14.30	C
40	ATOM	3998	O	GLU	A	518	111.328	50.788	13.375	1.00	16.77	O
	ATOM	3999	N	VAL	A	519	110.151	50.784	11.483	1.00	11.31	N
	ATOM	4000	CA	VAL	A	519	108.854	50.902	12.126	1.00	10.69	C
	ATOM	4001	CB	VAL	A	519	108.026	52.044	11.535	1.00	9.53	C
	ATOM	4002	CG1	VAL	A	519	106.686	52.199	12.295	1.00	7.75	C
45	ATOM	4003	CG2	VAL	A	519	108.850	53.338	11.581	1.00	8.74	C

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      ATOM   4004   C    VAL A 519    108.082  49.589  12.008  1.00 10.94         C
      ATOM   4005   O    VAL A 519    107.882  49.075  10.897  1.00  9.94         O
      ATOM   4006   N    PRO A 520    107.647  49.026  13.148  1.00 12.57         N
      ATOM   4007   CA   PRO A 520    106.867  47.763  13.066  1.00 14.58         C
  5   ATOM   4008   CB   PRO A 520    106.494  47.467  14.536  1.00 16.07         C
      ATOM   4009   CG   PRO A 520    107.485  48.235  15.356  1.00 17.24         C
      ATOM   4010   CD   PRO A 520    107.849  49.461  14.545  1.00 16.07         C
      ATOM   4011   C    PRO A 520    105.582  47.889  12.248  1.00 12.26         C
      ATOM   4012   O    PRO A 520    105.072  49.013  12.053  1.00 11.41         O
 10   ATOM   4013   N    ALA A 521    105.078  46.742  11.782  1.00 10.12         N
      ATOM   4014   CA   ALA A 521    103.731  46.642  11.197  1.00 10.96         C
      ATOM   4015   CB   ALA A 521    103.329  45.162  10.990  1.00 10.36         C
      ATOM   4016   C    ALA A 521    102.716  47.337  12.106  1.00  9.89         C
      ATOM   4017   O    ALA A 521    102.768  47.207  13.323  1.00  9.19         O
 15   ATOM   4018   N    HIS A 522    101.816  48.107  11.513  1.00  9.54         N
      ATOM   4019   CA   HIS A 522    100.814  48.843  12.269  1.00  9.64         C
      ATOM   4020   CB   HIS A 522     99.727  47.860  12.666  1.00 10.73         C
      ATOM   4021   CG   HIS A 522     99.191  47.110  11.469  1.00 10.88         C
      ATOM   4022   ND1  HIS A 522     98.521  47.744  10.477  1.00 11.26         N
 20   ATOM   4023   CE1  HIS A 522     98.216  46.859   9.510  1.00 12.49         C
      ATOM   4024   NE2  HIS A 522     98.705  45.661   9.875  1.00 11.79         N
      ATOM   4025   CD2  HIS A 522     99.310  45.787  11.087  1.00  9.87         C
      ATOM   4026   C    HIS A 522    101.407  49.618  13.431  1.00 11.25         C
      ATOM   4027   O    HIS A 522    100.931  49.558  14.575  1.00 11.49         O
 25   ATOM   4028   N    GLY A 523    102.466  50.367  13.114  1.00 11.52         N
      ATOM   4029   CA   GLY A 523    103.316  50.985  14.107  1.00 10.64         C
      ATOM   4030   C    GLY A 523    103.592  52.433  13.862  1.00  8.84         C
      ATOM   4031   O    GLY A 523    103.252  52.980  12.810  1.00  8.72         O
      ATOM   4032   N    VAL A 524    104.241  53.034  14.854  1.00  8.94         N
 30   ATOM   4033   CA   VAL A 524    104.610  54.432  14.845  1.00  8.56         C
      ATOM   4034   CB   VAL A 524    103.520  55.297  15.527  1.00  9.19         C
      ATOM   4035   CG1  VAL A 524    103.171  54.762  16.928  1.00  8.21         C
      ATOM   4036   CG2  VAL A 524    103.945  56.757  15.591  1.00  7.98         C
      ATOM   4037   C    VAL A 524    105.917  54.599  15.598  1.00 10.38         C
 35   ATOM   4038   O    VAL A 524    106.167  53.886  16.593  1.00 10.42         O
      ATOM   4039   N    ARG A 525    106.760  55.508  15.124  1.00  9.71         N
      ATOM   4040   CA   ARG A 525    107.859  56.028  15.940  1.00 10.60         C
      ATOM   4041   CB   ARG A 525    109.207  55.485  15.455  1.00 13.03         C
      ATOM   4042   CG   ARG A 525    109.297  53.949  15.562  1.00 18.03         C
 40   ATOM   4043   CD   ARG A 525    110.317  53.471  16.562  1.00 25.99         C
      ATOM   4044   NE   ARG A 525    111.397  52.876  15.804  1.00 34.69         N
      ATOM   4045   CZ   ARG A 525    112.674  52.854  16.145  1.00 28.95         C
      ATOM   4046   NH1  ARG A 525    113.526  52.273  15.310  1.00 30.55         N
      ATOM   4047   NH2  ARG A 525    113.114  53.398  17.284  1.00 32.10         N
 45   ATOM   4048   C    ARG A 525    107.827  57.551  15.888  1.00 10.27         C
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	ATOM	4049	O	ARG A 525	107.502	58.135	14.849	1.00	10.33	O
	ATOM	4050	N	VAL A 526	108.118	58.194	17.008	1.00	9.16	N
	ATOM	4051	CA	VAL A 526	108.174	59.656	17.048	1.00	10.36	C
	ATOM	4052	CB	VAL A 526	107.051	60.261	17.917	1.00	10.49	C
5	ATOM	4053	CG1	VAL A 526	107.197	61.783	18.027	1.00	8.98	C
	ATOM	4054	CG2	VAL A 526	105.665	59.895	17.362	1.00	10.91	C
	ATOM	4055	C	VAL A 526	109.524	59.987	17.629	1.00	11.51	C
	ATOM	4056	O	VAL A 526	109.798	59.616	18.764	1.00	14.38	O
	ATOM	4057	N	PHE A 527	110.383	60.617	16.839	1.00	9.91	N
10	ATOM	4058	CA	PHE A 527	111.660	61.103	17.323	1.00	9.52	C
	ATOM	4059	CB	PHE A 527	112.749	60.797	16.305	1.00	9.92	C
	ATOM	4060	CG	PHE A 527	112.995	59.320	16.114	1.00	11.05	C
	ATOM	4061	CD1	PHE A 527	113.911	58.643	16.915	1.00	13.35	C
	ATOM	4062	CE1	PHE A 527	114.145	57.276	16.719	1.00	14.90	C
15	ATOM	4063	CZ	PHE A 527	113.448	56.582	15.731	1.00	10.88	C
	ATOM	4064	CE2	PHE A 527	112.567	57.255	14.922	1.00	10.96	C
	ATOM	4065	CD2	PHE A 527	112.331	58.614	15.130	1.00	11.05	C
	ATOM	4066	C	PHE A 527	111.614	62.600	17.642	1.00	9.59	C
	ATOM	4067	O	PHE A 527	111.072	63.399	16.877	1.00	10.13	O
20	ATOM	4068	N	LEU A 528	112.197	62.974	18.775	1.00	9.22	N
	ATOM	4069	CA	LEU A 528	112.126	64.342	19.272	1.00	9.68	C
	ATOM	4070	CB	LEU A 528	111.408	64.382	20.634	1.00	9.09	C
	ATOM	4071	CG	LEU A 528	110.002	63.775	20.684	1.00	9.41	C
	ATOM	4072	CD1	LEU A 528	109.488	63.694	22.124	1.00	9.12	C
25	ATOM	4073	CD2	LEU A 528	109.030	64.599	19.823	1.00	8.64	C
	ATOM	4074	C	LEU A 528	113.515	64.909	19.449	1.00	9.76	C
	ATOM	4075	O	LEU A 528	114.362	64.267	20.049	1.00	10.21	O
	ATOM	4076	N	LEU A 529	113.719	66.115	18.932	1.00	10.18	N
	ATOM	4077	CA	LEU A 529	114.940	66.860	19.071	1.00	10.08	C
30	ATOM	4078	CB	LEU A 529	115.575	67.129	17.695	1.00	9.32	C
	ATOM	4079	CG	LEU A 529	116.785	68.085	17.678	1.00	9.62	C
	ATOM	4080	CD1	LEU A 529	118.000	67.439	18.343	1.00	11.82	C
	ATOM	4081	CD2	LEU A 529	117.150	68.508	16.265	1.00	10.57	C
	ATOM	4082	C	LEU A 529	114.600	68.175	19.799	1.00	11.06	C
35	ATOM	4083	O	LEU A 529	113.727	68.972	19.371	1.00	10.42	O
	ATOM	4084	N	ASP A 530	115.266	68.391	20.911	1.00	9.92	N
	ATOM	4085	CA	ASP A 530	115.041	69.596	21.704	1.00	11.43	C
	ATOM	4086	CB	ASP A 530	115.073	69.245	23.173	1.00	14.30	C
	ATOM	4087	CG	ASP A 530	114.798	70.443	24.083	1.00	16.65	C
40	ATOM	4088	OD1	ASP A 530	114.591	71.602	23.628	1.00	17.39	O
	ATOM	4089	OD2	ASP A 530	114.822	70.196	25.287	1.00	18.37	O
	ATOM	4090	C	ASP A 530	116.132	70.578	21.331	1.00	10.62	C
	ATOM	4091	O	ASP A 530	117.187	70.577	21.922	1.00	10.38	O
	ATOM	4092	N	ALA A 531	115.894	71.359	20.292	1.00	10.14	N
45	ATOM	4093	CA	ALA A 531	116.888	72.323	19.825	1.00	10.79	C

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	ATOM	4094	CB	ALA A 531	117.950	71.649	18.941	1.00	9.75		C
	ATOM	4095	C	ALA A 531	116.201	73.426	19.042	1.00	10.66		C
	ATOM	4096	O	ALA A 531	115.168	73.230	18.375	1.00	10.28		O
	ATOM	4097	N	GLN A 532	116.791	74.592	19.134	1.00	10.54		N
5	ATOM	4098	CA	GLN A 532	116.467	75.682	18.253	1.00	15.30		C
	ATOM	4099	CB	GLN A 532	117.405	76.857	18.575	1.00	16.44		C
	ATOM	4100	CG	GLN A 532	117.022	78.154	17.900	1.00	23.33		C
	ATOM	4101	CD	GLN A 532	117.997	79.280	18.191	1.00	25.77		C
	ATOM	4102	OE1	GLN A 532	118.922	79.139	18.999	1.00	31.32		O
10	ATOM	4103	NE2	GLN A 532	117.787	80.405	17.544	1.00	26.18		N
	ATOM	4104	C	GLN A 532	116.657	75.241	16.781	1.00	13.76		C
	ATOM	4105	O	GLN A 532	117.622	74.559	16.467	1.00	11.93		O
	ATOM	4106	N	VAL A 533	115.762	75.666	15.897	1.00	12.61		N
	ATOM	4107	CA	VAL A 533	115.898	75.410	14.472	1.00	12.23		C
15	ATOM	4108	CB	VAL A 533	114.625	75.848	13.697	1.00	12.90		C
	ATOM	4109	CG1	VAL A 533	114.842	75.775	12.192	1.00	10.51		C
	ATOM	4110	CG2	VAL A 533	113.429	74.979	14.107	1.00	10.72		C
	ATOM	4111	C	VAL A 533	117.122	76.148	13.920	1.00	13.56		C
	ATOM	4112	O	VAL A 533	117.261	77.351	14.113	1.00	12.02		O
20	ATOM	4113	N	THR A 534	118.018	75.398	13.284	1.00	12.09		N
	ATOM	4114	CA	THR A 534	119.175	75.928	12.595	1.00	12.78		C
	ATOM	4115	CB	THR A 534	120.469	75.604	13.351	1.00	14.58		C
	ATOM	4116	OG1	THR A 534	120.563	74.171	13.497	1.00	14.83		O
	ATOM	4117	CG2	THR A 534	120.505	76.337	14.719	1.00	13.89		C
25	ATOM	4118	C	THR A 534	119.381	75.376	11.189	1.00	13.87		C
	ATOM	4119	O	THR A 534	120.070	76.010	10.399	1.00	14.05		O
	ATOM	4120	N	GLU A 535	118.859	74.196	10.863	1.00	15.17		N
	ATOM	4121	CA	GLU A 535	119.104	73.617	9.521	1.00	16.86		C
	ATOM	4122	CB	GLU A 535	118.583	72.165	9.452	1.00	20.66		C
30	ATOM	4123	CG	GLU A 535	118.387	71.568	8.065	1.00	28.44		C
	ATOM	4124	CD	GLU A 535	119.646	71.502	7.279	1.00	38.00		C
	ATOM	4125	OE1	GLU A 535	120.694	71.256	7.907	1.00	43.92		O
	ATOM	4126	OE2	GLU A 535	119.584	71.714	6.043	1.00	49.47		O
	ATOM	4127	C	GLU A 535	118.463	74.530	8.448	1.00	14.94		C
35	ATOM	4128	O	GLU A 535	117.260	74.784	8.489	1.00	12.32		O
	ATOM	4129	N	PRO A 536	119.269	75.045	7.506	1.00	13.22		N
	ATOM	4130	CA	PRO A 536	118.787	76.103	6.607	1.00	14.11		C
	ATOM	4131	CB	PRO A 536	119.994	76.395	5.696	1.00	14.51		C
	ATOM	4132	CG	PRO A 536	121.184	75.893	6.427	1.00	16.92		C
40	ATOM	4133	CD	PRO A 536	120.728	74.833	7.394	1.00	16.34		C
	ATOM	4134	C	PRO A 536	117.558	75.790	5.747	1.00	11.81		C
	ATOM	4135	O	PRO A 536	116.701	76.644	5.572	1.00	12.20		O
	ATOM	4136	N	THR A 537	117.485	74.589	5.207	1.00	10.03		N
	ATOM	4137	CA	THR A 537	116.364	74.177	4.361	1.00	11.44		C
45	ATOM	4138	CB	THR A 537	116.758	72.938	3.522	1.00	13.05		C

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      ATOM   4139  OG1 THR A 537       116.976  71.808   4.374  1.00 16.34          O
      ATOM   4140  CG2 THR A 537       118.049  73.203   2.750  1.00 11.25          C
      ATOM   4141  C   THR A 537       115.075  73.956   5.196  1.00 10.50          C
      ATOM   4142  O   THR A 537       113.969  74.280   4.774  1.00  9.54          O
   5  ATOM   4143  N   LEU A 538       115.247  73.473   6.411  1.00  9.49          N
      ATOM   4144  CA  LEU A 538       114.154  73.371   7.357  1.00  8.98          C
      ATOM   4145  CB  LEU A 538       114.604  72.593   8.595  1.00  8.29          C
      ATOM   4146  CG  LEU A 538       113.554  72.443   9.713  1.00  8.54          C
      ATOM   4147  CD1 LEU A 538       112.371  71.621   9.205  1.00  8.35          C
  10  ATOM   4148  CD2 LEU A 538       114.163  71.821  10.953  1.00  7.14          C
      ATOM   4149  C   LEU A 538       113.627  74.792   7.713  1.00  9.27          C
      ATOM   4150  O   LEU A 538       112.419  75.050   7.599  1.00  9.78          O
      ATOM   4151  N   ALA A 539       114.523  75.699   8.090  1.00  8.43          N
      ATOM   4152  CA  ALA A 539       114.134  77.080   8.399  1.00 10.03          C
  15  ATOM   4153  CB  ALA A 539       115.338  77.950   8.810  1.00  8.28          C
      ATOM   4154  C   ALA A 539       113.416  77.714   7.216  1.00 11.94          C
      ATOM   4155  O   ALA A 539       112.420  78.407   7.401  1.00 12.14          O
      ATOM   4156  N   ALA A 540       113.903  77.479   6.000  1.00 12.69          N
      ATOM   4157  CA  ALA A 540       113.261  78.090   4.829  1.00 13.57          C
  20  ATOM   4158  CB  ALA A 540       114.112  77.914   3.559  1.00 12.36          C
      ATOM   4159  C   ALA A 540       111.826  77.588   4.624  1.00 12.40          C
      ATOM   4160  O   ALA A 540       110.924  78.389   4.402  1.00 13.10          O
      ATOM   4161  N   ALA A 541       111.597  76.281   4.744  1.00 12.30          N
      ATOM   4162  CA  ALA A 541       110.260  75.730   4.607  1.00 12.06          C
  25  ATOM   4163  CB  ALA A 541       110.290  74.194   4.601  1.00 12.11          C
      ATOM   4164  C   ALA A 541       109.330  76.259   5.717  1.00 11.71          C
      ATOM   4165  O   ALA A 541       108.167  76.578   5.477  1.00 11.89          O
      ATOM   4166  N   LEU A 542       109.861  76.369   6.922  1.00 10.84          N
      ATOM   4167  CA  LEU A 542       109.081  76.820   8.061  1.00 10.57          C
  30  ATOM   4168  CB  LEU A 542       109.828  76.539   9.360  1.00  9.37          C
      ATOM   4169  CG  LEU A 542       110.008  75.053   9.792  1.00  9.27          C
      ATOM   4170  CD1 LEU A 542       111.003  74.968  10.949  1.00  6.79          C
      ATOM   4171  CD2 LEU A 542       108.679  74.412  10.154  1.00  7.05          C
      ATOM   4172  C   LEU A 542       108.746  78.325   7.946  1.00 12.02          C
  35  ATOM   4173  O   LEU A 542       107.635  78.736   8.295  1.00  9.27          O
      ATOM   4174  N   ASP A 543       109.720  79.121   7.481  1.00 10.97          N
      ATOM   4175  CA  ASP A 543       109.503  80.535   7.208  1.00 11.93          C
      ATOM   4176  CB  ASP A 543       110.778  81.211   6.677  1.00 11.96          C
      ATOM   4177  CG  ASP A 543       111.880  81.335   7.727  1.00 15.31          C
  40  ATOM   4178  OD1 ASP A 543       111.587  81.321   8.945  1.00 14.43          O
      ATOM   4179  OD2 ASP A 543       113.056  81.460   7.315  1.00 15.12          O
      ATOM   4180  C   ASP A 543       108.379  80.721   6.171  1.00 11.78          C
      ATOM   4181  O   ASP A 543       107.494  81.565   6.351  1.00 12.70          O
      ATOM   4182  N   ALA A 544       108.429  79.949   5.094  1.00 11.45          N
  45  ATOM   4183  CA  ALA A 544       107.393  80.014   4.057  1.00 13.07          C
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      ATOM   4184  CB   ALA A 544      107.771  79.164   2.840  1.00 14.31          C
      ATOM   4185  C    ALA A 544      106.004  79.630   4.576  1.00 12.78          C
      ATOM   4186  O    ALA A 544      105.017  80.249   4.184  1.00 11.26          O
      ATOM   4187  N    ALA A 545      105.929  78.636   5.470  1.00 12.10          N
   5  ATOM   4188  CA   ALA A 545      104.653  78.258   6.101  1.00 11.76          C
      ATOM   4189  CB   ALA A 545      104.766  76.923   6.841  1.00  8.95          C
      ATOM   4190  C    ALA A 545      104.122  79.373   7.030  1.00 11.06          C
      ATOM   4191  O    ALA A 545      102.924  79.646   7.010  1.00 12.09          O
      ATOM   4192  N    MET A 546      104.994  80.051   7.789  1.00 10.46          N
  10  ATOM   4193  CA   MET A 546      104.555  81.173   8.640  1.00 11.25          C
      ATOM   4194  CB   MET A 546      105.658  81.652   9.618  1.00 11.09          C
      ATOM   4195  CG   MET A 546      106.097  80.590  10.628  1.00 11.56          C
      ATOM   4196  SD   MET A 546      104.767  80.106  11.774  1.00 12.53          S
      ATOM   4197  CE   MET A 546      104.589  81.658  12.694  1.00 10.43          C
  15  ATOM   4198  C    MET A 546      104.057  82.337   7.785  1.00 11.91          C
      ATOM   4199  O    MET A 546      103.026  82.922   8.103  1.00 13.59          O
      ATOM   4200  N    ALA A 547      104.776  82.674   6.719  1.00 12.15          N
      ATOM   4201  CA   ALA A 547      104.346  83.763   5.842  1.00 15.42          C
      ATOM   4202  CB   ALA A 547      105.393  84.097   4.786  1.00 14.98          C
  20  ATOM   4203  C    ALA A 547      102.997  83.411   5.188  1.00 16.22          C
      ATOM   4204  O    ALA A 547      102.121  84.251   5.111  1.00 17.52          O
      ATOM   4205  N    ASP A 548      102.815  82.159   4.777  1.00 15.85          N
      ATOM   4206  CA   ASP A 548      101.560  81.762   4.150  1.00 15.63          C
      ATOM   4207  CB   ASP A 548      101.582  80.321   3.666  1.00 16.71          C
  25  ATOM   4208  CG   ASP A 548      100.277  79.933   2.990  1.00 17.92          C
      ATOM   4209  OD1  ASP A 548      100.047  80.384   1.859  1.00 23.54          O
      ATOM   4210  OD2  ASP A 548       99.464  79.251   3.606  1.00 21.00          O
      ATOM   4211  C    ASP A 548      100.377  81.945   5.110  1.00 17.65          C
      ATOM   4212  O    ASP A 548       99.316  82.431   4.704  1.00 13.49          O
  30  ATOM   4213  N    ALA A 549      100.582  81.575   6.369  1.00 15.54          N
      ATOM   4214  CA   ALA A 549       99.535  81.640   7.373  1.00 19.94          C
      ATOM   4215  CB   ALA A 549       99.968  80.908   8.643  1.00 16.36          C
      ATOM   4216  C    ALA A 549       99.123  83.086   7.693  1.00 22.92          C
      ATOM   4217  O    ALA A 549       98.055  83.297   8.260  1.00 20.41          O
  35  ATOM   4218  N    ARG A 550       99.965  84.072   7.366  1.00 26.65          N
      ATOM   4219  CA   ARG A 550       99.590  85.480   7.565  1.00 30.18          C
      ATOM   4220  CB   ARG A 550      100.815  86.373   7.839  1.00 28.79          C
      ATOM   4221  CG   ARG A 550      101.406  86.152   9.227  1.00 29.17          C
      ATOM   4222  CD   ARG A 550      102.524  87.143   9.534  1.00 39.26          C
  40  ATOM   4223  NE   ARG A 550      103.742  86.795   8.804  1.00 47.80          N
      ATOM   4224  CZ   ARG A 550      104.685  85.943   9.230  1.00 51.10          C
      ATOM   4225  NH1  ARG A 550      104.582  85.330  10.415  1.00 51.89          N
      ATOM   4226  NH2  ARG A 550      105.744  85.696   8.457  1.00 33.57          N
      ATOM   4227  C    ARG A 550       98.725  86.069   6.442  1.00 33.84          C
  45  ATOM   4228  O    ARG A 550       98.128  87.120   6.637  1.00 31.87          O
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	ATOM	4229	N	ARG	A	551	98.619	85.392	5.301	1.00	36.87	N
	ATOM	4230	CA	ARG	A	551	97.786	85.879	4.184	1.00	35.97	C
	ATOM	4231	CB	ARG	A	551	98.063	85.076	2.913	1.00	34.44	C
	ATOM	4232	CG	ARG	A	551	99.484	85.175	2.404	1.00	40.33	C
5	ATOM	4233	CD	ARG	A	551	99.671	84.462	1.064	1.00	50.67	C
	ATOM	4234	NE	ARG	A	551	100.913	83.674	1.057	1.00	68.59	N
	ATOM	4235	CZ	ARG	A	551	102.152	84.180	1.113	1.00	69.62	C
	ATOM	4236	NH1	ARG	A	551	102.359	85.496	1.159	1.00	70.63	N
	ATOM	4237	NH2	ARG	A	551	103.206	83.365	1.130	1.00	50.36	N
10	ATOM	4238	C	ARG	A	551	96.283	85.782	4.483	1.00	40.67	C
	ATOM	4239	O	ARG	A	551	95.820	84.797	5.078	1.00	41.34	O
	ATOM	4240	N	SER	A	552	95.528	86.788	4.038	1.00	45.37	N
	ATOM	4241	CA	SER	A	552	94.055	86.754	4.083	1.00	48.64	C
	ATOM	4242	CB	SER	A	552	93.466	88.064	3.546	1.00	45.77	C
15	ATOM	4243	OG	SER	A	552	93.565	89.086	4.511	1.00	56.51	O
	ATOM	4244	C	SER	A	552	93.465	85.613	3.257	1.00	53.97	C
	ATOM	4245	O	SER	A	552	93.988	85.285	2.195	1.00	44.21	O
	ATOM	4246	N	ARG	A	553	92.400	84.997	3.776	1.00	58.75	N
	ATOM	4247	CA	ARG	A	553	91.395	84.310	2.946	1.00	62.60	C
20	ATOM	4248	CB	ARG	A	553	91.490	82.774	2.990	1.00	53.31	C
	ATOM	4249	CG	ARG	A	553	92.046	82.144	4.257	1.00	45.97	C
	ATOM	4250	CD	ARG	A	553	93.550	81.923	4.128	1.00	48.06	C
	ATOM	4251	NE	ARG	A	553	94.060	81.093	5.208	1.00	47.70	N
	ATOM	4252	CZ	ARG	A	553	95.283	80.574	5.267	1.00	48.46	C
25	ATOM	4253	NH1	ARG	A	553	96.176	80.798	4.300	1.00	43.23	N
	ATOM	4254	NH2	ARG	A	553	95.611	79.817	6.313	1.00	48.31	N
	ATOM	4255	C	ARG	A	553	90.001	84.766	3.376	1.00	77.50	C
	ATOM	4256	O	ARG	A	553	89.820	85.337	4.454	1.00	86.21	O
	ATOM	4257	OXT	ARG	A	553	89.021	84.582	2.656	1.00	87.66	O
30	ATOM	4258	CA	CA	A	600	70.802	57.236	35.062	1.00	15.98	CA
	ATOM	4259	CA	CA	A	601	63.208	65.968	29.650	1.00	13.29	CA
	ATOM	4260	CA	CA	A	602	67.621	77.498	10.597	1.00	9.99	CA
	ATOM	4680	CL	CL	A	603	72.381	53.223	16.908	1.00	13.61	CL
	ATOM	4674	O3	GOL	B	1	71.181	62.613	17.255	1.00	12.69	O
35	ATOM	4675	C3	GOL	B	1	70.059	63.246	16.665	1.00	15.67	C
	ATOM	4676	C2	GOL	B	1	68.954	62.285	16.286	1.00	21.27	C
	ATOM	4677	O2	GOL	B	1	69.488	61.026	15.941	1.00	26.24	O
	ATOM	4678	C1	GOL	B	1	68.041	62.832	15.191	1.00	22.45	C
	ATOM	4679	O1	GOL	B	1	67.264	61.777	14.630	1.00	26.00	O
40	ATOM	4681	O3	GOL	B	2	72.946	67.251	14.695	1.00	15.32	O
	ATOM	4682	C3	GOL	B	2	71.767	66.657	15.249	1.00	14.09	C
	ATOM	4683	C2	GOL	B	2	70.559	67.586	15.090	1.00	14.05	C
	ATOM	4684	O2	GOL	B	2	70.621	68.590	16.096	1.00	12.33	O
	ATOM	4685	C1	GOL	B	2	69.249	66.846	15.221	1.00	18.07	C
45	ATOM	4686	O1	GOL	B	2	69.023	66.062	14.039	1.00	17.82	O

	ATOM	4687	O3	GOL B	3	72.515	64.096	10.689	1.00	25.67	O
	ATOM	4688	C3	GOL C	4	73.467	64.963	11.307	1.00	26.15	C
	ATOM	4689	C2	GOL C	4	72.861	66.338	11.544	1.00	25.64	C
	ATOM	4690	O2	GOL C	4	73.851	67.096	12.249	1.00	19.50	O
5	ATOM	4691	C1	GOL C	4	72.435	67.029	10.241	1.00	22.26	C
	ATOM	4692	O1	GOL C	4	73.539	67.080	9.298	1.00	23.90	O
	ATOM	4261	O	HOH W	1	73.301	61.252	25.027	1.00	9.85	O
	ATOM	4262	O	HOH W	2	94.676	65.066	13.807	1.00	10.58	O
	ATOM	4263	O	HOH W	3	59.711	76.459	12.227	1.00	7.99	O
10	ATOM	4264	O	HOH W	4	98.238	68.392	15.962	1.00	11.94	O
	ATOM	4265	O	HOH W	5	97.088	65.408	16.506	1.00	11.85	O
	ATOM	4266	O	HOH W	6	62.085	65.925	13.108	1.00	16.04	O
	ATOM	4267	O	HOH W	7	73.920	61.551	37.146	1.00	15.54	O
	ATOM	4268	O	HOH W	8	77.168	50.157	33.169	1.00	15.21	O
15	ATOM	4269	O	HOH W	9	61.919	63.088	23.865	1.00	11.76	O
	ATOM	4270	O	HOH W	10	72.608	74.669	15.812	1.00	10.72	O
	ATOM	4271	O	HOH W	11	63.466	64.051	28.377	1.00	9.82	O
	ATOM	4272	O	HOH W	12	69.752	66.825	27.140	1.00	12.03	O
	ATOM	4273	O	HOH W	13	96.364	76.517	4.720	1.00	15.03	O
20	ATOM	4274	O	HOH W	14	114.715	68.298	11.096	1.00	13.68	O
	ATOM	4275	O	HOH W	15	97.437	71.403	15.360	1.00	10.85	O
	ATOM	4276	O	HOH W	16	77.509	58.818	30.992	1.00	10.02	O
	ATOM	4277	O	HOH W	17	90.586	69.226	5.708	1.00	12.97	O
	ATOM	4278	O	HOH W	18	68.221	64.485	27.002	1.00	15.33	O
25	ATOM	4279	O	HOH W	19	80.372	45.787	14.915	1.00	13.14	O
	ATOM	4280	O	HOH W	20	89.056	64.621	10.452	1.00	13.00	O
	ATOM	4281	O	HOH W	21	71.497	52.451	19.773	1.00	9.03	O
	ATOM	4282	O	HOH W	22	87.363	68.955	0.376	1.00	15.62	O
	ATOM	4283	O	HOH W	23	88.823	64.449	1.620	1.00	17.84	O
30	ATOM	4284	O	HOH W	24	56.279	65.027	11.407	1.00	19.72	O
	ATOM	4285	O	HOH W	25	87.136	52.751	3.189	1.00	17.97	O
	ATOM	4286	O	HOH W	26	69.509	54.464	17.311	1.00	13.33	O
	ATOM	4287	O	HOH W	27	82.485	70.854	9.739	1.00	9.26	O
	ATOM	4288	O	HOH W	28	72.417	49.514	23.793	1.00	10.68	O
35	ATOM	4289	O	HOH W	29	75.569	72.013	9.882	1.00	7.94	O
	ATOM	4290	O	HOH W	30	61.004	77.739	8.577	1.00	10.78	O
	ATOM	4291	O	HOH W	31	96.117	69.727	1.018	1.00	16.27	O
	ATOM	4292	O	HOH W	32	74.350	72.855	37.663	1.00	26.67	O
	ATOM	4293	O	HOH W	33	63.557	56.952	14.842	1.00	22.65	O
40	ATOM	4294	O	HOH W	34	87.254	72.718	−1.207	1.00	18.26	O
	ATOM	4295	O	HOH W	35	63.640	78.182	7.997	1.00	12.81	O
	ATOM	4296	O	HOH W	36	85.296	51.423	5.220	1.00	14.66	O
	ATOM	4297	O	HOH W	37	97.165	53.677	18.048	1.00	10.53	O
	ATOM	4298	O	HOH W	38	64.992	73.401	11.693	1.00	8.79	O
45	ATOM	4299	O	HOH W	39	101.191	51.144	16.856	1.00	15.00	O

	ATOM	4300	O	HOH	W	40	75.284	85.427	6.931	1.00	17.36	O
	ATOM	4301	O	HOH	W	41	101.467	75.016	7.535	1.00	10.33	O
	ATOM	4302	O	HOH	W	42	72.548	75.644	-0.400	1.00	10.93	O
	ATOM	4303	O	HOH	W	43	61.115	84.329	10.013	1.00	12.37	O
5	ATOM	4304	O	HOH	W	44	69.051	57.185	17.220	1.00	11.51	O
	ATOM	4305	O	HOH	W	45	73.187	63.785	15.880	1.00	11.17	O
	ATOM	4306	O	HOH	W	46	65.091	72.566	4.534	1.00	7.86	O
	ATOM	4307	O	HOH	W	47	57.598	82.971	20.246	1.00	17.55	O
	ATOM	4308	O	HOH	W	48	74.831	78.095	6.016	1.00	23.98	O
10	ATOM	4309	O	HOH	W	49	94.448	64.970	10.381	1.00	53.92	O
	ATOM	4310	O	HOH	W	50	68.059	48.033	21.658	1.00	14.51	O
	ATOM	4311	O	HOH	W	51	69.864	50.679	30.531	1.00	23.84	O
	ATOM	4312	O	HOH	W	52	101.668	62.523	28.476	1.00	16.04	O
	ATOM	4313	O	HOH	W	53	60.457	82.754	8.003	1.00	10.43	O
15	ATOM	4314	O	HOH	W	54	98.841	70.632	2.293	1.00	18.12	O
	ATOM	4315	O	HOH	W	55	67.848	79.785	10.036	1.00	9.14	O
	ATOM	4316	O	HOH	W	56	74.745	56.274	10.581	1.00	18.03	O
	ATOM	4317	O	HOH	W	57	107.555	65.751	24.148	1.00	17.39	O
	ATOM	4318	O	HOH	W	58	81.728	45.851	19.575	1.00	20.99	O
20	ATOM	4319	O	HOH	W	59	74.805	89.197	26.239	1.00	32.84	O
	ATOM	4320	O	HOH	W	60	78.732	79.384	5.490	1.00	19.88	O
	ATOM	4321	O	HOH	W	61	99.553	53.549	-2.727	1.00	19.88	O
	ATOM	4322	O	HOH	W	62	94.758	52.611	18.965	1.00	11.05	O
	ATOM	4323	O	HOH	W	63	67.287	76.740	8.446	1.00	11.29	O
25	ATOM	4324	O	HOH	W	64	83.036	49.847	4.981	1.00	34.91	O
	ATOM	4325	O	HOH	W	65	87.761	78.169	25.477	1.00	13.59	O
	ATOM	4326	O	HOH	W	66	121.197	67.660	19.855	1.00	22.88	O
	ATOM	4327	O	HOH	W	67	68.256	60.005	12.705	1.00	15.28	O
	ATOM	4328	O	HOH	W	68	67.303	78.440	12.806	1.00	8.06	O
30	ATOM	4329	O	HOH	W	69	66.845	79.531	-1.065	1.00	11.75	O
	ATOM	4330	O	HOH	W	70	55.069	60.199	32.523	1.00	23.75	O
	ATOM	4331	O	HOH	W	71	74.053	46.715	12.581	1.00	15.95	O
	ATOM	4332	O	HOH	W	72	105.148	61.097	-0.647	1.00	17.00	O
	ATOM	4333	O	HOH	W	73	64.494	84.335	9.317	1.00	12.26	O
35	ATOM	4334	O	HOH	W	74	100.602	53.757	19.330	1.00	10.19	O
	ATOM	4335	O	HOH	W	75	67.110	83.095	1.371	1.00	20.23	O
	ATOM	4336	O	HOH	W	76	103.582	73.620	6.383	1.00	13.21	O
	ATOM	4337	O	HOH	W	77	63.044	58.060	30.204	1.00	10.84	O
	ATOM	4338	O	HOH	W	78	83.815	86.086	17.713	1.00	20.16	O
40	ATOM	4339	O	HOH	W	79	123.110	58.293	10.793	1.00	22.58	O
	ATOM	4340	O	HOH	W	80	90.442	77.202	11.004	1.00	12.85	O
	ATOM	4341	O	HOH	W	81	57.217	86.597	21.382	1.00	23.04	O
	ATOM	4342	O	HOH	W	82	53.312	61.917	29.205	1.00	18.81	O
	ATOM	4343	O	HOH	W	83	111.915	70.094	23.094	1.00	25.06	O
45	ATOM	4344	O	HOH	W	84	89.625	78.270	13.483	1.00	18.96	O

	ATOM	4345	O	HOH W	85	96.516	63.335	23.952	1.00 14.76	O
	ATOM	4346	O	HOH W	86	58.334	56.896	7.380	1.00 27.79	O
	ATOM	4347	O	HOH W	87	99.460	74.622	25.157	1.00 22.95	O
	ATOM	4348	O	HOH W	88	104.112	48.169	5.268	1.00 18.97	O
5	ATOM	4349	O	HOH W	89	99.458	68.003	1.873	1.00 15.08	O
	ATOM	4350	O	HOH W	90	88.400	80.289	2.682	1.00 17.29	O
	ATOM	4351	O	HOH W	91	75.965	70.423	4.608	1.00 14.51	O
	ATOM	4352	O	HOH W	92	53.399	62.729	10.490	1.00 24.51	O
	ATOM	4353	O	HOH W	93	68.022	85.521	7.670	1.00 17.66	O
10	ATOM	4354	O	HOH W	94	105.909	78.173	24.075	1.00 26.48	O
	ATOM	4355	O	HOH W	95	101.655	73.227	23.203	1.00 23.79	O
	ATOM	4356	O	HOH W	96	103.701	50.954	0.929	1.00 23.11	O
	ATOM	4357	O	HOH W	97	59.352	53.719	26.555	1.00 23.04	O
	ATOM	4358	O	HOH W	98	101.037	80.238	12.096	1.00 14.80	O
15	ATOM	4359	O	HOH W	99	104.659	69.936	3.574	1.00 14.04	O
	ATOM	4360	O	HOH W	100	103.458	57.078	25.658	1.00 18.60	O
	ATOM	4361	O	HOH W	101	53.805	58.863	12.913	1.00 19.64	O
	ATOM	4362	O	HOH W	102	99.745	78.300	10.665	1.00 14.90	O
	ATOM	4363	O	HOH W	103	77.791	89.583	25.879	1.00 23.54	O
20	ATOM	4364	O	HOH W	104	67.035	91.326	12.980	1.00 13.78	O
	ATOM	4365	O	HOH W	105	98.933	81.009	13.428	1.00 19.24	O
	ATOM	4366	O	HOH W	106	75.580	70.650	7.511	1.00 11.53	O
	ATOM	4367	O	HOH W	107	59.161	75.386	2.056	1.00 24.13	O
	ATOM	4368	O	HOH W	108	66.095	86.539	5.769	1.00 49.22	O
25	ATOM	4369	O	HOH W	109	70.790	48.831	21.889	1.00 17.12	O
	ATOM	4370	O	HOH W	110	97.251	66.013	23.525	1.00 13.20	O
	ATOM	4371	O	HOH W	111	90.643	65.822	0.466	1.00 17.40	O
	ATOM	4372	O	HOH W	112	77.830	47.523	31.224	1.00 18.87	O
	ATOM	4373	O	HOH W	113	75.241	65.944	15.456	1.00 9.63	O
30	ATOM	4374	O	HOH W	114	60.785	50.522	27.718	1.00 31.80	O
	ATOM	4375	O	HOH W	115	64.668	86.557	24.982	1.00 23.71	O
	ATOM	4376	O	HOH W	116	101.098	77.558	8.202	1.00 22.22	O
	ATOM	4377	O	HOH W	117	106.242	44.285	12.903	1.00 21.32	O
	ATOM	4378	O	HOH W	118	123.211	57.118	17.184	1.00 30.89	O
35	ATOM	4379	O	HOH W	119	49.666	66.238	12.695	1.00 21.19	O
	ATOM	4380	O	HOH W	120	71.195	75.320	36.843	1.00 25.49	O
	ATOM	4381	O	HOH W	121	81.772	73.968	38.012	1.00 18.19	O
	ATOM	4382	O	HOH W	122	106.975	54.241	19.306	1.00 35.36	O
	ATOM	4383	O	HOH W	123	95.547	54.279	−2.956	1.00 27.88	O
40	ATOM	4384	O	HOH W	124	87.005	79.057	18.173	1.00 14.23	O
	ATOM	4385	O	HOH W	125	79.393	54.321	37.906	1.00 37.60	O
	ATOM	4386	O	HOH W	126	94.507	47.383	26.763	1.00 23.32	O
	ATOM	4387	O	HOH W	127	84.879	52.791	7.568	1.00 17.75	O
	ATOM	4388	O	HOH W	128	55.781	62.401	29.883	1.00 18.64	O
45	ATOM	4389	O	HOH W	129	110.793	64.343	1.131	1.00 31.33	O

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      ATOM   4390   O   HOH W 130    74.853  47.091  10.115  1.00 25.36        O
      ATOM   4391   O   HOH W 131    68.626  48.003  15.032  1.00 19.30        O
      ATOM   4392   O   HOH W 132    52.375  86.184  10.402  1.00 20.12        O
      ATOM   4393   O   HOH W 133    61.832  62.184  10.783  1.00 14.63        O
   5  ATOM   4394   O   HOH W 134    59.866  87.352  20.211  1.00 18.08        O
      ATOM   4395   O   HOH W 135    53.092  75.022  28.267  1.00 29.34        O
      ATOM   4396   O   HOH W 136    71.633  51.059  32.204  1.00 27.11        O
      ATOM   4397   O   HOH W 137    65.108  44.264  19.073  1.00 15.72        O
      ATOM   4398   O   HOH W 138    94.400  49.865  27.884  1.00 30.99        O
  10  ATOM   4399   O   HOH W 139    50.035  63.741  26.686  1.00 25.35        O
      ATOM   4400   O   HOH W 140    46.992  72.601  19.528  1.00 23.56        O
      ATOM   4401   O   HOH W 141    58.833  62.898  33.585  1.00 24.60        O
      ATOM   4402   O   HOH W 142    44.590  64.528  17.631  1.00 22.37        O
      ATOM   4403   O   HOH W 143   111.934  67.262  22.863  1.00 21.36        O
  15  ATOM   4404   O   HOH W 144   120.388  70.373  16.578  1.00 14.72        O
      ATOM   4405   O   HOH W 145    79.376  74.934   5.640  1.00 26.11        O
      ATOM   4406   O   HOH W 146    90.390  44.528  20.624  1.00 19.00        O
      ATOM   4407   O   HOH W 147    76.952  72.281   2.898  1.00 17.25        O
      ATOM   4408   O   HOH W 148    62.874  55.052  36.871  1.00 21.58        O
  20  ATOM   4409   O   HOH W 149   109.178  61.001   0.007  0.50 12.71        O
      ATOM   4410   O   HOH W 150    56.846  65.884  26.764  1.00 16.72        O
      ATOM   4411   O   HOH W 151    71.021  82.380  33.675  1.00 35.41        O
      ATOM   4412   O   HOH W 152    87.683  55.474  36.044  1.00 25.03        O
      ATOM   4413   O   HOH W 153   123.483  60.711   3.281  1.00 21.36        O
  25  ATOM   4414   O   HOH W 154   120.007  74.411  17.561  1.00 23.51        O
      ATOM   4415   O   HOH W 155   104.565  50.945  16.980  1.00 26.60        O
      ATOM   4416   O   HOH W 156    50.788  68.696  12.297  1.00 13.87        O
      ATOM   4417   O   HOH W 157    64.965  81.214   5.914  1.00 19.59        O
      ATOM   4418   O   HOH W 158    77.322  74.978   4.042  1.00 30.33        O
  30  ATOM   4419   O   HOH W 159    90.308  65.171  -2.317  1.00 25.76        O
      ATOM   4420   O   HOH W 160    60.365  48.834  20.546  0.50 16.06        O
      ATOM   4421   O   HOH W 161   106.038  63.576  23.717  1.00 17.05        O
      ATOM   4422   O   HOH W 162    72.774  83.675  31.704  1.00 24.11        O
      ATOM   4423   O   HOH W 163   115.099  80.456  11.855  1.00 21.57        O
  35  ATOM   4424   O   HOH W 164    83.838  59.796   3.811  1.00 32.77        O
      ATOM   4425   O   HOH W 165    96.519  81.214   9.486  1.00 24.49        O
      ATOM   4426   O   HOH W 166   110.093  46.455  13.328  1.00 25.75        O
      ATOM   4427   O   HOH W 167    88.789  80.875  13.101  1.00 22.74        O
      ATOM   4428   O   HOH W 168    93.993  42.594  18.292  1.00 35.15        O
  40  ATOM   4429   O   HOH W 169   114.470  62.504   3.385  1.00 17.97        O
      ATOM   4430   O   HOH W 170    78.601  75.108  -3.396  1.00 18.66        O
      ATOM   4431   O   HOH W 171    93.427  74.507  26.479  1.00 18.67        O
      ATOM   4432   O   HOH W 172    97.843  81.288  16.078  1.00 23.16        O
      ATOM   4433   O   HOH W 173    54.469  71.301  27.298  1.00 15.33        O
  45  ATOM   4434   O   HOH W 174    93.660  76.333   5.563  1.00 17.81        O
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	ATOM	4435	O	HOH	W	175	84.853	68.817	-2.631	1.00	22.36	O
	ATOM	4436	O	HOH	W	176	121.180	70.239	19.170	1.00	29.32	O
	ATOM	4437	O	HOH	W	177	108.298	83.418	12.138	1.00	25.06	O
	ATOM	4438	O	HOH	W	178	83.712	78.028	32.000	1.00	20.46	O
5	ATOM	4439	O	HOH	W	179	67.141	81.712	7.552	1.00	21.89	O
	ATOM	4440	O	HOH	W	180	62.541	68.408	33.461	1.00	29.28	O
	ATOM	4441	O	HOH	W	181	65.408	70.134	3.389	1.00	27.44	O
	ATOM	4442	O	HOH	W	182	113.444	63.788	0.119	1.00	33.32	O
	ATOM	4443	O	HOH	W	183	99.202	79.019	23.664	1.00	33.88	O
10	ATOM	4444	O	HOH	W	184	81.811	56.321	8.309	1.00	18.01	O
	ATOM	4445	O	HOH	W	185	104.695	48.686	1.991	1.00	29.99	O
	ATOM	4446	O	HOH	W	186	91.166	47.945	8.668	1.00	22.78	O
	ATOM	4447	O	HOH	W	187	76.861	76.447	-1.977	1.00	29.90	O
	ATOM	4448	O	HOH	W	188	96.399	56.342	-4.528	1.00	36.18	O
15	ATOM	4449	O	HOH	W	189	121.474	73.020	15.923	1.00	25.26	O
	ATOM	4450	O	HOH	W	190	75.992	79.362	8.074	1.00	15.32	O
	ATOM	4451	O	HOH	W	191	54.002	55.741	33.109	1.00	27.06	O
	ATOM	4452	O	HOH	W	192	57.016	67.916	7.091	1.00	27.85	O
	ATOM	4453	O	HOH	W	193	65.809	67.983	6.395	1.00	26.22	O
20	ATOM	4454	O	HOH	W	194	66.750	47.235	25.205	1.00	21.34	O
	ATOM	4455	O	HOH	W	195	95.184	73.954	0.422	1.00	22.08	O
	ATOM	4456	O	HOH	W	196	75.333	75.333	-0.000	0.50	13.56	O
	ATOM	4457	O	HOH	W	197	81.217	56.678	3.652	1.00	37.14	O
	ATOM	4458	O	HOH	W	198	125.030	60.203	11.952	1.00	17.94	O
25	ATOM	4459	O	HOH	W	199	76.598	89.434	12.516	1.00	22.60	O
	ATOM	4460	O	HOH	W	200	112.635	73.309	24.326	1.00	20.41	O
	ATOM	4461	O	HOH	W	201	84.628	74.145	37.911	1.00	29.11	O
	ATOM	4462	O	HOH	W	202	72.195	61.400	12.843	1.00	21.93	O
	ATOM	4463	O	HOH	W	203	102.947	60.372	-2.389	1.00	19.32	O
30	ATOM	4464	O	HOH	W	204	82.537	67.759	41.630	1.00	21.13	O
	ATOM	4465	O	HOH	W	205	69.650	90.264	20.249	1.00	25.92	O
	ATOM	4466	O	HOH	W	206	75.713	82.524	5.830	1.00	19.46	O
	ATOM	4467	O	HOH	W	207	47.260	68.787	16.787	1.00	23.79	O
	ATOM	4468	O	HOH	W	208	57.044	54.098	29.348	1.00	27.99	O
35	ATOM	4469	O	HOH	W	209	101.703	64.874	29.441	1.00	35.49	O
	ATOM	4470	O	HOH	W	210	87.050	58.665	37.767	1.00	28.29	O
	ATOM	4471	O	HOH	W	211	84.684	88.336	19.151	1.00	28.61	O
	ATOM	4472	O	HOH	W	212	73.249	79.393	37.007	1.00	36.47	O
	ATOM	4473	O	HOH	W	213	59.038	83.563	5.692	1.00	35.37	O
40	ATOM	4474	O	HOH	W	214	67.372	56.095	9.127	1.00	31.02	O
	ATOM	4475	O	HOH	W	215	83.573	74.823	-2.801	1.00	19.22	O
	ATOM	4476	O	HOH	W	216	68.447	47.207	26.924	1.00	42.51	O
	ATOM	4477	O	HOH	W	217	81.010	91.223	14.982	1.00	30.59	O
	ATOM	4478	O	HOH	W	218	87.303	68.371	-2.354	1.00	27.16	O
45	ATOM	4479	O	HOH	W	219	110.154	50.325	17.049	1.00	47.88	O

	ATOM	4480	O	HOH	W	220	60.787	73.335	−1.445	1.00 24.21	O
	ATOM	4481	O	HOH	W	221	123.179	57.853	6.627	1.00 26.28	O
	ATOM	4482	O	HOH	W	222	50.620	61.766	13.066	1.00 28.43	O
	ATOM	4483	O	HOH	W	223	94.515	48.871	−1.271	1.00 39.99	O
5	ATOM	4484	O	HOH	W	224	65.325	42.750	11.974	1.00 26.08	O
	ATOM	4485	O	HOH	W	225	90.620	42.752	14.084	1.00 28.44	O
	ATOM	4486	O	HOH	W	226	97.230	50.969	1.379	1.00 26.27	O
	ATOM	4487	O	HOH	W	227	87.263	60.639	−1.472	1.00 22.95	O
	ATOM	4488	O	HOH	W	228	71.204	48.313	26.160	1.00 37.66	O
10	ATOM	4489	O	HOH	W	229	47.164	73.476	16.870	1.00 27.02	O
	ATOM	4490	O	HOH	W	230	57.026	82.251	5.185	1.00 35.48	O
	ATOM	4491	O	HOH	W	231	121.634	72.538	11.669	1.00 22.09	O
	ATOM	4492	O	HOH	W	232	63.830	58.417	37.824	1.00 22.78	O
	ATOM	4493	O	HOH	W	233	109.779	64.696	25.610	1.00 27.71	O
15	ATOM	4494	O	HOH	W	234	127.112	62.797	3.298	1.00 21.77	O
	ATOM	4495	O	HOH	W	235	92.909	70.007	29.855	1.00 19.69	O
	ATOM	4496	O	HOH	W	236	53.860	79.833	30.827	1.00 25.84	O
	ATOM	4497	O	HOH	W	237	76.482	90.500	18.681	1.00 25.12	O
	ATOM	4498	O	HOH	W	238	90.052	68.736	1.081	1.00 19.11	O
20	ATOM	4499	O	HOH	W	239	86.447	86.342	17.699	1.00 49.63	O
	ATOM	4500	O	HOH	W	240	96.085	44.177	17.449	1.00 42.22	O
	ATOM	4501	O	HOH	W	241	66.922	49.221	7.857	1.00 47.05	O
	ATOM	4502	O	HOH	W	242	106.498	61.383	25.442	1.00 28.21	O
	ATOM	4503	O	HOH	W	243	100.486	45.422	4.123	1.00 27.75	O
25	ATOM	4504	O	HOH	W	244	58.307	51.452	28.048	1.00 35.59	O
	ATOM	4505	O	HOH	W	245	85.984	79.272	1.854	1.00 26.64	O
	ATOM	4506	O	HOH	W	246	84.234	69.367	−5.526	1.00 29.58	O
	ATOM	4507	O	HOH	W	247	87.115	52.747	35.439	1.00 34.73	O
	ATOM	4508	O	HOH	W	248	70.792	87.469	26.838	1.00 26.97	O
30	ATOM	4509	O	HOH	W	249	96.459	49.952	5.974	1.00 21.53	O
	ATOM	4510	O	HOH	W	250	47.767	70.550	13.770	1.00 29.95	O
	ATOM	4511	O	HOH	W	251	86.560	73.668	39.293	1.00 47.51	O
	ATOM	4512	O	HOH	W	252	45.832	61.785	15.244	1.00 21.66	O
	ATOM	4513	O	HOH	W	253	108.580	44.328	14.260	1.00 35.28	O
35	ATOM	4514	O	HOH	W	254	95.902	46.926	2.969	1.00 34.16	O
	ATOM	4515	O	HOH	W	255	56.550	63.161	32.245	1.00 37.13	O
	ATOM	4516	O	HOH	W	256	60.187	76.165	−0.446	1.00 35.06	O
	ATOM	4517	O	HOH	W	257	72.684	70.326	36.840	1.00 25.08	O
	ATOM	4518	O	HOH	W	258	54.750	60.357	10.750	1.00 18.22	O
40	ATOM	4519	O	HOH	W	259	52.763	72.610	5.100	1.00 50.83	O
	ATOM	4520	O	HOH	W	260	117.089	79.182	5.585	1.00 22.93	O
	ATOM	4521	O	HOH	W	261	103.172	74.524	24.878	1.00 41.61	O
	ATOM	4522	O	HOH	W	262	72.037	43.960	19.954	1.00 26.38	O
	ATOM	4523	O	HOH	W	263	79.804	50.175	7.642	1.00 31.24	O
45	ATOM	4524	O	HOH	W	264	84.826	46.412	11.054	1.00 32.09	O

	ATOM	4525	O	HOH W 265	98.104	77.912	6.547	1.00 30.32	O
	ATOM	4526	O	HOH W 266	62.993	82.801	7.209	1.00 17.64	O
	ATOM	4527	O	HOH W 267	67.160	45.671	23.036	1.00 17.48	O
	ATOM	4528	O	HOH W 268	88.333	80.250	27.199	1.00 21.70	O
5	ATOM	4529	O	HOH W 269	65.119	65.664	5.972	1.00 42.90	O
	ATOM	4530	O	HOH W 270	97.353	78.743	9.238	1.00 21.99	O
	ATOM	4531	O	HOH W 271	73.949	91.306	18.938	1.00 36.21	O
	ATOM	4532	O	HOH W 272	91.649	76.339	26.681	1.00 22.47	O
	ATOM	4533	O	HOH W 273	69.562	90.168	17.110	1.00 32.94	O
10	ATOM	4534	O	HOH W 274	125.965	68.961	22.198	1.00 53.30	O
	ATOM	4535	O	HOH W 275	89.524	60.937	-4.011	1.00 36.66	O
	ATOM	4536	O	HOH W 276	73.712	71.887	25.613	1.00 11.78	O
	ATOM	4537	O	HOH W 277	71.697	72.645	23.573	1.00 11.89	O
	ATOM	4538	O	HOH W 278	69.689	71.131	22.527	1.00 9.20	O
15	ATOM	4539	O	HOH W 279	67.801	71.824	20.327	1.00 11.05	O
	ATOM	4540	O	HOH W 280	83.110	63.463	16.520	1.00 14.63	O
	ATOM	4541	O	HOH W 281	84.730	61.296	16.825	1.00 13.02	O
	ATOM	4542	O	HOH W 282	82.330	64.752	14.305	1.00 11.14	O
	ATOM	4543	O	HOH W 283	79.849	65.958	14.376	1.00 12.95	O
20	ATOM	4544	O	HOH W 284	77.982	64.918	12.545	1.00 9.14	O
	ATOM	4545	O	HOH W 285	87.321	60.005	15.505	1.00 10.28	O
	ATOM	4546	O	HOH W 286	86.315	57.787	16.752	1.00 7.53	O
	ATOM	4547	O	HOH W 287	84.249	54.156	16.640	1.00 12.46	O
	ATOM	4548	O	HOH W 288	84.416	51.453	16.932	1.00 13.71	O
25	ATOM	4549	O	HOH W 289	54.396	71.736	18.322	1.00 9.78	O
	ATOM	4550	O	HOH W 290	53.429	69.712	19.975	1.00 14.49	O
	ATOM	4551	O	HOH W 291	60.518	74.256	19.629	1.00 12.46	O
	ATOM	4552	O	HOH W 292	61.215	72.779	21.734	1.00 10.28	O
	ATOM	4553	O	HOH W 293	73.011	64.617	26.681	1.00 11.58	O
30	ATOM	4554	O	HOH W 294	70.799	63.140	27.201	1.00 11.06	O
	ATOM	4555	O	HOH W 295	75.251	65.494	28.347	1.00 10.71	O
	ATOM	4556	O	HOH W 296	70.115	59.305	30.735	1.00 16.03	O
	ATOM	4557	O	HOH W 297	69.647	58.706	33.452	1.00 10.27	O
	ATOM	4558	O	HOH W 298	99.000	55.080	10.817	1.00 11.69	O
35	ATOM	4559	O	HOH W 299	100.425	53.056	12.524	1.00 12.45	O
	ATOM	4560	O	HOH W 300	66.242	65.428	14.776	1.00 16.43	O
	ATOM	4561	O	HOH W 301	81.405	80.063	12.880	1.00 12.57	O
	ATOM	4562	O	HOH W 302	79.412	80.396	11.081	1.00 10.27	O
	ATOM	4563	O	HOH W 303	68.824	60.209	41.465	1.00 31.92	O
40	ATOM	4564	O	HOH W 304	59.552	55.604	29.512	1.00 17.67	O
	ATOM	4565	O	HOH W 305	60.083	55.562	36.754	1.00 33.95	O
	ATOM	4566	O	HOH W 306	69.237	44.346	23.441	1.00 24.40	O
	ATOM	4567	O	HOH W 307	69.770	40.875	12.372	1.00 26.72	O
	ATOM	4568	O	HOH W 308	95.206	62.760	30.095	1.00 25.02	O
45	ATOM	4569	O	HOH W 309	95.950	59.484	34.012	1.00 27.04	O

	ATOM	4570	O	HOH W 310	56.711	66.265	31.461	1.00 30.50	O
	ATOM	4571	O	HOH W 311	55.298	65.451	28.963	1.00 25.06	O
	ATOM	4572	O	HOH W 312	90.647	71.911	33.467	1.00 23.47	O
	ATOM	4573	O	HOH W 313	50.077	73.625	22.368	1.00 19.98	O
5	ATOM	4574	O	HOH W 314	49.389	72.201	24.596	1.00 35.15	O
	ATOM	4575	O	HOH W 315	58.934	84.452	11.723	1.00 22.56	O
	ATOM	4576	O	HOH W 316	69.713	73.707	−3.172	1.00 14.53	O
	ATOM	4577	O	HOH W 317	71.077	73.328	−0.554	1.00 16.15	O
	ATOM	4578	O	HOH W 318	64.017	79.240	0.019	1.00 26.81	O
10	ATOM	4579	O	HOH W 319	79.020	83.776	31.548	1.00 29.75	O
	ATOM	4580	O	HOH W 320	85.533	76.663	33.378	1.00 30.19	O
	ATOM	4581	O	HOH W 321	73.452	69.182	7.589	1.00 17.09	O
	ATOM	4582	O	HOH W 322	71.448	86.128	10.831	1.00 19.34	O
	ATOM	4583	O	HOH W 323	83.503	89.728	21.490	1.00 22.84	O
15	ATOM	4584	O	HOH W 324	87.715	86.894	21.851	1.00 23.54	O
	ATOM	4585	O	HOH W 325	79.121	60.500	5.937	1.00 27.41	O
	ATOM	4586	O	HOH W 326	86.368	65.385	0.562	1.00 27.35	O
	ATOM	4587	O	HOH W 327	95.444	50.430	8.518	1.00 15.26	O
	ATOM	4588	O	HOH W 328	94.301	57.944	−3.286	1.00 29.04	O
20	ATOM	4589	O	HOH W 329	116.537	52.721	3.638	1.00 27.13	O
	ATOM	4590	O	HOH W 330	76.275	59.378	7.337	1.00 40.19	O
	ATOM	4591	O	HOH W 331	70.747	63.822	13.042	1.00 28.63	O
	ATOM	4592	O	HOH W 332	84.440	47.986	34.116	1.00 18.43	O
	ATOM	4593	O	HOH W 333	83.154	43.293	29.434	1.00 25.96	O
25	ATOM	4594	O	HOH W 334	98.697	47.505	21.570	1.00 27.02	O
	ATOM	4595	O	HOH W 335	102.772	52.282	20.064	1.00 32.70	O
	ATOM	4596	O	HOH W 336	110.632	58.836	4.205	1.00 26.47	O
	ATOM	4597	O	HOH W 337	111.849	61.745	3.152	1.00 44.94	O
	ATOM	4598	O	HOH W 338	101.125	49.787	−0.988	1.00 33.96	O
30	ATOM	4599	O	HOH W 339	117.159	66.545	21.836	1.00 21.84	O
	ATOM	4600	O	HOH W 340	120.244	56.609	12.191	1.00 23.32	O
	ATOM	4601	O	HOH W 341	115.170	51.278	14.257	1.00 30.44	O
	ATOM	4602	O	HOH W 342	111.491	80.833	3.165	1.00 29.82	O
	ATOM	4603	O	HOH W 343	101.953	82.610	10.773	1.00 25.43	O
35	ATOM	4604	O	HOH W 344	46.011	67.990	20.238	1.00 19.80	O
	ATOM	4605	O	HOH W 345	115.554	79.243	14.726	1.00 22.39	O
	ATOM	4606	O	HOH W 346	87.673	44.927	20.726	1.00 20.86	O
	ATOM	4607	O	HOH W 347	57.443	78.585	2.560	1.00 23.83	O
	ATOM	4608	O	HOH W 348	60.383	74.826	31.955	1.00 23.36	O
40	ATOM	4609	O	HOH W 349	108.102	83.941	7.708	1.00 25.74	O
	ATOM	4610	O	HOH W 350	86.983	47.544	34.355	1.00 26.63	O
	ATOM	4611	O	HOH W 351	82.239	52.554	8.350	1.00 23.73	O
	ATOM	4612	O	HOH W 352	79.115	47.275	26.274	1.00 27.40	O
	ATOM	4613	O	HOH W 353	50.652	70.037	24.709	1.00 25.78	O
45	ATOM	4614	O	HOH W 354	114.054	65.476	22.808	1.00 25.31	O

	ATOM	4615	O	HOH W 355	111.136	48.957	4.228	1.00	26.53	O
	ATOM	4616	O	HOH W 356	104.951	81.706	2.014	1.00	23.31	O
	ATOM	4617	O	HOH W 357	117.608	69.017	3.208	1.00	26.80	O
	ATOM	4618	O	HOH W 358	60.255	54.205	15.233	1.00	21.92	O
5	ATOM	4619	O	HOH W 359	125.742	61.809	20.938	1.00	23.68	O
	ATOM	4620	O	HOH W 360	71.318	45.857	21.866	1.00	28.16	O
	ATOM	4621	O	HOH W 361	64.336	48.484	29.783	1.00	25.84	O
	ATOM	4622	O	HOH W 362	64.410	70.021	33.218	1.00	28.32	O
	ATOM	4623	O	HOH W 363	99.662	51.728	26.853	1.00	25.37	O
10	ATOM	4624	O	HOH W 364	57.619	85.004	23.472	1.00	26.78	O
	ATOM	4625	O	HOH W 365	109.513	85.026	14.107	1.00	31.48	O
	ATOM	4626	O	HOH W 366	71.356	78.874	7.358	1.00	27.32	O
	ATOM	4627	O	HOH W 367	56.265	89.128	21.290	1.00	31.78	O
	ATOM	4628	O	HOH W 368	115.927	67.059	-0.659	1.00	28.23	O
15	ATOM	4629	O	HOH W 369	86.347	87.208	6.215	1.00	28.36	O
	ATOM	4630	O	HOH W 370	100.399	47.343	16.164	1.00	28.80	O
	ATOM	4631	O	HOH W 371	125.082	66.017	15.408	1.00	29.06	O
	ATOM	4632	O	HOH W 372	106.891	75.678	3.454	1.00	25.59	O
	ATOM	4633	O	HOH W 373	88.447	43.131	24.920	1.00	29.14	O
20	ATOM	4634	O	HOH W 374	48.419	79.853	13.172	1.00	26.52	O
	ATOM	4635	O	HOH W 375	47.642	75.779	22.363	1.00	34.45	O
	ATOM	4636	O	HOH W 376	114.861	82.439	9.087	1.00	35.35	O
	ATOM	4637	O	HOH W 377	74.958	81.956	35.600	1.00	28.35	O
	ATOM	4638	O	HOH W 378	111.202	79.501	1.078	1.00	32.07	O
25	ATOM	4639	O	HOH W 379	97.594	63.105	29.216	1.00	30.45	O
	ATOM	4640	O	HOH W 380	89.237	84.051	11.598	1.00	28.28	O
	ATOM	4641	O	HOH W 381	97.163	60.858	31.713	1.00	37.20	O
	ATOM	4642	O	HOH W 382	111.105	76.736	1.164	1.00	37.60	O
	ATOM	4643	O	HOH W 383	89.108	80.551	20.138	1.00	31.32	O
30	ATOM	4644	O	HOH W 384	109.208	54.650	0.012	0.50	20.78	O
	ATOM	4645	O	HOH W 385	56.533	53.431	9.966	1.00	29.03	O
	ATOM	4646	O	HOH W 386	70.988	87.241	12.976	1.00	30.02	O
	ATOM	4647	O	HOH W 387	59.625	58.605	35.175	1.00	33.71	O
	ATOM	4648	O	HOH W 388	86.544	43.124	22.806	1.00	33.84	O
35	ATOM	4649	O	HOH W 389	87.274	64.588	39.751	1.00	33.06	O
	ATOM	4650	O	HOH W 390	72.877	87.061	6.624	1.00	32.33	O
	ATOM	4651	O	HOH W 391	71.897	80.278	5.628	1.00	26.70	O
	ATOM	4652	O	HOH W 392	69.516	42.838	9.000	1.00	32.63	O
	ATOM	4653	O	HOH W 393	109.629	83.070	9.904	1.00	30.86	O
40	ATOM	4654	O	HOH W 394	78.125	92.023	24.704	1.00	30.52	O
	ATOM	4655	O	HOH W 395	78.953	91.893	22.367	1.00	27.36	O
	ATOM	4656	O	HOH W 396	77.655	92.424	20.194	1.00	27.78	O
	ATOM	4657	O	HOH W 397	95.558	64.394	32.011	1.00	41.48	O
	ATOM	4658	O	HOH W 398	68.942	73.097	35.691	1.00	31.00	O
45	ATOM	4659	O	HOH W 399	123.235	58.210	19.901	1.00	37.19	O

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     ATOM   4660  O   HOH W 400     81.026  75.783  39.765  1.00 33.48          O
     ATOM   4661  O   HOH W 401     89.218  44.167  31.825  1.00 29.29          O
     ATOM   4662  O   HOH W 402     75.739  46.600  22.208  1.00 32.70          O
     ATOM   4663  O   HOH W 403     93.604  58.674  35.287  1.00 33.41          O
  5  ATOM   4664  O   HOH W 404    114.143  53.316   2.795  1.00 36.89          O
     ATOM   4665  O   HOH W 405     62.314  77.901  -1.690  1.00 31.79          O
     ATOM   4666  O   HOH W 406    119.132  74.672  20.486  1.00 38.01          O
     ATOM   4667  O   HOH W 407     89.827  72.251  40.058  1.00 37.03          O
     ATOM   4668  O   HOH W 408     62.078  85.872  25.358  1.00 38.89          O
 10  ATOM   4669  O   HOH W 409     66.149  86.250  27.163  1.00 39.99          O
     ATOM   4670  O   HOH W 410    111.238  48.481  15.078  1.00 38.99          O
     ATOM   4671  O   HOH W 411    122.333  65.281   8.119  1.00 26.63          O
     ATOM   4672  O   HOH W 412    104.767  59.363  26.560  1.00 33.01          O
     ATOM   4673  O   HOH W 413     91.741  81.149  13.569  1.00 36.22          O
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Claims

1. An isolated nucleic acid comprising the nucleotide sequence of SEQ ID NO: 1 or of a degenerate variant of SEQ ID NO: 1.

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2. An isolated nucleic acid comprising a sequence that encodes a polypeptide consisting of the amino acid sequence of SEQ ID NO: 3.

3. An isolated nucleic acid comprising a sequence that hybridizes under stringent

10   conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 1, or the complement of SEQ ID NO: 1.

4. An isolated nucleic acid comprising a sequence at least 66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, 99%, or 99.5% identical to SEQ ID NO: 1.

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5. The isolated nucleic acid of claim 4 wherein the nucleic acid encodes a polypeptide that has starch hydrolysis activity.

6. An isolated nucleic acid comprising a sequence that encodes a polypeptide at least

20   66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, 99%, or 99.5% identical to SEQ ID NO: 3, wherein the polypeptide has starch hydrolysis activity.

7. An isolated nucleic acid comprising a sequence that encodes a polypeptide comprising the sequence of SEQ ID NO: 3, or SEQ ID NO: 3 with up to 50 conservative amino acid

25   substitutions, wherein the polypeptide has starch hydrolysis activity.

8. A purified polypeptide, the amino acid sequence of which comprises a sequence at least 66%, 67%, 68%, 69%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, 99%, or 99.5% identical to SEQ ID NO: 3.

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9. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 3, but with 0 to 20 conservative amino acid substitutions.

5   10. An expression vector comprising the nucleic acid sequence of any of claims 1-6 operably linked to an expression control sequence.

11. A cultured cell comprising the vector of claim 10.

10   12. A cultured cell comprising the nucleic acid of any of claims 1-6 operably linked to an expression control sequence.

13. A cultured cell tranfected with the vector of claim 10, or a progeny of said cell, wherein the cell expresses the nucleic acid to form a polypeptide.

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14. A method of producing a protein, the method comprising culturing the cell of claim 11 under conditions permitting expression of the polypeptide.

15. A method of using the polypeptide of any of claims 8 or 9, the method comprising

20   including the polypeptide in any of: starch liquefaction, starch saccharification, textile desizing, starch modification in the paper and pulp industry, brewing, baking, production of syrups for the food industry, production of feedstocks for fermentation processes, animal feed, and, removal of starchy soils and/or stains during dishwashing and/or laundry washing.

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16. A composition comprising the polypeptide of any of claims 8 or 9, and at least one

accessory enzyme selected from the group consisting of phytase, protease, pullulanase,

β-amylase, isoamylase, a different amylase, alpha-glucosidase, cellulase, xylanase,

5   hemicellulase, beta-glucosidase, transferase, pectinase, lipase, cutinase, esterase,

choline oxidases, peroxidases/oxidases, pectate lyases, mannanases, cutinases,

laccases, phospholipases, lysophospholipases, acyltransferases, perhydrolases,

arylesterases, and redox enzymes.
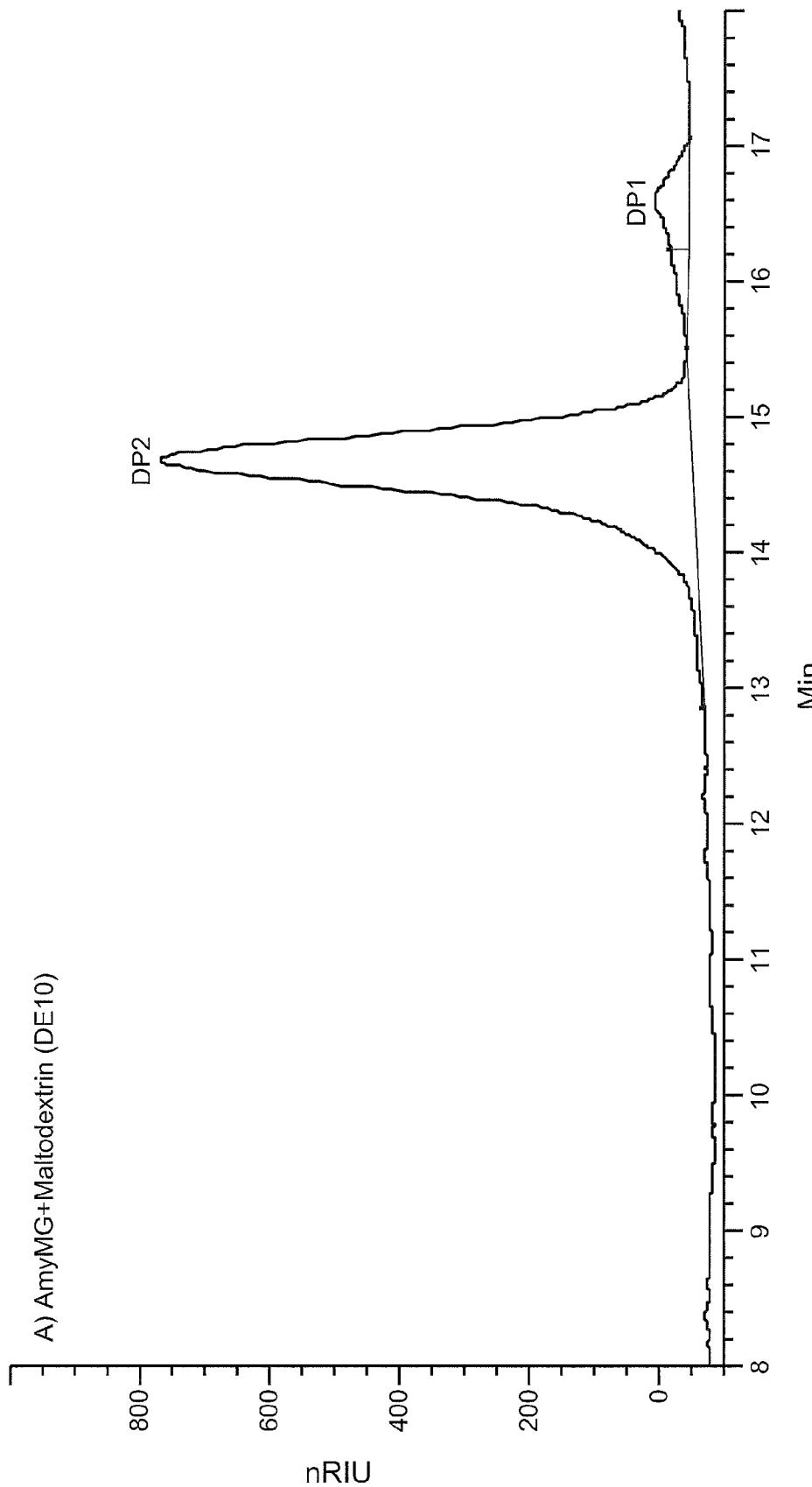
FIG. 1A
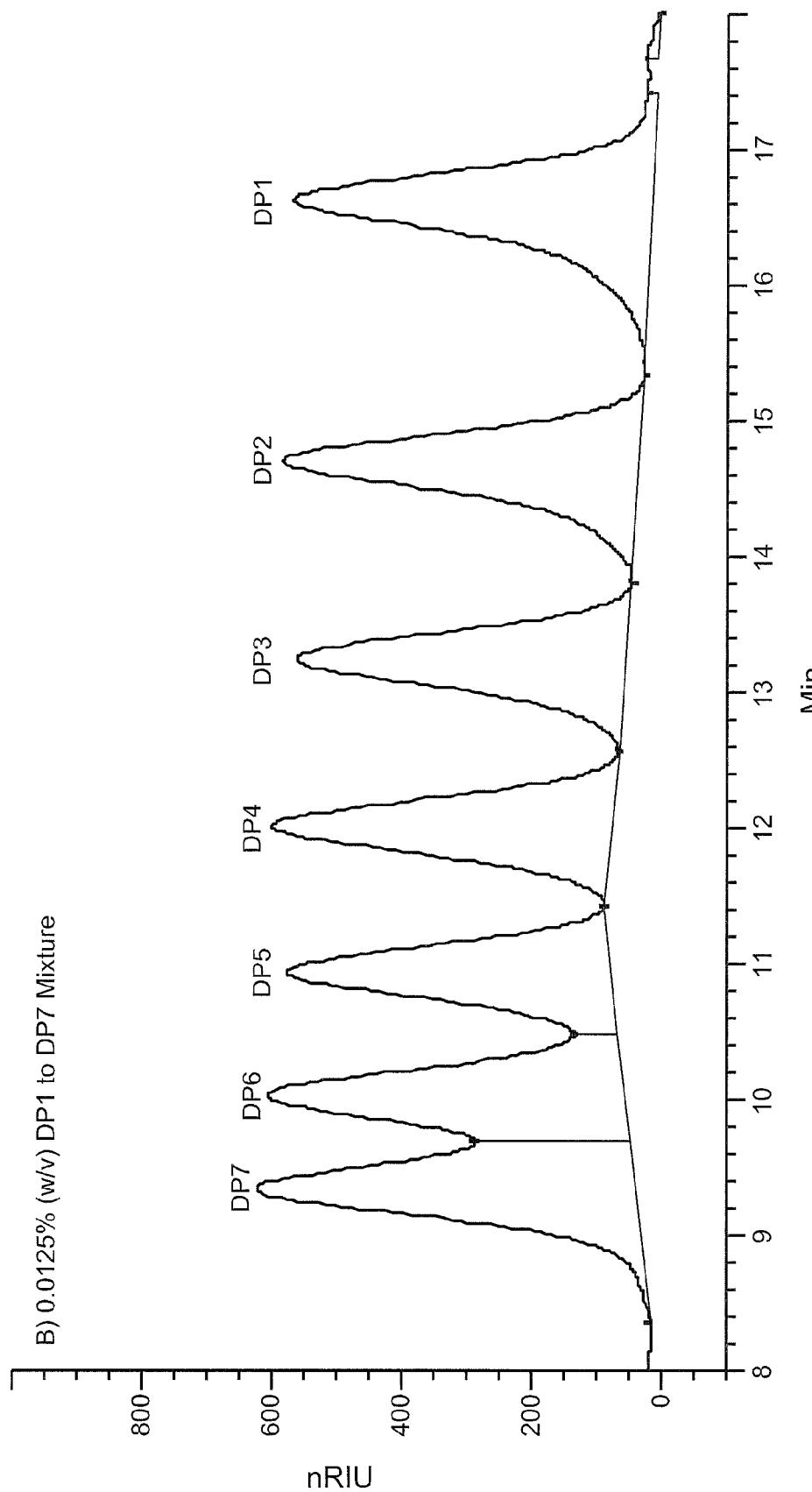
FIG. 1B
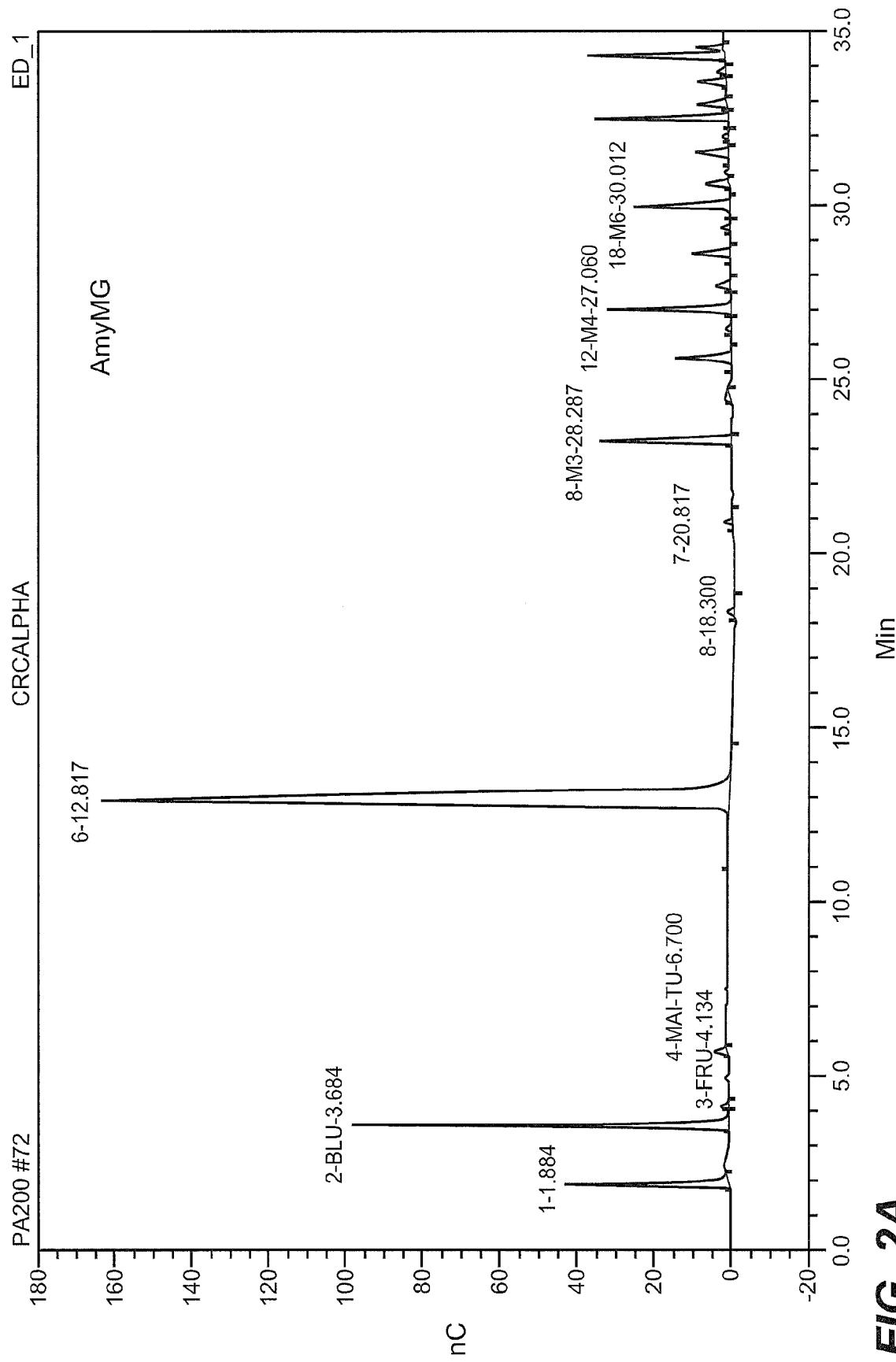
FIG. 2A
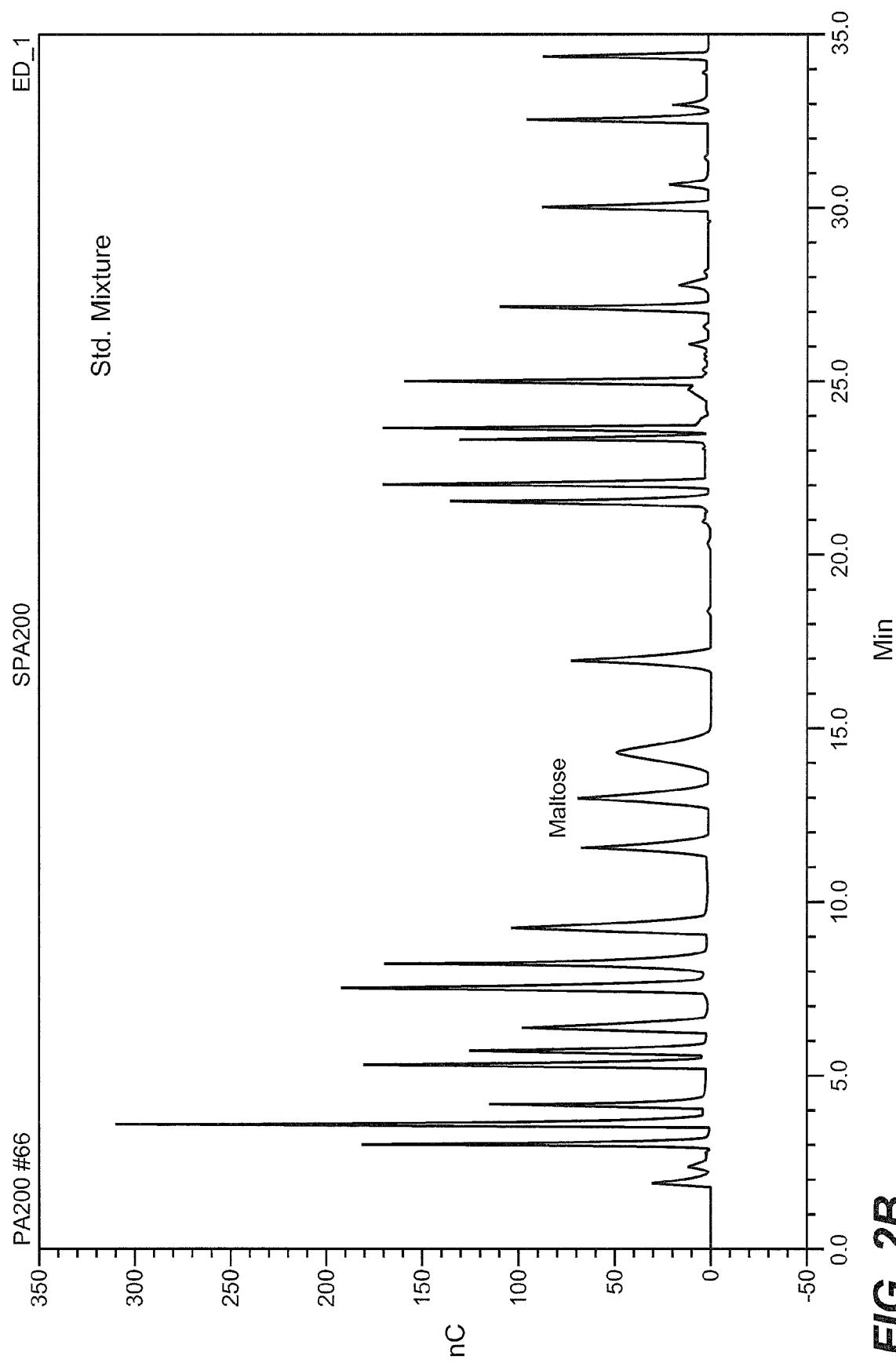
FIG. 2B
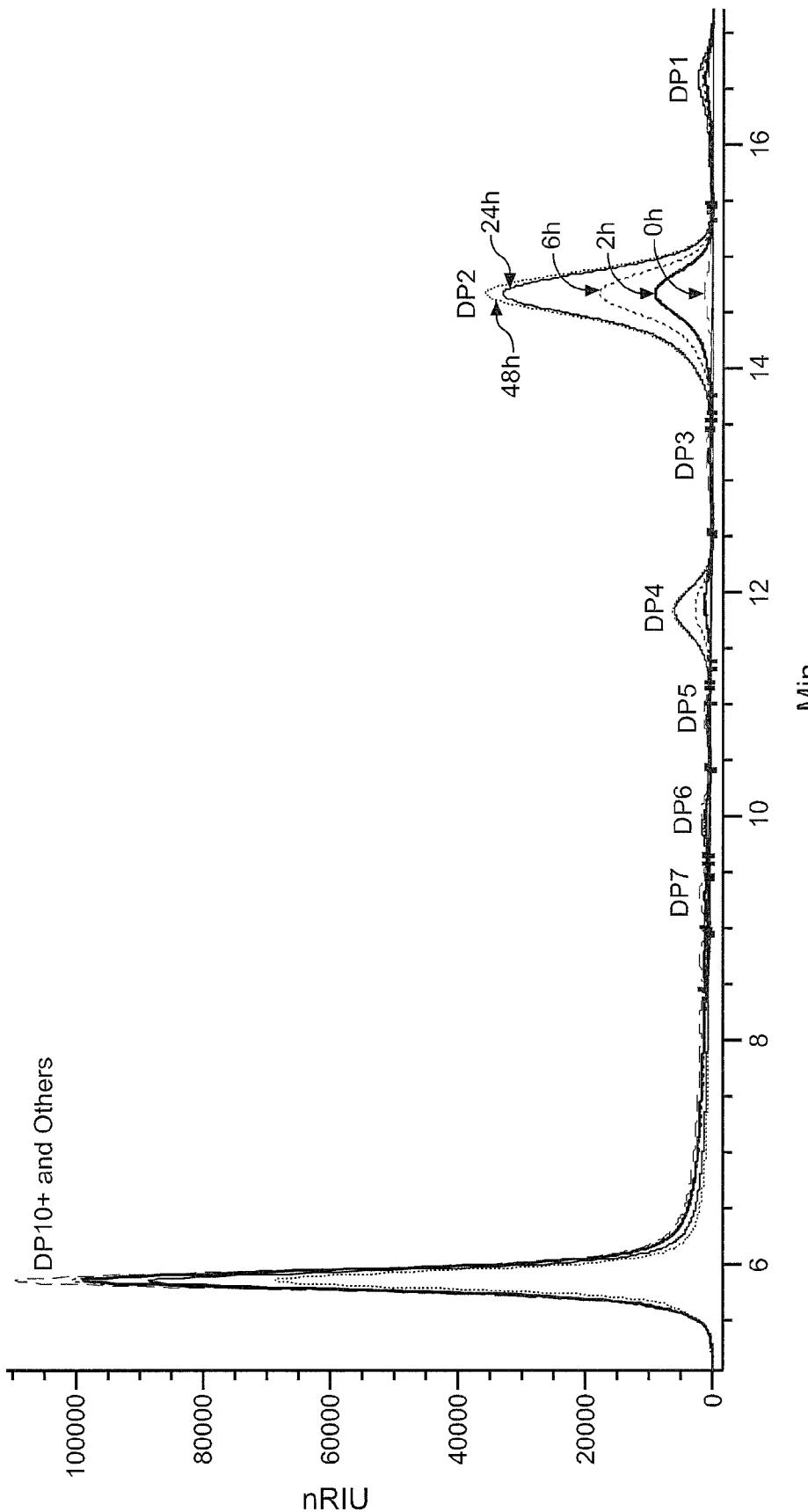
FIG. 3
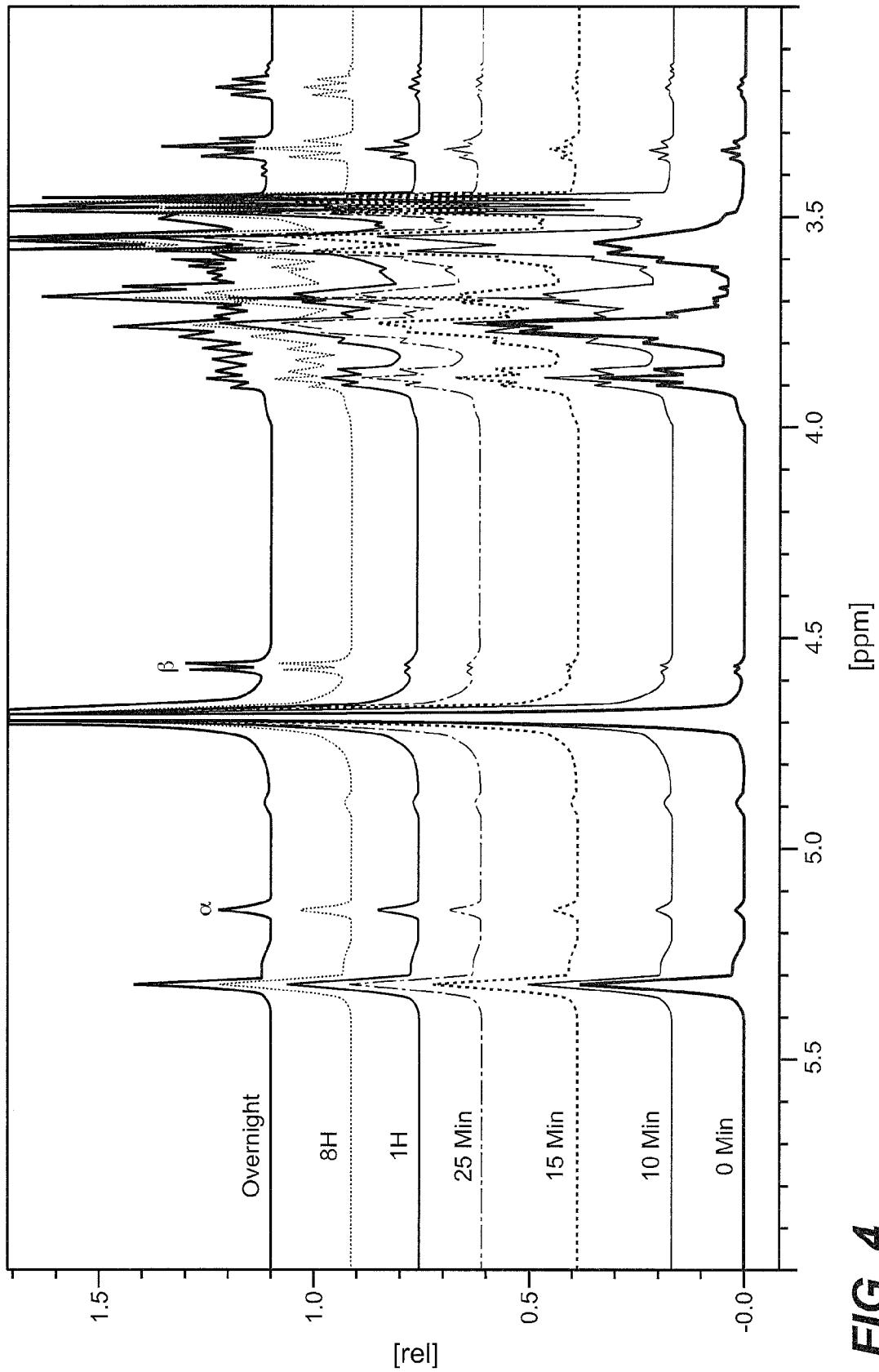
FIG. 4
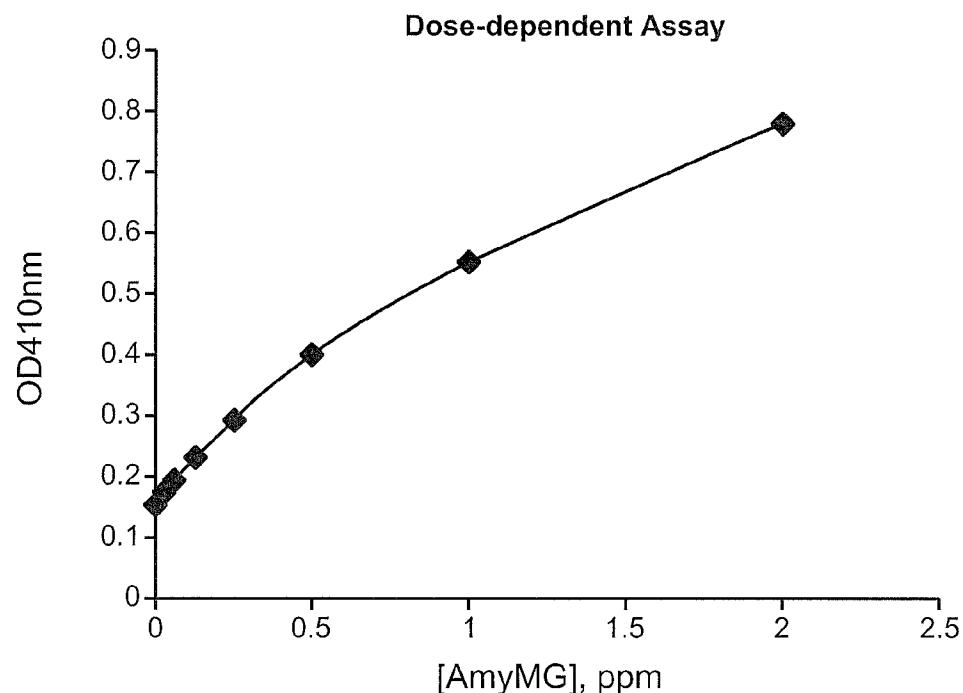
FIG. 5
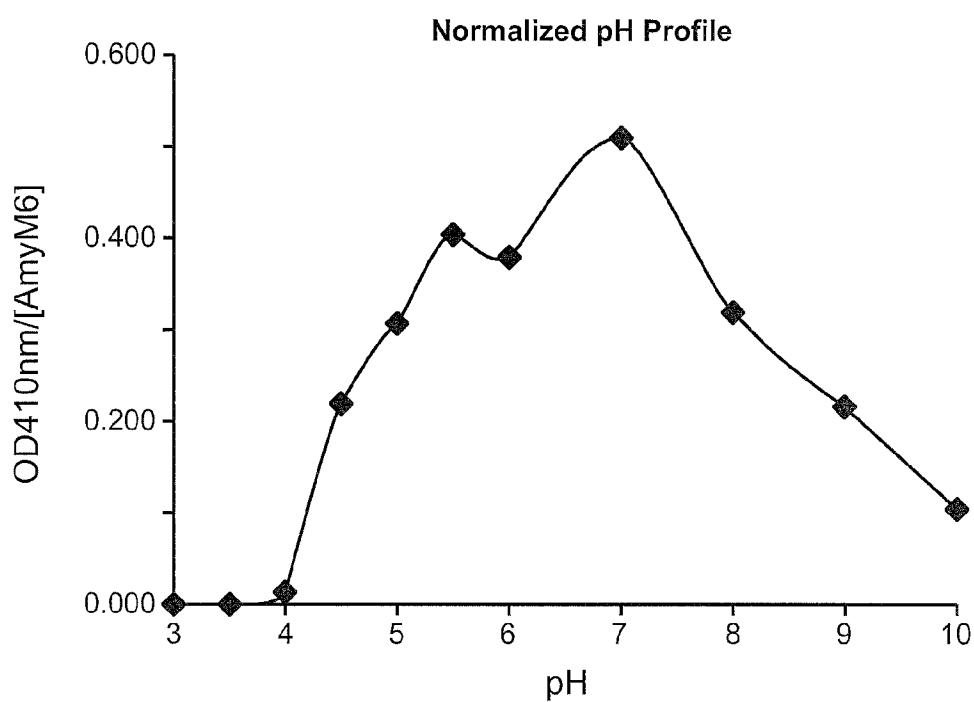
FIG. 6
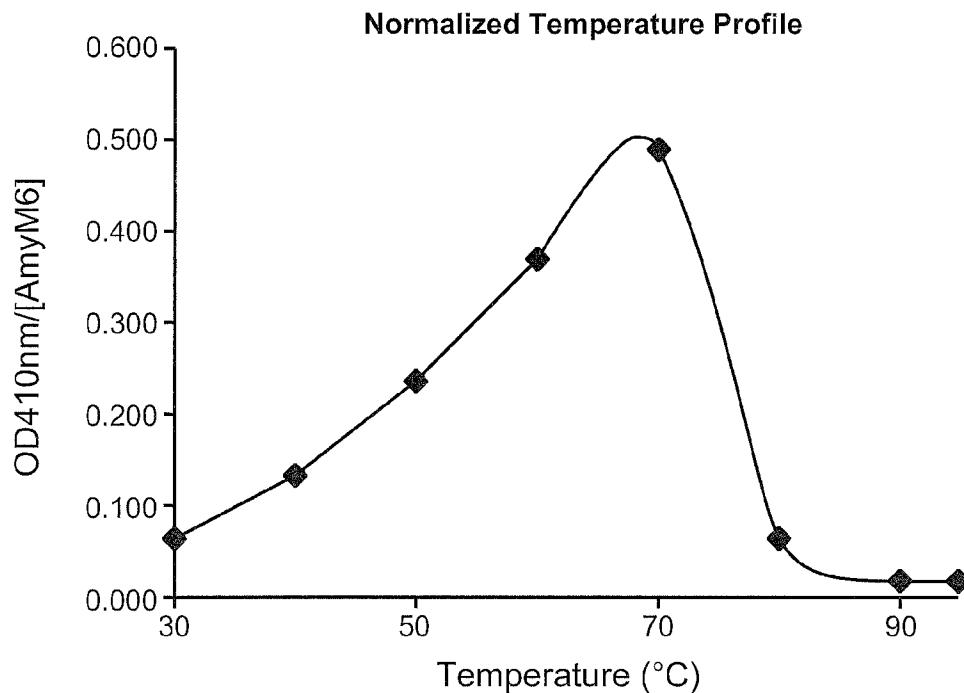
FIG. 7
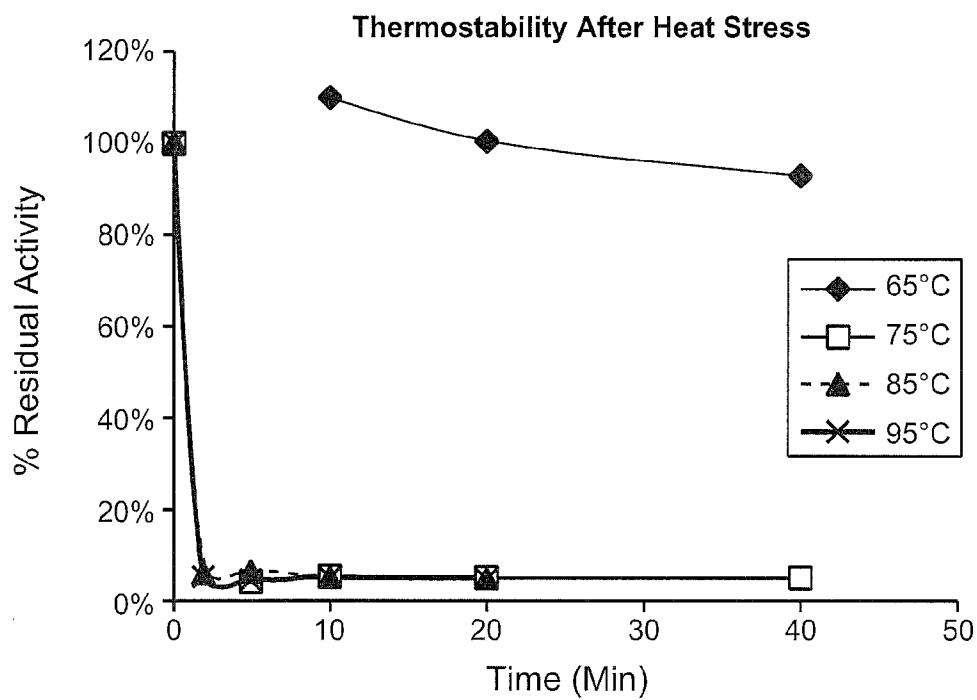
FIG. 8
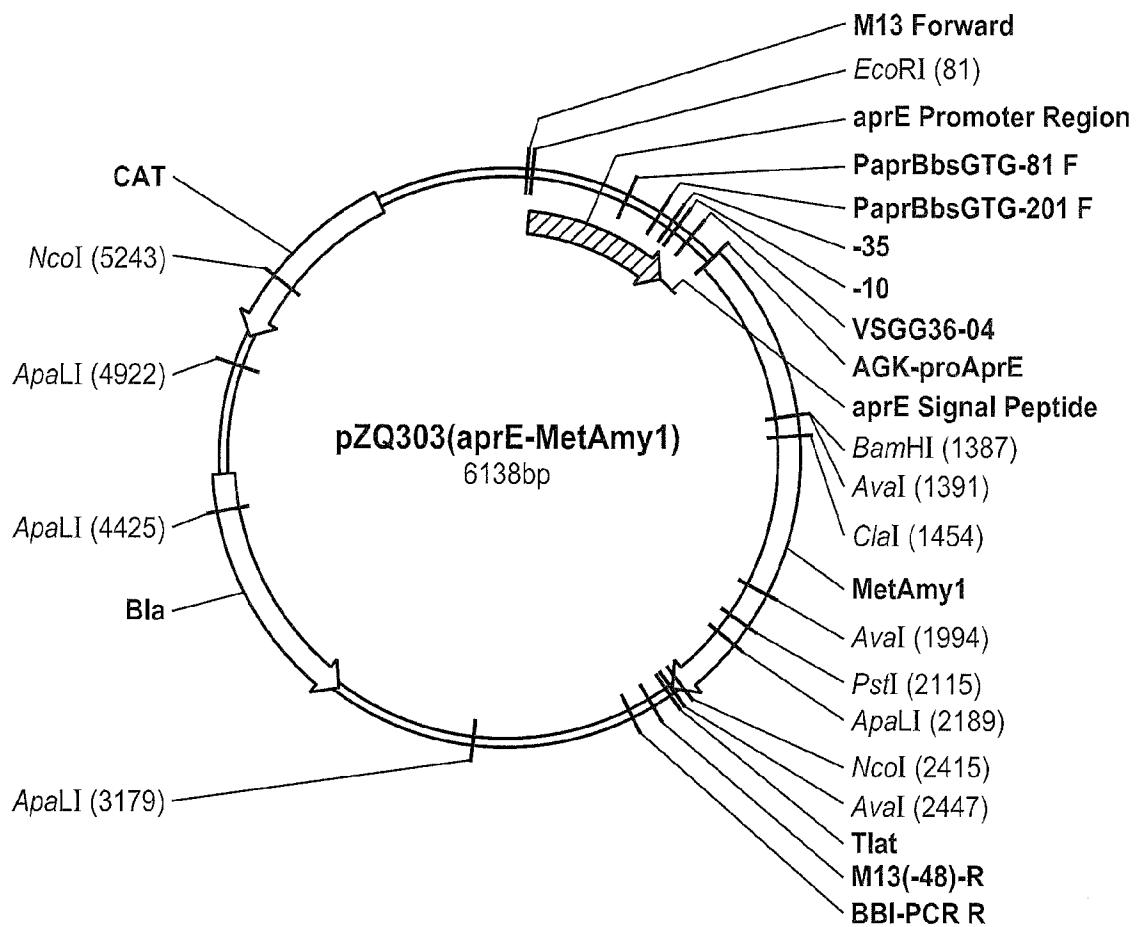
FIG. 9

INTERNATIONAL SEARCH REPORT

Box No. I   Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1.   With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

    a.   (means)

    [X]   on paper

    [X]   in electronic form

    b.   (time)

    [ ]   in the international application as filed

    [X]   together with the international application in electronic form

    [X]   subsequently to this Authority for the purpose of search

2.   [X]   In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3.   Additional comments:

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N9/28   C12N9/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, Sequence Search, WPI Data, BIOSIS, CHEM ABS Data, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	F. LIRA ET AL: "Whole-Genome Sequence of Stenotrophomonas maltophilia D457, a Clinical Isolate and a Model Strain", JOURNAL OF BACTERIOLOGY, vol. 194, no. 13, 11 June 2012 (2012-06-11), pages 3563-3564, XP055101962, ISSN: 0021-9193, DOI: 10.1128/JB.00602-12 the whole document -/--	4,6,8

[X] Further documents are listed in the continuation of Box C.   [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 February 2014	03/03/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Huber, Angelika

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation).   DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	-& DATABASE UniProt [Online] 13 June 2012 (2012-06-13), "SubName: Full=Cyclomaltodextrin glucanotransferase;", XP002720289, retrieved from EBI accession no. UNIPROT:I0KKS7 Database accession no. I0KKS7 sequence -----	
Y	J. YUN ET AL: "Characterization of a Novel Amylolytic Enzyme Encoded by a Gene from a Soil-Derived Metagenomic Library", APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 70, no. 12, 1 December 2004 (2004-12-01), pages 7229-7235, XP055101964, ISSN: 0099-2240, DOI: 10.1128/AEM.70.12.7229-7235.2004 the whole document -----	1-16
Y	WO 2008/112727 A2 (DANISCO US INC GENENCOR DIV [US]; DUAN GANG [CN]; QIAN KATHY [CN]; SCH) 18 September 2008 (2008-09-18) claims -----	1-16

3

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			AT	533841 T	15-12-2011
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