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(54) Title: SUBSTITUTED 5-PHENYL PYRIMIDINES I IN THERAPY

(57) Abstract: The present invention relates to substituted 5-phenyl pyrimidines I, which carry a radical X in the 4-position of the pyrimidine ring, a radical Y in the 6-position of the pyrimidine ring, the radical X denoting a group of the formula NR^1R^2, OR^{1a} or SR^{1a}, in which R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1-C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1} as defined in claim 1, R^{1a} has one of the meanings given for R^1 except for hydrogen; the radical Y being selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl; and wherein the pyrimidine radical may also carry a radical different from hydrogen in the 2-position and wherein the phenyl ring in the 5-position of the pyrimidine ring may be unsubstituted or carry 1, 2, 3, 4 or 5 radicals L which are different from hydrogen, and the pharmaceutically acceptable salts substituted 5-phenyl pyrimidines for use in therapy, in particular in therapy or treatment of cancerous diseases.

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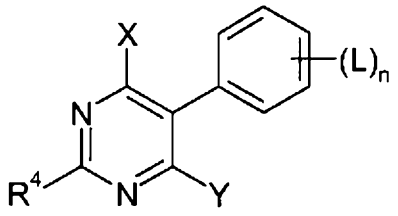
Substituted 5-phenyl pyrimidines I in therapy

Description

In a first embodiment, the invention, the subject of the application is directed to the use of substituted 5-phenyl pyrimidines of the formula I and their pharmaceutically acceptable salts in the manufacture of a medicament for therapy of cancer or cancerous diseases:



(I)

wherein

X is a group of the formula NR^1R^2, OR^{1a} or SR^{1a}, in which

R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or

the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1–C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; wherein

R^{a1} is halogen, oxo, nitro, cyano, hydroxy, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA), N(A')A, N(A')-C(=O)-A, N(A'')-C(=O)-N(A')A, $S(=O)_m$-A, $S(=O)_m$-O-A, $S(=O)_m$-N(A')A, phenyl or 5- or 6-membered heteroaryl, containing 1, 2, 3 or 4 nitrogen atoms as ring members or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, where the phenyl

and the hetaryl moiety may carry one to three radicals selected from the group consisting of halogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-halogenalkyl, C_1-C_6-alkoxy, cyano, nitro, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA) or N(A')A,

wherein m is 0,1 or 2;

A, A' and A" independently of each other are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by nitro, cyanato, cyano or C_1-C_4-alkoxy; or A and A' together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

R^{1a} has one of the meanings given for R^1 except for hydrogen;

Y is a radical selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

L is a radical which comprises from 1 to 10 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 0 to 4 and which is selected from the group consisting of;
halogen, cyano, cyanato (OCN), nitro, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-N(A^2)A^1, wherein

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully

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halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L or A^1, A^2 or A^3, respectively,for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

n is 0, 1, 2, 3, 4 or 5;

R^4 is a radical which comprises from 1 to 15 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 1 to 4, wherein the radical R^4 is selected from radicals R^{4a}, R^{4c} and R^{4d}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae -ON=C$R^a$$R^b$, -C$R^c$=NO$R^a$, -N$R^c$N=C$R^a$$R^b$, -N$R^cNR^a$$R^b$, -NO$R^a$; -N$R^c$C(=N$R^d$)-N$R^a$$R^b$, -N$R^c$C(=O)-N$R^a$$R^b$, -N$R^a$C(=O)$R^c$, -N$R^a$C(=NO$R^c$)-$R^d$, -O(C=O)$R^c$, - C(=O)-O$R^a$, -C(=O)-N$R^a$$R^b$, -C(=NO$R^c$)-N$R^a$$R^b$, -C$R^c$(=NN$R^a$$R^b$), wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl,

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phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond, it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x;

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)=NOR^\beta$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl.

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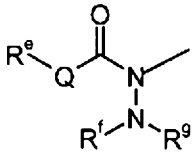
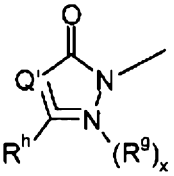
R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

 may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to

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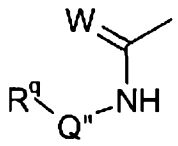
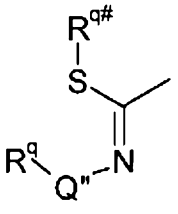
which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

In a second embodiment, the invention the subject of the application is directed to a method of providing therapy for cancer or cancerous diseases to a subject in need thereof, which method includes administering to a subject substituted 5-phenyl pyrimidines of the formula I and their pharmaceutically acceptable salts:

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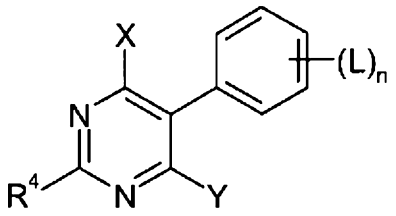
11.  (I)

wherein

X is a group of the formula NR^1R^2, OR^{1a} or SR^{1a}, in which

R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or

the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1–C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; wherein

R^{a1} is halogen, oxo, nitro, cyano, hydroxy, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA), N(A')A, N(A')-C(=O)-A, N(A")-C(=O)-N(A')A, $S(=O)_m$-A, $S(=O)_m$-O-A, $S(=O)_m$-N(A')A, phenyl or 5- or 6-membered heteroaryl, containing 1, 2, 3 or 4 nitrogen atoms as ring members or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, where the phenyl and the hetaryl moiety may carry one to three radicals selected from the group consisting of halogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-halogenalkyl, C_1-C_6-alkoxy, cyano, nitro, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA) or N(A')A,

wherein m is 0,1 or 2;

A, A' and A" independently of each other are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl,

phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by nitro, cyanato, cyano or C_1-C_4-alkoxy; or A and A' together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

R^{1a} has one of the meanings given for R^1 except for hydrogen;

Y is a radical selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

L is a radical which comprises from 1 to 10 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 0 to 4 and which is selected from the group consisting of;
halogen, cyano, cyanato (OCN), nitro, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-N(A^2)A^1, wherein

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L or A^1, A^2 or A^3, respectively,for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

n is 0, 1, 2, 3, 4 or 5;

R^4 is a radical which comprises from 1 to 15 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 1 to 4, wherein the radical R^4 is selected from radicals R^{4a}, R^{4c} and R^{4d}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae -ON=CR^aR^b, -CR^c=NOR^a, -NR^cN=CR^aR^b, -NR^cNR^aR^b, -NOR^a; -NR^cC(=NR^d)-NR^aR^b, -NR^cC(=O)-NR^aR^b, -NR^aC(=O)R^c, -NR^aC(=NOR^c)-R^d, -O(C=O)R^c, - C(=O)-OR^a, -C(=O)-NR^aR^b, -C(=NOR^c)-NR^aR^b, -CR^c(=NNR^aR^b), wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond, it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x;

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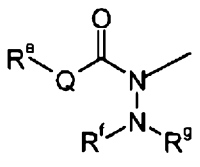
R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)=NOR^\beta$,

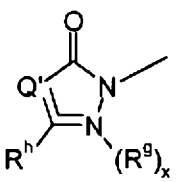
wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl.

R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

⋯⋯ may be a double bond or a single bond;

Z is oxygen;

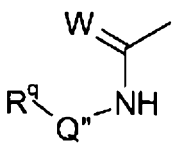
R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

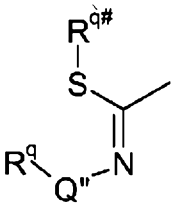
R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

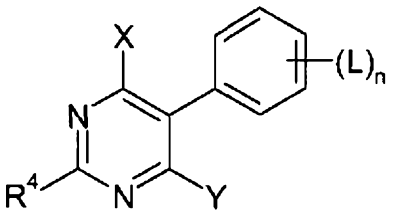
$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

The invention in its broadest form is directed to substituted 5-phenyl pyrimidines of the formula I,



(I)

wherein

X denotes a group of the formula NR^1R^2, OR^{1a} or SR^{1a}, in which

R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as

ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or

the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1–C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; wherein

R^{a1} is halogen, oxo, nitro, cyano, hydroxy, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA), N(A')A, N(A')-C(=O)-A, N(A'')-C(=O)-N(A')A, $S(=O)_m$-A, $S(=O)_m$-O-A, $S(=O)_m$-N(A')A, phenyl or 5- or 6-membered heteroaryl, containing 1, 2, 3 or 4 nitrogen atoms as ring members or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, where the phenyl and the hetaryl moiety may carry one to three radicals selected from the group consisting of halogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl,

C_1-C_6-halogenalkyl, C_1-C_6-alkoxy, cyano, nitro, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA) or N(A')A,

wherein m is 0,1 or 2;

A, A' and A" independently of each other are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by nitro, cyanato, cyano or C_1-C_4-alkoxy; or A and A' together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

R^{1a} has one of the meanings given for R^1 except for hydrogen;

Y is a radical selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

R^4 is a radical different from hydrogen, which comprises from 1 to 15 atoms that are different from hydrogen and which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 1 to 4:

L is a radical which comprises from 1 to 10 atoms that are different from hydrogen and which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 0 to 4;

n is 0, 1, 2, 3, 4 or 5;

and the pharmaceutically acceptable salts of the substituted 5-phenyl pyrimidines I for use in therapy, in particular in therapy or treatment of cancerous diseases.

The invention also relates to pharmaceutical compositions comprising a 5-phenyl pyrimidine of the formula I as herein defined or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier. Moreover the invention relates to the use of a 5-phenyl pyrimidine of the formula I as herein defined and of their pharmaceutically acceptable salts in the manufacture of a medicament for treatment of cancer and to a method for cancer treatment, which comprises administering to the subject in need thereof an effective amount of a 5-phenyl pyrimidine of the formula I as herein defined or of their pharmaceutically acceptable salts.

Despite dramatic advances in research and novel treatment options, cancer is still one of the leading cause of death. Amongst the different types of cancer such as lung, breast, prostate and colon cancer as well as colon lymphomas, are most frequently diagnosed and ovarian cancer is the 2nd most common reproductive cancer after breast cancer in women. A large number of cytotoxic compounds are known to effectively inhibit the growth of tumor cells, including taxoides like paclitaxel (Taxole), docetaxel (Taxotere), the vinka alkaloids vinorelbine, vinblastine, vindesine and vincristine. However, these compounds are natural products having a complex structure and thus are difficult to produce.

It is, therefore, an object of the present invention to provide compounds which effectively control or inhibit growth and/or progeny of tumor cells and thus are useful in the treatment of cancer. It is highly desirable that these compounds can be synthesized from simple starting compounds according to standard methods of organic chemistry.

We have found that these and further objects are achieved by the substituted 5-phenyl pyrimidines I defined at the outset. Furthermore, we have found a method for treating cancer, which comprises administering to the subject in need thereof an effective amount of a 5-phenyl pyrimidine I as herein defined or of their pharmaceutically acceptable salts.

Substituted 5-phenyl pyrimidines I have been occasionally described in the literature, e.g. in WO 02/074753, WO 03/070721, WO 03/043993 and WO 2004/103978. The compounds disclosed in these documents are active against various phytopathogenic fungi. However, these documents do not describe or suggest that these compounds may be effective in the treatment of diseases or even in the treatment of cancer.

Substituted 5-phenyl pyrimidines I can be prepared by the methods disclosed in WO 02/074753, WO 03/070721, WO 03/043993, WO 2004/103978, PCT/EP04/07258 and DE 102004034197.4 and in the literature cited therein as well as by standard methods of organic chemistry.

It is likewise possible to use physiologically tolerated salts of the 5-phenyl pyrimidines I, especially acid addition salts with physiologically tolerated acids. Examples of suitable physiologically tolerated organic and inorganic acids are hydrochloric acid, hydrobromic acid, phosphoric acid, nitric acid, sulfuric acid, organic sulfonic acids having from 1 to 12 carbon atoms, e.g. C_1-C_4-alkylsulfonic acids such as methanesulfonic acid, cycloaliphatic sulfonic acids such as S-(+)-10-camphorsulfonic acids and aromatic sulfonic acids such as benzenesulfonic acid and toluenesulfonic acid, di- and tricarboxylic acids and hydroxycarboxylic acids having from 2 to 10 carbon atoms such as oxalic acid, malonic acid, maleic acid, fumaric acid, mucic acid, lactic acid, tartaric acid, citric acid, glycolic acid and adipic acid, as well as *cis*- and *trans*-cinnamic acid, furoic acid and benzoic acid. Other utilizable acids are described in Fortschritte der Arzneimittelforschung [Advances in Drug Research], Volume 10, pages 224 *ff.*, Birkhäuser Verlag, Basel and Stuttgart, 1966. The physiologically tolerated salts of 5-phenyl pyrimidines I may be present as the mono-, bis-, tris- and tetrakis-salts, that is, they may contain 1, 2, 3 or 4 of the aforementioned acid molecules per molecule of formula I. The acid molecules may be present in their acidic form or as an anion. The acid addition salts are prepared in a customary manner by mixing the free base of a 5-phenyl pyrimidine I with a corresponding acid, where appropriate in solution in water or an organic solvent as for example a lower alcohol such as methanol, ethanol, *n*-propanol or isopropanol, an ether such as methyl *tert*-butyl ether or diisopropyl ether, a ketone such as acetone or methyl ethyl ketone, or an ester such as ethyl acetate. Solvents, wherein the acid addition salt of I is insoluble (anti-solvents), might be added to precipitate the salt. Suitable anti-solvents comprise C_1-C_4-alkylesters of C_1-C_4-aliphatic acids such as ethyl acetate, aliphatic and cycloaliphatic hydrocarbons such as hexane, cyclohexane, heptane, etc., di-C_1-C_4-alkylethers such as methyl *tert*-butyl ether or diisopropyl ether.

In the symbol definitions given in formula I above, collective terms were used which generally represent the following substituents:

- halogen: fluorine, chlorine, bromine or iodine;

- alkyl and the alkyl moieties of alkoxy, alkylthio, alkoxycarbonyl, alkylamino, di(alkyl)amino, alkylaminocarbonyl, di(alkyl)amincarbonyl, alkylcarbonylamino, alkylsulfinyl, alkylsulfonyl, alkylaminosulfonyl or di(alkyl)aminosulfonyl: saturated, straight-chain or branched hydrocarbon radicals having 1 to 10, preferably 1 to 6 carbon atoms, especially 1 to 4 carbon atoms, such as methyl, ethyl, propyl, 1-methylethyl, butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, or pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 2,2-di-methylpropyl, 1-ethylpropyl, hexyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl,

2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl and 1-ethyl-2-methylpropyl;

- alkenyl and the alkenyl moieties of alkenyloxy: unsaturated, straight-chain or branched hydrocarbon radicals having 2 to 6, preferably 2 to 4 carbon atoms, and a double bond in any position, especially C_3-C_4-alkenyl, for example ethenyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-methyl-1-propenyl, 2-methyl-1-propenyl, 1-methyl-2-propenyl and 2-methyl-2-propenyl;

- alkynyl: straight-chain or branched hydrocarbon radicals having 2 to 6, preferably 2 to 4 carbon atoms, and a triple bond in any position, especially C_3-C_4-alkynyl, for example ethynyl, 1-propynyl, 2-propynyl, 1-butynyl, 2-butynyl, 3-butynyl and 1-methyl-2-propynyl;

- cycloalkyl: mono- or bicyclic hydrocarbon radicals having 3 to 10 carbon atoms; monocyclic groups having 3 to 8, especially 3 to 6 ring members, for example C_3-C_8-cycloalkyl such as cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl and cyclooctyl;

- haloalkyl and the haloalkyl moieties of haloalkoxy: straight-chain or branched alkyl groups having 1 to 10 carbon atoms, preferably 1 to 6 carbon atoms, especially 1 to 4 carbon atoms (as mentioned above), where the hydrogen atoms in these groups may be partially or fully replaced by halogen atoms as mentioned above, for example C_1-C_2-haloalkyl, such as chloromethyl, bromomethyl, dichloromethyl, trichloromethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chlorofluoromethyl, dichlorofluoromethyl, chlorodifluoromethyl, 1-chloroethyl, 1-bromoethyl, 1-fluoroethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloro-2-fluoroethyl, 2-chloro-2,2-difluoroethyl, 2,2-dichloro-2-fluoroethyl, 2,2,2-trichloroethyl and pentafluoroethyl; similar considerations apply to other halogenated groups such as haloalkenyl and haloalkynyl where the hydrogen atoms of the alkenyl and alkynyl groups may be partially or fully replaced by halogen atoms as mentioned above;

- oxy-alkyleneoxy: divalent straight-chain hydrocarbon radicals having 1 to 3 carbon atoms, e.g. OCH_2CH_2O or $OCH_2CH_2CH_2O$;

- 5- or 6-membered heterocycle: homo- or bicyclic hydrocarbon radicals containing one to four heteroatoms selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom; unsaturated (heterocyclyl) includes partially unsaturated, e.g. mono-unsaturated, and aromatic (heteroaryl); said heterocycles in particular include:

- 5-membered heteroaryl, containing one to four nitrogen atoms or one to three nitrogen atoms and one sulfur or oxygen atom: 5-membered heteroaryl groups which, in addition to carbon atoms, may contain one to four nitrogen atoms or one to three nitrogen atoms and one sulfur or oxygen atom as ring members, for example 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, 2-pyrrolyl, 3-pyrrolyl, 3-isoxazolyl, 4-isoxazolyl, 5-isoxazolyl, 3-isothiazolyl, 4-isothiazolyl, 5-isothiazolyl, 3-pyrazolyl, 4-pyrazolyl, 5-pyrazolyl, 2-oxazolyl, 4-oxazolyl, 5-oxazolyl, 2-thiazolyl, 4-thiazolyl, 5-thiazolyl, 2-imidazolyl, 4-imidazolyl, 1,2,4-oxadiazol-3-yl, 1,2,4-oxadiazol-5-yl, 1,2,4-thiadiazol-3-yl, 1,2,4-thiadiazol-5-yl, 1,2,3-triazol-?-yl, 1,2,4-triazol-3-yl, tetrazolyl, 1,3,4-oxadiazol-2-yl, 1,3,4-thiadiazol-2-yl and 1,3,4-triazol-2-yl;

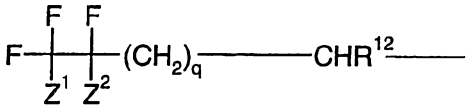
- 6-membered heteroaryl, containing one to four nitrogen atoms: 6-membered heteroaryl groups which, in addition to carbon atoms, may contain one to three or one to four nitrogen atoms as ring members, for example 2-pyridinyl, 3-pyridinyl, 4-pyridinyl, 3-pyridazinyl, 4-pyridazinyl, 2-pyrimidinyl, 4-pyrimidinyl, 5-pyrimidinyl, 2-pyrazinyl, 1,2,3-triazinyl, 1,3,5-triazin-2-yl and 1,2,4-triazin-3-yl.

- 5- and 6-membered heterocyclyl, containing one to four nitrogen atoms or one to three nitrogen atoms and one sulfur or oxygen atom: 3-pyrazolidinyl, 4-pyrazolidinyl, 5-pyrazolidinyl, 2-pyrrolodin-2-yl, 2-pyrrolodin-3-yl, 3- pyrrolodin-2-yl, 3-pyrrolodin-3-yl, 1-piperidinyl, 2-piperidinyl, 3-piperidinyl, 4-piperidinyl, pyridin(1,2-dihydro)-2-on-1-yl, 2-piperazinyl, 1-pyrimidinyl, 2-pyrimidinyl, morpholin-4-yl, thiomorpholin-4-yl.

With regard to their activity to inhibit growth and progeny of tumor cells preference is given to 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^1 is not hydrogen. Particularly preferred are 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^2 is hydrogen. Very particular preference is given to compounds I in which R^1 is not hydrogen and R^2 is hydrogen. Preference is likewise given to 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^2 is methyl or ethyl.

Particular preference is given 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^1 is C_1-C_6-alkyl, C_2-C_6-alkenyl or C_1-C_8-haloalkyl.

Preference is likewise given 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^1 is a group B:



(B)

in which

Z^1 is hydrogen, fluorine or C_1-C_6-fluoroalkyl,
Z^2 is hydrogen or fluorine, or
Z^1 and Z^2 together form a double bond;
q is 0 or 1; and
R^{12} is hydrogen or methyl.

Moreover, preference is given to 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^1 is C_3-C_6-cycloalkyl which may be substituted by C_1-C_4-alkyl.

If R^1 and/or R^2 contain haloalkyl or haloalkenyl groups having a center of chirality, the (S)-isomers are preferred for these groups. In the case of halogen-free alkyl or alkenyl groups having a center of chirality in R^1 or R^2, preference is given to the (R)configured isomers.

Preference is furthermore given to 5-phenyl pyrimidines I, wherein X is a radical NR^1R^2 in which R^1 and R^2 together with the nitrogen atom to which they are attached form a piperidinyl, morpholinyl or thiomorpholinyl ring, in particular a piperidinyl ring which is optionally substituted by one to three groups selected from halogen, C_1-C_4-alkyl or C_1-C_4-haloalkyl. Amongst these preference is given to compounds I in which R^1 and R^2 together with the nitrogen atom to which they are attached form a 4-methylpiperidine ring.

Preference is also given to 5-phenyl pyrimidines I, wherein the radical NR^1R^2 forms a pyrazole ring which is optionally substituted by one or two groups selected from halogen, C_1-C_4-alkyl or C_1-C_4-haloalkyl, in particular by 2-methyl or 3-methyl.

Preferred radicals X of the formula NR^1R^2 include:
NH-C_2H_5, NH($CH(CH_3)_2$), NH-$CH_2CH_2CH_3$, NH($CH(CH_3)(C_2H_5)$), (S)-NHCH(CH_3)(C_2H_5), NH-CH(CH_3)($CH_2CH_2CH_3$), (R)-NHCH(CH_3)($C(CH_3)_3$), NH-CH(CH_3)$CH(CH_3)_2$, (R)-NHCH(CH_3)($CH(CH_3)_2$), (S)-NHCH(CH_3)($CH(CH_3)_2$), NH(cyclopentyl), $NHCH_2CF_3$, NHCH(CH_3)(CF_3), (R)-NHCH(CH_3)(CF_3), (S)-NHCH(CH_3)(CF_3), NH-CH(CH_3)CH_2OCH_3, NH-CH(CH_3)CH_2OH, NH-$CH_2C(CH_3)=CH_2$, $N(CH_2CH_3)_2$, N(CH_3)($CH_2CH=CH_2$), N(CH_3)-$CH_2CH_2CH=CH_2$, N($CH_2CH=CH_2$)$_2$, piperidin-1-yl, 2-methyl-piperidin-1-yl, 3-methyl-piperidin-1-yl, 4-methyl-piperidin-1-yl, 3,6-dihydro-2H-pyridin-1-yl, 2-methyl-pyrrolidin-1-yl, (S)-NHCH(CH_3)($C(CH_3)_3$), -NH-n-butyl, -NH-tert-butyl, -NH-(sec-pentyl), -NH-2-methyl-cyclopentyl, 2-methyl-oxiranyl-methyl-amino, -N(ethyl)(isopropyl), -N(ethyl)(sec-butyl), -N(sec-butyl)$_2$, NHCH(CH_3)-isobutyl NH-benzyl, -NHCH(CH_3)CH_2-$CH(CH_3)_2$, -NH-CH(CH_3)CH_2-C(O)-OH, N(CH_2CH_3)$CH_2C(CH_3)=CH_2$, -N(n-Pr)($CH_2CH=CH_2$), -NH-CH_2CH_2-CH_2-OH, -N(CH_3)(CH_2CH_2OH), -N(benzyl)(CH_2CH_2OH), -N(CH_2CH_2OH)($CH_2CH=CH_2$)- -N($CH_2CH_2OSiMe_3$)($CH_2CH=CH_2$), -N(CN)($CH_2CH=CH_2$), -NH-CH(CH_3)CH_2-OCH_3,

-NH-CH(CH_3)CH_2-C(O)-OCH_3, 2-butoxycarbonyl-pyrrolidin-1-yl, 2,5-dimethyl-pyrrolidin-1-yl, 2,6-dimethyl-morpholin-4-yl and 1,1-dioxo-thiomorpholin-4-yl.

Amongst 5-phenyl pyrimidines I, wherein X is a radical OR^{1a} or SR^{1a}, preference is given to those wherein X is OR^{1a}. The radical R^{1a} is preferably selected from C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-alkenyl, C_2-C_6-alkinyl or C_3-C_6-cycloalkyl. In particular R^{1a} is selected from C_1-C_6-alkyl, C_2-C_6-alkenyl or C_1-C_6-haloalkyl which are branched in α-position. Likewise preferred are compounds I wherein R^{1a} is C_1-C_4-haloalkyl. Amongst these 5-phenyl pyrimidines I are especially preferred, wherein R^{1a} is ethyl, propyl, i-propyl, 1,2-dimethylpropyl, 1,2,2-trimethylpropyl, 1-methyl-2,2,2-trifluoroethyl or 2,2,2-trifluoroethyl.

Preference is given to 5-phenyl pyrimidines I, wherein Y is halogen, C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, in particular chlorine.

The phenyl ring in the 5-phenyl pyrimidines I may be unsubstituted or preferably carries 1, 2, 3, 4 or 5, in particular 1, 2 or 3 substituents L which are different from hydrogen. Suitable radicals L usually comprises from 1 to 10 atoms that are different from hydrogen and which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms are usually from 0 to 10, the number of halogen atoms are usually from 0 to 5 and the number of heteroatoms that are different from halogen are generally being from 0 to 4. Examples of suitable radicals L comprise:

halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, wherein

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L or A^1, A^2 or A^3, respectively,for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

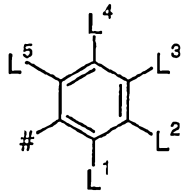
In particular L is selected from the group of the radicals L^a, L^b, L^c, L^d and L^e as described hereinafter.

Preferably the radicals L are selected from the group consisting of halogen, cyano, nitro, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_4-alkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl, CO-NH_2, alkylaminocarbonyl, di-C_1-C_4-alkylaminocarbonyl, C_1-C_4-alkylcarbonylamino, N-C_1-C_4-alkylcarbonyl-N-C_1-C_4-alkylamino and C_1-C_4-alkoxycarbonyl, in particular fluorine, chlorine, bromine, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy or C_1-C_4-alkoxycarbonyl, especially preferably fluorine, chlorine, C_1-C_2-alkyl, such as methyl or ethyl, C_1-C_2-fluoroalkyl, such as trifluoromethyl, C_1-C_2-alkoxy, such as methoxy, or C_1-C_2-alkoxycarbonyl, such as methoxycarbonyl, SCH_3, SO_2CH_3, CO-NH_2, CO-$NHCH_3$, CO-NHC_2H_5, CO-$N(CH_3)_2$, NH-C(=O)CH_3, N(CH_3)-C(=O)CH_3 or $COOCH_3$

More preferably the radicals L are selected from the group consisting of halogen, cyano, nitro, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_4-alkoxy and C_1-C_4-alkoxycarbonyl, in particular fluorine, chlorine, bromine, cyano, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxy or C_1-C_4-alkoxycarbonyl, especially preferably fluorine, chlorine, C_1-C_2-alkyl, such as methyl or ethyl, C_1-C_2-fluoroalkyl, such as trifluoromethyl, C_1-C_2-alkoxy, such as methoxy, or C_1-C_2-alkoxycarbonyl, such as methoxycarbonyl.

Preference is given to 5-phenyl pyrimidines I, wherein one or two radical(s) L is (are) attached to one (or two) of the ortho-position(s) of the phenyl ring.

In a particular preferred embodiment of the invention the phenyl ring of the 5-phenyl pyrimidines I is of the formula C



(C)

in which # is the point of attachment to the pyrimidine ring and

L^1 is hydrogen, fluorine, chlorine, CH_3 or CF_3;

L^2, L^4 independently of one another are hydrogen or fluorine, in particular hydrogen;

L^3 is hydrogen, fluorine, chlorine, cyano, CH_3, OCH_3 or $COOCH_3$; and

L^5 is hydrogen, fluorine or CH_3,

where at least one of the radicals L^1 to L^5 and in particular 1, 2 or 3 of the radicals L^1 to L^5 are different from hydrogen.

The substituted 5-phenyl pyrimidines also carry a radical R^4 in the 2-position, which is different from hydrogen. This radical R^4 comprises from 1 to 15, in particular 2 to 15 atoms that are different from hydrogen and which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms are usually from 0 to 10, the number of halogen atoms are usually from 0 to 5 and the number of heteroatoms that are different from halogen are generally being from 1 to 4. Preferred substituents in the 2-position are the radicals R^{4a}, R^{4b}, R^{4c} and R^{4d} as described hereinafter.

In a first embodiment of the invention the substituted 5-phenylpyrimidine compounds I carry a radical R^{4a} in the 2-position of the pyrimidine ring, wherein

R^{4a} denotes halogen, cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, NR^aR^b, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond;

a cyclic radical selected from C_3-C_{10}-Cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denotes cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)$=NOR^β,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl.

Preferably R^{4a} is selected from cyano, N_3, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)$-NR^aR^b, $-NR^cC(=O)$-NR^aR^b, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)$-R^d, $-O(C=O)R^c$, $-C(=O)$-OR^a,

-C(=O)-NR^aR^b, -C(=NOR^c)-NR^aR^b, -CR^c(=NNR^aR^b), wherein

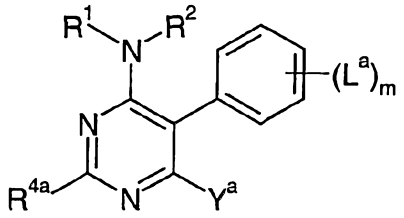
R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond;

More preferably R^{4a} is selected from halogen, cyano or a radical of the formulae -ON=CR^aR^b,-CR^c=NOR^a, -NR^cN=CR^aR^b, -$NR^cNR^aR^b$, -NR^cC(=O)-NR^aR^b, -NR^aC(=O)R^c, -NR^aC(=NOR^c)-R^d, -C(=O)-NR^aR^b, -C(=NOR^c)-NR^aR^b, -CR^c(=NNR^aR^b), wherein R^a, R^b, R^c and R^d are as defined above.

In particular R^a is H or C_1-C_6-alkyl, R^b is H or C_1-C_6-alkyl, R^c is H, C_1-C_6-alkyl or C_1-C_4-haloalkyl and R^d is H or C_1-C_6-alkyl, or R^a and R^b or R^a and R^c together form a C_2-C_4-alkylene group which may comprise a double bond.

Examples of preferred radicals R^{4a} include:
2-oxo-pyrrolidin-1-yl, -C(CH_3)=NOH, -C(NH_2)=NOH, -C(NH_2)=$NOCH_3$, -C(NH_2)=NOC_2H_5, -C(NH_2)=$NOCHF_2$, -C(O)NH_2, -C(O)NH(CH_3), -C(O)NHC(O)CH_3, -CN, -N(CH_3)NH_2, -NHN=CH(CH(CH_3)C(=O)OC_2H_5) and -ON=C(CH_3)$_2$.

Amongst the 5-phenyl pyrimidines I, which carry a radical R^{4a} in the 2-position of the pyrimidine moiety, compounds formula Ia



(Ia)

are preferred, in which R^1, R^2 and R^{4a} have the meanings given above,

m is 1, 2, 3, 4 or 5, in particular 1, 2 or 3;

Y^a denotes halogen, cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1–C_4-haloalkoxy or C_3–C_6-alkenyloxy; in particular C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, most preferably chlorine;

L^a denotes, independently of each other, halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy and C_1-C_6-haloalkyl. In particular the phenyl ring of the compounds Ia is of the formula C as defined above.

In a second embodiment of the invention the substituted 5-phenylpyrimidine compounds I carry a radical R^{4b} in the 2-position of the pyrimidine ring, wherein R^{4b} denotes a five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycle comprising one to four hetero atoms selected from the group consisting of O, N or S, it being possible for R^{4b} to be substituted by one to three identical or different groups R^{44}, wherein

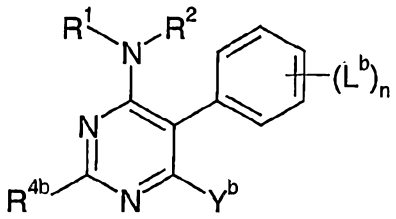
R^{44} is halogen, hydroxyl, cyano, oxo, nitro, amino, mercapto, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, carboxyl, C_1-C_6-alkoxycarbonyl, carbamoyl, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkyl-C_1-C_6-alkylamincarbonyl, morpholinocarbonyl, pyrrolidinocarbonyl, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, hydroxysulfonyl, aminosulfonyl, C_1-C_6-alkylaminosulfonyl, di(C_1-C_6-alkyl)aminosulfonyl, phenyl, 5- or 6-membered heteroaryl comprising one to four hetero atoms selected from the group consisting of O, N or S it being possible for the alkyl, phenyl, heteroaryl, cycloalkyl and alkoxy groups in the radicals R^{44} to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x as defined above.

Preferably the radical R^{4b} is selected from an aromatic heterocyclic radical which comprises 1, 2 or 3 nitrogen atoms as ring members or 1 or 2 nitrogen atoms and 1 oxygen atom or 1 sulfur atom as ring members, in particular pyrazol, in particular pyrazol-1-yl, thiazol, in particular thiazol-2-yl or thiazol-4-yl, 1,2,3-triazol, in particular 1,2,3-triazol-1-yl or 1,2,3-triazol-2-yl, 1,2,4-triazol, in particular 1,2,4-triazol-1-yl, pyridyl, in particular pyridin-2-yl, pyrazin, in particular pyrazin-2-yl, and pyridazin, in particular pyridazin-3-yl. The aforementioned aromatic heterocyclic radicals may carry 1, 2 or 3 identical or different groups R^{44} as defined above, in particular a radical R^{44} which is selected from halogen, cyano, nitro, amino, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkoxycarbonyl, C_1-C_4-alkylcarbonyloxy, C_1-C_4-haloalkyl, C_1-C_4-haloalkoxy, C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl, -S-CH_2-C_6H_5 (benzylthio), phenyl or furyl.

Examples of preferred radicals R^{4b} include:
pyrazol-1-yl, 3-amino-pyrazol-1-yl, 3-(i-propyl)pyrazol-1-yl, 3-bromo-pyrazol-1-yl, 3-CH_3-pyrazol-1-yl, 3-CF_3-pyrazol-1-yl, 3-phenylpyrazol-1-yl, 4-bromo-pyrazol-1-yl, 4-chloro-pyrazol-1-yl, 4-iodo-pyrazol-1-yl, 4-CH_3-pyrazol-1-yl, 4-cyano-pyrazol-1-yl, 5-nitropyrazol-1-yl, 3-amino-4-cyano-pyrazol-1-yl, 3-(furan-2-yl)-4-methyl-pyrazol-1-yl,

4-methyl-5-oxo-2,5-dihydro-pyrazol-1-yl, 5-chloro-4-methyl-pyrazol-1-yl, 5-ethoxycarbonyl-3-methyl-pyrazol-1-yl, 5-methoxy-4-methyl-pyrazol-1-yl, 3,5-dimethylpyrazol-1-yl, 3,5-dimethyl-4-chloropyrazol-1-yl, 1,2,3-triazol-1-yl, 1,2,3-triazol-2-yl, 1,2,4-triazol-1-yl, 3-amino-1,2,4-triazol-1-yl, 3-benzylsulfanyl-1,2,4-triazol-1-yl, 3-nitro-1,2,4-triazol-1-yl, 3,5-dimethyl-1,2,4-triazol-1-yl, thiazol-2-yl, 2-methyl-thiazol-4-yl, 4-methyl-thiazol-2-yl, 2-pyridyl, 4-CH_3-pyrid-2-yl, 6-CH_3-pyrid-2-yl, pyrazin-2-yl and pyridazin-3-yl.

Amongst the 5-phenyl pyrimidines I, which carry a radical R^{4b} in the 2-position of the pyrimidine moiety, compounds formula Ib



(Ib)

are preferred in which R^1, R^2 and R^{4b} are as define above,

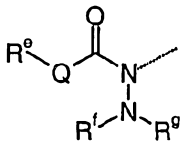
n is 1, 2, 3, 4 or 5, in particular 1, 2, or 3;

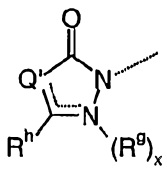
Y^b denotes halogen, cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1–C_4-haloalkoxy or C_3–C_6-alkenyloxydenotes halogen, cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1–C_4-haloalkoxy or C_3–C_6-alkenyloxy; in particular C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, most preferably chlorine;

L^b denotes, independently of each other, halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkyl, C_1-C_6-haloalkoxy, C_3-C_6-cycloalkoxy, C_1-C_6-alkoxycarbonyl and C_1-C_6-alkylaminocarbonyl. In particular the phenyl ring of the compounds Ib is of the formula C as defined above.

In a third embodiment of the invention the substituted 5-phenylpyrimidine compounds I carry a radical R^{4c} in the 2-position of the pyrimidine ring, wherein

R^{4c} corresponds to one of the formulae:





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

..... may be a double bond or a single bond;

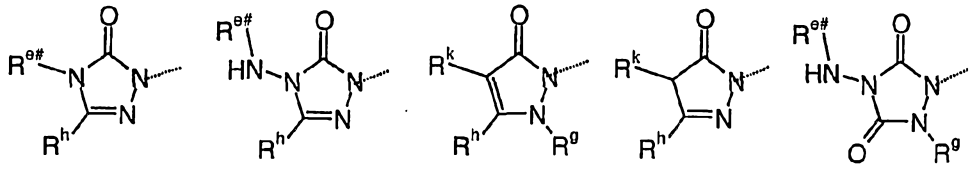
R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano;

R^h together with the carbon to which it is attached may be a carbonyl group;

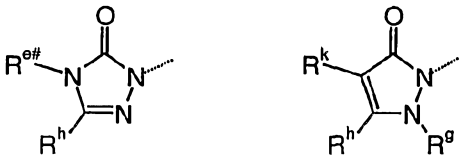
where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

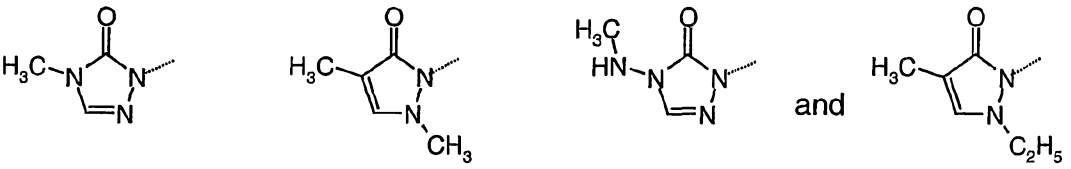
Preferably, the radical R^{4c} corresponds one of the following formulae:



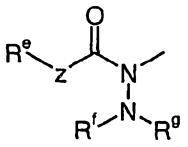
wherein $R^{e\#}$, R^g and R^h are as defined above. In these formulae $R^{e\#}$, R^g and R^h are preferably independently of one another hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_6-cycloalkyl, in particular are hydrogen, methyl or ethyl. Amongst these preference is given to radicals R^{4c} of the formulae:



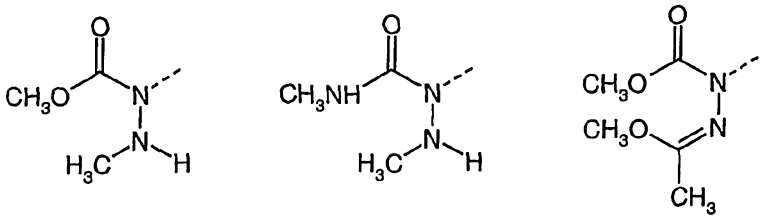
wherein $R^{e\#}$, R^g and R^h are as defined above. Examples for these radicals include radicals of the following formulae:



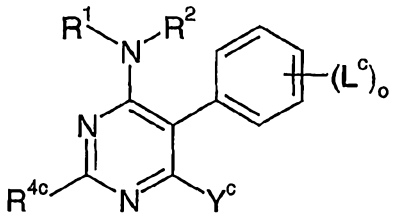
Likewise, preference is given to 5-phenyl pyrimidines I, wherein the radical R^{4c} in the 2-position is of the formula:



wherein Z, R^e, R^f and R^g are as defined above. Preferably Z is oxygen. Preferably R^e, R^f and R^g are independently of one another hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_6-cycloalkyl, in particular hydrogen, methyl or ethyl or R^f and R^g together with the nitrogen are a radical R^e-Z-C(R^h)=N, wherein Z, R^e and R^h are as defined above. In particular Z is oxygen and R^e and R^h are H or C_1-C_6-alkyl. Examples of this type of radical R^{4c} include:



Amongst the 5-phenyl pyrimidines I, which carry a radical R^{4c} in the 2-position of the pyrimidine moiety, compounds formula Ic



(Ic)

in which R^1, R^2 and R^{4c} have the meanings given above,

o is 1, 2, 3, 4 or 5, in particular 1, 2 or 3;

Y^c is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy or C_3-C_4-alkynyloxy, where the alkyl, alkenyl and alkynyl radicals of Y^c may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl, in particular C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, most preferably chlorine;

L^c is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1,

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L^c for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

Particular preference is also given to compounds Ic in which Y^c is C_1-C_4-alkyl which may be substituted by halogen. Moreover, particular preference is given to compounds Ic in which Y^c is halogen, cyano, C_1-C_4-alkyl or C_1-C_4-alkoxy. Especially preferred are compounds I in which Y^c is methyl, ethyl, cyano, bromine or in particular chlorine.

Moreover, particular preference is given to compounds Ic in which the index o and the substituents L^c are as defined below:

o is 1 to 3;

L^c is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^3)(=N-OA^1), N(A^2)A^1, N(A^3)-C(=O)-A^1 or S(=O)$_m$-A^1;

m is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy, or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

Especially preferred are compounds Ic, where the substituent L^c is as defined below:

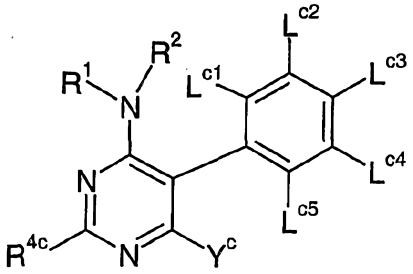
L^c is halogen, cyano, C_1-C_8-alkyl, C_1-C_6-alkoxy, -C(=O)-O-A^1, -C(=O)-N(A^2)A^3,

m is 0, 1 or 2;

A^1, A^2, independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl which radicals may carry a radical R^u as defined above.

R^u is preferably halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_5-C_6-cycloalkenyl, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), where the aliphatic or alicyclic groups for their part may be partially or fully halogenated or may carry one to three groups R^v, R^v having the same meaning as R^u. R^u is in particular halogen, cyano, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_6-alkoxy, C_2-C_6-alkenyloxy, C_2-C_6-alkynyloxy, C_3-C_6-cycloalkyl, C_5-C_6-cycloalkenyl.

Amongst compounds Ic preference is given to compounds Ic'



(Ic')

wherein R^1, R^2, R^{4c} and Y^c are as defined above and wherein

L^{c1} is fluorine, chlorine, CH_3 or CF_3;

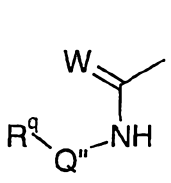
L^{c2}, L^{c4} independently of one another are hydrogen, CH_3 or fluorine;

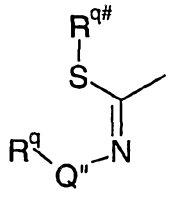
L^{c3} is hydrogen, fluorine, chlorine, bromine, cyano, CH_3, SCH_3, OCH_3, SO_2CH_3, CO-NH_2, CO-$NHCH_3$, CO-NHC_2H_5, CO-$N(CH_3)_2$, NH-C(=O)CH_3, N(CH_3)-C(=O)CH_3 or $COOCH_3$ and

L^{c5} is hydrogen, fluorine, chlorine or CH_3.

In a fourth embodiment of the invention the substituted 5-phenyl pyrimidine compounds I carry a radical R^{4d} in the 2-position of the pyrimidine ring, wherein

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl (=C_1-C_4-alkylcarbonyl) and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

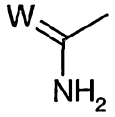
$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

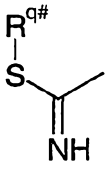
W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acylamino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

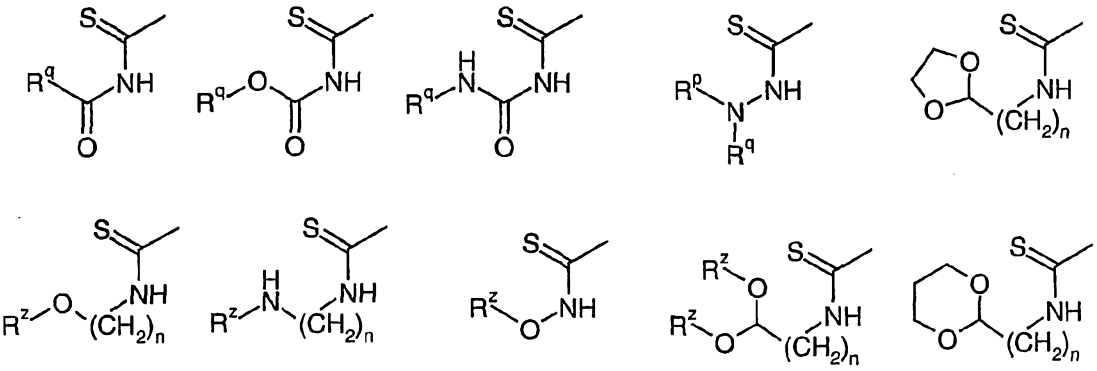
Preferred radicals R^{4d} are of the following formulae





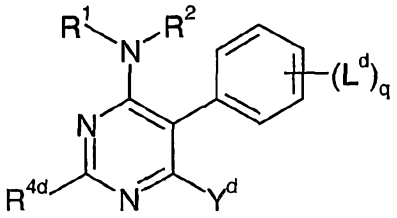
wherein W and $R^{q\#}$ are as defined above.

Finally, R^{4d} may preferably have the following meanings, which may also be understood as prodrug radical definitions (see Medicinal Research Reviews 2003, 23, 763-793, or J. of Pharmaceutical Sciences 1997, 86, 765-767):



In the ten aforementioned radicals the index n in the alkenyl radicals of the above formulae is an integer from 1, 2 or 3. The substituent R^z is preferably hydrogen, methyl, allyl or propargyl and particularly preferably hydrogen. The substituent R^q is preferably hydrogen, C_1-C_6-alkyl or C_2-C_6-alkenyl and with particular preference methyl, allyl or propargyl.

Amongst the 5-phenyl pyrimidines I, which carry a radical R^{4d} in the 2-position of the pyrimidine moiety, compounds formula Id



(Id)

are preferred, in which R^1, R^2 and R^{4d} have the meanings given in claim 1,

q is 1, 2, 3, 4 or 5, in particular 1, 2 or 3;

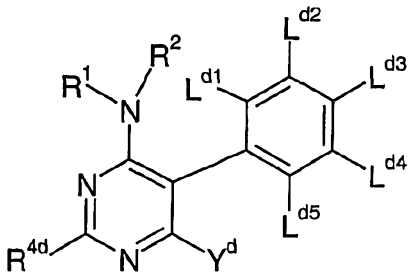
Y^d is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^d may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl. Y^d is in particular C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, most preferably chlorine;

L^d has one of the meanings given for L^c.

Particular preference is also given to compounds Id in which Y^d is C_1-C_4-alkyl which may be substituted by halogen. Moreover, particular preference is given to compounds

Ic in which Y^d is halogen, cyano, C_1-C_4-alkyl or C_1-C_4-alkoxy. Especially preferred are compounds I in which Y^d is methyl, ethyl, cyano, bromine or in particular chlorine.

Amongst compounds Id preference is given to compounds Id'



(Id')

wherein R^1, R^2, R^{4d} and Y^d are as defined above and wherein

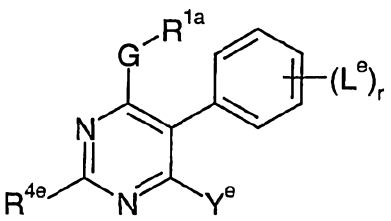
L^{d1} is fluorine, chlorine, CH_3 or CF_3;

L^{d2}, L^{d4} independently of one another are hydrogen, CH_3 or fluorine;

L^{d3} is hydrogen, fluorine, chlorine, bromine, cyano, CH_3, SCH_3, OCH_3, SO_2CH_3, $CO\text{-}NH_2$, $CO\text{-}NHCH_3$, $CO\text{-}NHC_2H_5$, $CO\text{-}N(CH_3)_2$, $NH\text{-}C(=O)CH_3$, $N(CH_3)\text{-}C(=O)CH_3$ or $COOCH_3$ and

L^{d5} is hydrogen, fluorine, chlorine or CH_3.

In another embodiment of the invention, the substituted 5-phenyl pyrimidines I are of formula Ie



(Ie)

in which R^{1a} is as defined in claim 1,

r is 1, 2, 3, 4 or 5, in particular 1, 2 or 3;

Y^e is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^e may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

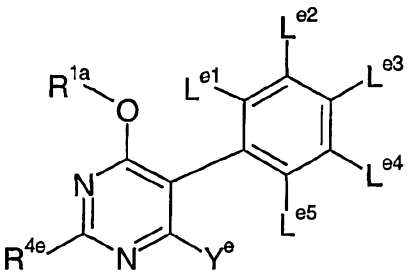
G denotes O or S, in particular O;

L^e has one of the meanings given for L^c, in particular one of the preferred meanings.

R^{4e} has one of the meanings given for R^a or R^{4a}, in particular one of the preferred meanings.

Y^e is in particular halogen, C_1-C_4-alkyl, cyano or C_1-C_4-alkoxy, such as chlorine, bromine, methyl, cyano, methoxy or ethoxy, especially chlorine, bromine or methyl, most preferably chlorine.

Amongst compounds Ie preference is given to compounds Ie'



(Ie')

wherein R^1, R^2, R^{4e} and Y^e are as defined above and wherein

L^{e1} is fluorine, chlorine, CH_3 or CF_3;

L^{e2},L^{e4} independently of one another are hydrogen, CH_3 or fluorine;

L^{e3} is hydrogen, fluorine, chlorine, bromine, cyano, CH_3, SCH_3, OCH_3, SO_2CH_3, $CO\text{-}NH_2$, $CO\text{-}NHCH_3$, $CO\text{-}NHC_2H_5$, $CO\text{-}N(CH_3)_2$, $NH\text{-}C(=O)CH_3$, $N(CH_3)\text{-}C(=O)CH_3$ or $COOCH_3$ and

L^{e5} is hydrogen, fluorine, chlorine or CH_3.

The substituted 5-phenyl pyrimidines I, in particular the compounds of the formulae Ia, Ib, Ic, Id and Ie effectively inhibit growth and/or progeny of tumor cells as can be shown by standard tests on tumor cell lines such as HeLa, MCF-7 and COLO 205. In particular, 5-phenyl pyrimidines I show in general IC_{50} values < 10^{-6} mol/l (i.e. < 1 µM), preferably IC_{50} values < 10^{-7} mol/l (i.e. < 100 nM) for cell cycle inhibition in HeLa cells as determined by the test procedure outlined below.

Based on the results of these standard pharmacological test procedures, substituted 5-phenyl pyrimidines are useful as agents for treating, inhibiting or controlling the growth and/or progeny of cancerous tumor cells and associated diseases in a subject in need thereof. Therefore these compounds are useful in therapy of cancer in warm blooded vertebrates, i.e. mammals and birds, in particular human beings but also in other mammals of economic and/or social importance e.g. carnivores such as cats and

dogs, swine (pigs, hogs and wild boars), ruminats (e.g. cattle, oxen, sheep, deer, goats, bison) and horses, or bird in particular poultry such as turkeys, chickens, ducks, geese, guinea fowl and the like.

In particular 5-phenyl pyrimidines I are useful in therapy of cancer or cancerous disease including cancer of breast, lung, colon, prostate, melanoma, epidermal, kidney bladder, mouth, larynx, esophagus, stomach, ovary, pancreas, liver, skin and brain.

The effective dosage of active ingredient employed may vary depending on the particular compound employed, the mode of administration and severity of the condition being treated. However, in general satisfactory results are obtained when the compounds of the invention are administered in amounts ranging from about 0.10 to about 100 mg/kg of body weight per day. A preferred regimen for optimum results would be from about 1 mg to about 20 mg/kg of body weight per day and such dosage units are employed that a total of from about 70 mg to about 1400 mg of the active compound for a subject of about 70 kg of body weight are administered in a 24 hour period.

The dosage regimen for treating mammals may be adjusted to provide the optimum therapeutic response. For example, several divided doses may be administered daily or the dose may be proportionally reduced as indicated by the exigencies of the therapeutic situation. A decidedly practical advantage is that these active compounds may be administered in any convenient manner such as by the oral, intravenous, intramuscular or subcutaneous routes. The active compounds may be orally administered, for example, with an inert diluent or with an assimilable edible carrier, or they may be enclosed in hard or soft shell gelatine capsules, or they may be compressed into tablets or they may be incorporated directly with the food of the diet. For oral therapeutic administration, these active compounds may be incorporated with excipients and used in the form of ingestible tablets, buccal tablets, troches, capsules, elixirs, suspensions, syrups, wafers and the like. Such compositions and preparations should contain at least 0.1% of active compound. The percentage of the compositions and preparations may, of course, be varied and may conveniently be between about 2% to about 60% of the weight of the unit. The amount of active compound in such therapeutically useful compositions is such that a suitable dosage will be obtained. Preferred compositions or preparations according to the present invention are prepared so that an oral dosage unit form contains between 10 and 1000 mg of active compound.

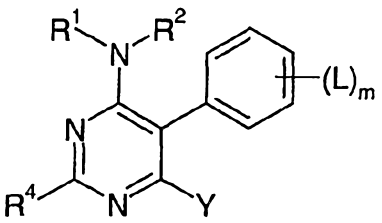
The tablets, troches, pills, capsules and the like may also contain the following: a binder such as gum tragacanth, acacia, corn starch or gelatine; excipients such as dicalcium phosphate; a disintegrating agent such as corn starch, potato starch, alginic

acid and the like; a lubricant such as magnesium stearate; and a sweetening agent such as sucrose, lactose, or saccharin may be added or a flavoring agent such as peppermint, oil of wintergreen or cherry flavoring. When the dosage unit form is a capsule, it may contain, in addition to materials of the above type, a liquid carrier. Various other materials may be present as coatings or to otherwise modify the physical form of the dosage unit. For instance, tablets, pills or capsules may be coated with shellac, sugar or both. A syrup or elixir may contain the active compound, sucrose, as a sweetening agent, methyl and propylparabens as preservatives, a dye and flavoring such as cherry or orange flavor. Of course, any material used in preparing any dosage unit form should be pharmaceutically pure and substantially non-toxic in the amounts used. In addition, these active compounds may be incorporated into sustained-release preparations and formulations.

These active compounds may also be administered parenterally or intraperitoneally. Solutions or suspensions of these active compounds as a free base or pharmacologically acceptable salt can be prepared in water suitably mixed with a surfactant such as hydroxypropylcellulose. Dispersions can also be prepared in glycerol, liquid polyethylene glycols, and mixtures thereof in oils. Under ordinary conditions of storage and use, these preparations contain a preservative to prevent the growth or microorganisms.

The pharmaceutical forms suitable for injectable use include sterile aqueous solutions or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions. In all cases, the form must be sterile and must be fluid to the extent that easy syringability exists. It must be stable under the conditions of manufacture and storage and must be prepared against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (e.g., glycerol, propylene glycol and liquid poly-ethylene glycol), suitable mixtures thereof, and vegetable oils.

The following examples 1 to 221 given in table 1 are representative compounds of this invention which are useful as anticancer agents. In table 1 the compounds are defined by formula I-A, wherein for the respective example R^1, R^2, R^4, Y, $(L)_m$ are given in the rows of table 1.



(I-A)

Table 1: compounds of the general formula I-A

Example	R^4	NR^1R^2	Y	$(L)_m$
1	pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
2	2-pyridyl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
3	3,5-(CH_3)$_2$-4-Cl-pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
4	3-phenylpyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
5	3-(i-propyl)pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
6	3-CF_3-pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
7	5-nitropyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
8	1,2,4-triazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
9	-N(CH_3)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
10	-CN	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
11	6-CH_3-pyrid-2-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
12	pyrid-2-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
13	6-CH_3-pyrid-2-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
14	4-CH_3-pyrid-2-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
15	4-CH_3-pyrid-2-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
16	3-CF_3-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
17	4-Br-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
18	3-CH_3-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3
19	4-Br-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2-F, 6-Cl
20	3-CH_3-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2-F, 6-Cl
21	3,5-dimethyl-pyrazol-1-yl	NH-CH(CH_3)$_2$	Cl	2,4,6-F_3

Example	R^4	NR^1R^2	Y	$(L)_m$
22	3-(i-propyl)pyrazol-1-yl	NH-CH$(CH_3)_2$	Cl	2,4,6-F_3
23	5-nitropyrazol-1-yl	NH-CH$(CH_3)_2$	Cl	2,4,6-F_3
24	4-CH_3-pyrazol-1-yl	NH-CH$(CH_3)_2$	Cl	2,4,6-F_3
25	pyrazin-2-yl	NH-CH$(CH_3)_2$	Cl	2-F, 6-Cl
26	pyrazin-2-yl	N$(CH_2CH_3)_2$	Cl	2,4,6-F_3
27	pyrazin-2-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
28	1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
29	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
30	3,5-dimethyl-pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
31	5-nitropyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
32	3-methyl-pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
33	4-methyl-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
34	4-iodo-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
35	4-chloro-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
36	pyridazin-3-yl	(S)-NHCH(CH_3)CH$(CH_3)_2$	Cl	2,4,6-F_3
37	pyrazin-2-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
38	3-bromo-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
39	thiazol-2-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
40	thiazol-2-yl	NH(cyclopentyl)	Cl	2,4,6-F_3
41	pyrazol-1-yl	3,6-dihydro-2H-pyridin-1-yl	Cl	2,4,6-F_3
42	1,2,3-triazol-1-yl	3-methyl-piperidin-1-yl	Cl	2,4,6-F_3
43	pyrazol-1-yl	3-methyl-piperidin-1-yl	Cl	2,4,6-F_3
44	1,2,4-triazol-1-yl	3-methyl-piperidin-1-yl	Cl	2,4,6-F_3
45	1,2,3-triazol-1-yl	3,6-dihydro-2H-pyridin-1-yl	Cl	2,4,6-F_3

Example	R^4	NR^1R^2	Y	$(L)_m$
46	pyrazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2-F, 6-Cl
47	1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-F, 6-Cl
48	1,2,4-triazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2-F, 6-Cl
49	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-F, 6-Cl
50	1,2,3-triazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2-F, 6-Cl
51	pyrazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
52	1,2,4-triazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
53	4-bromo-pyrazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
54	3,5-dimethyl-1,2,4-triazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
55	4-methyl-pyrazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
56	1,2,3-triazol-1-yl	piperidin-1-yl	Cl	2,4,6-F_3
57	3-aminopyrazol-1-yl	NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
58	-C(NH_2)=NOH	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
59	3,5-dimethyl-1,2,4-triazol-1-yl	3,6-dihydro-2H-pyridin-1-yl	Cl	2,4,6-F_3
60	1,2,4-triazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,4,6-F_3
61	2-pyridyl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
62	2-pyridyl	NH($CH(CH_3)_2$)	Cl	2,6-F_2, 4-OCH_3
63	2-pyridyl	NH($CH(CH_3)(C_2H_5)$)	Cl	2,6-F_2, 4-OCH_3
64	2-pyridyl	NH(cyclopentyl)	Cl	2,6-F_2, 4-OCH_3
65	2-pyridyl	(S)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,6-F_2, 4-OCH_3
66	pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-F, 6-Cl
67	pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
68	1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
69	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3

Example	R^4	NR^1R^2	Y	$(L)_m$
70	2-methyl-thiazol-4-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,4,6-F_3
71	2-methyl-thiazol-4-yl	NHCH(CH_3)(C_2H_5)	Cl	2,4,6-F_3
72	2-methyl-thiazol-4-yl	NH(cyclopentyl)	Cl	2,4,6-F_3
73	2-pyridyl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OH
74	pyrazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2,4,6-F_3
75	1,2,4-triazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2,4,6-F_3
76	1,2,3-triazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2,4,6-F_3
77	3,5-dimethyl-1,2,4-triazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2,4,6-F_3
78	pyridazin-3-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
79	pyridazin-3-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
80	pyridazin-3-yl	NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,4,6-F_3
81	2-pyridyl	4-methyl-piperidin-1-yl	Cl	2,6-F_2
82	2-pyridyl	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2
83	2-pyridyl	NH-CH(CH_3)$_2$	Cl	2,6-F_2
84	2-pyridyl	(R)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2
85	3,5-dimethyl-1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-F, 6-Cl
86	3-nitro-1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
87	pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-F, 4-CH_3
88	5-ethoxycarbonyl-3-methyl-pyrazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,4,6-F_3
89	3-nitro-1,2,4-triazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,4,6-F_3
90	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	CH_3	2,4,6-F_3
91	1,2,3-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2,4,6-F_3
92	3-methyl-pyrazol-1-yl	(R)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2,4,6-F_3
93	1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	CH_3	2,4,6-F_3

Example	R^4	NR^1R^2	Y	$(L)_m$
94	3-amino-1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,4,6-F_3
95	3-(furan-2-yl)-4-methylpyrazol-1-yl	NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
96	pyrazol-1-yl	2-methyl-piperidin-1-yl	Cl	2,4,6-F_3
97	pyrazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 4-CH_3
98	1,2,4-triazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2-F, 6-Cl
99	pyrazol-1-yl	3-methyl-piperidin-1-yl	Cl	2-F, 4-CH_3
100	1,2,4-triazol-1-yl	(S)-NHCH(CH_3)($CH(CH_3)_2$)	Cl	2-F, 4-CH_3
101	pyrazol-1-yl	NH-$CH(CH_3)_2$	Cl	2,4,6-F_3
102	pyrazol-1-yl	(S)-NHCH(CH_3)(C_2H_5)	Cl	2-F, 4-CH_3
103	pyrazol-1-yl	NH-$CH_2CH_2CH_3$	Cl	2-F, 4-CH_3
104	3-amino-pyrazol-1-yl	NH-$CH(CH_3)_2$	Cl	2,4,6-F_3
105	pyrazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2,4-F_2
106	pyrazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-Cl
107	1,2,3-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-Cl
108	pyrazol-1-yl	NH-CH_2CF_3	Cl	2-F, 4-CH_3
109	pyrazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-CH_3
110	1,2,4-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-CH_3
111	1,2,3-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-CH_3
112	-ON=$C(CH_3)_2$	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-CH_3
113	1,2,4-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2,6-F_2
114	1,2,3-triazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2,6-F_2
115	pyrazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2
116	1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2
117	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2

Example	R^4	NR^1R^2	Y	$(L)_m$
118	3,5-dimethyl-1,2,4-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2,6-F_2
119	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	Cl	2-Cl, 4-F
120	4-iodo-pyrazol-1-yl	NH-CH(CH_3)(C_2H_5)	Cl	2-F, 6-CH_3
121	3-amino-pyrazol-1-yl	NH-CH(CH_3)($CH_2CH_2CH_3$)	Cl	2-F, 4-CH_3
122	3-amino-pyrazol-1-yl	NH-$CH_2C(CH_3)=CH_2$	Cl	2,4,6-F_3
123	4-bromo-pyrazol-1-yl	N(CH_3)-$CH_2CH=CH_2$	Cl	2,4,6-F_3
124	4-bromo-pyrazol-1-yl	NH-CH(CH_3)CH_2OH	Cl	2,4,6-F_3
125	pyrazol-1-yl	2-methyl-piperidin-1-yl	Cl	2,6-F_2
126	1,2,3-triazol-1-yl	2-methyl-piperidin-1-yl	Cl	2,6-F_2
127	3-amino-pyrazol-1-yl	2-methyl-piperidin-1-yl	Cl	2,6-F_2
128	3-amino-pyrazol-1-yl	NH-CH(CH_3)CH_2OCH_3	Cl	2-F, 4-CH_3
129	thiazol-2-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
130	-$C(NH_2)=NOCH_3$	(R)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
131	3-amino-pyrazol-1-yl	N(CH_3)-$CH_2CH_2CH=CH_2$	Cl	2-F, 6-Cl
132	pyrazol-1-yl	N(CH_3)-$CH_2CH_2CH=CH_2$	Cl	2-Cl, 4-F
133	4-methyl-pyrazol-1-yl	N(CH_3)-$CH_2CH_2CH=CH_2$	Cl	2-Cl, 4-F
134	4-bromo-pyrazol-1-yl	N($CH_2CH=CH_2$)$_2$	Cl	2-Cl, 4-F
135	3-amino-pyrazol-1-yl	N($CH_2CH=CH_2$)$_2$	Cl	2-Cl, 4-F
136	thiazol-2-yl	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-F, 6-Cl
137	-$C(NH_2)=NOH$	(R)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
138	pyrazol-1-yl	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,4,6-F_3
139	1,2,3-triazol-1-yl	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,4,6-F_3
140	pyrazol-1-yl	2-methyl-pyrrolidin-1-yl	Cl	2,6-F_2
141	1,2,4-triazol-1-yl	2-methyl-piperidin-1-yl	Cl	2,4-F_2

Example	R^4	NR^1R^2	Y	$(L)_m$
142	pyrazol-1-yl	$N(CH_3)$-$CH_2CH=CH_2$	Cl	2,4,6-F_3
143	3-amino-pyrazol-1-yl	NH-$CH(CH_3)C_2H_5$	Cl	2-F, 6-CH_3
144	-$C(NH_2)$=NOH	NH-$CH(CH_3)_2$	Cl	2,4,6-F_3
145	-$C(NH_2)$=NOH	(S)-NH-$CH(CH_3)CH(CH_3)_2$	Cl	2,4,6-F_3
146	-$C(NH_2)$=NOH	NH-$CH(CH_3)C_2H_5$	Cl	2,4,6-F_3
147	-$C(NH_2)$=$NOCH_3$	(S)-NH-$CH(CH_3)CH(CH_3)_2$	Cl	2,4,6-F_3
148	3-amino-pyrazol-1-yl	NH-$CH(CH_3)(C_2H_5)$	Cl	2-F, 6-Cl
149	3-amino-pyrazol-1-yl	NH-CH_2CF_3	Cl	2-F, 4-CH_3
150	4-chloro-pyrazol-1-yl	NH-CH_2CF_3	Cl	2-F, 4-CH_3
151	3-benzylsulfanyl-1,2,4-triazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
152	-NHN=CH$(CH(CH_3)C(O)OC_2H_5)$	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
153	4-methyl-5-oxo-2,5-dihydro-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
154	5-methoxy-4-methyl-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
155	5-chloro-4-methyl-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
156	pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	CH_3	2,4,6-F_3
157	1,2,3-triazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	CH_3	2,4,6-F_3
158	-$C(NH_2)$=NOC_2H_5	(R)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
159	-C(O)NH_2	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
160	5-ethoxycarbonyl-3-methyl-pyrazol-1-yl	NH-$CH_2CH_2CH_3$	Cl	2-F, 4-CH_3
161	pyrazol-1-yl	2-methyl-piperidin-1-yl	Br	2,4,6-F_3
162	4-cyano-pyrazol-1-yl	(S)-NHCH$(CH_3)(CF_3)$	Cl	2,4,6-F_3
163	4-cyano-pyrazol-1-yl	NH-$CH(CH_3)C_2H_5$	Cl	2-F, 6-Cl
164	pyrazol-1-yl	NH-C_2H_5	Cl	2,4,6-F_3
165	1,2,3-triazol-2-yl	(S)-NHCH$(CH_3)(CF_3)$	Br	2,4,6-F_3

Example	R^4	NR^1R^2	Y	$(L)_m$
166	1,2,3-triazol-1-yl	4-methyl-piperidin-1-yl	CH_3	2-F, 6-Cl
167	pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	F	2,4,6-F_3
168	-C(NH_2)=NOH	(S)-NHCH(CH_3)(C_2H_5)	Cl	2-Cl, 4-F
169	-C(S)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2-F, 6-Cl
170	-C(NH_2)=NOCH_3	2-methyl-pyrrolidinyl-1-yl	Cl	2-Cl, 4-F
171	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	CH_3	2,4,6-F_3
172	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 4-F
173	-C(NH_2)=NOH	NH-CH_2CF_3	Cl	2,4,6-F_3
174	-C(O)NH(CH_3)	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
175	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2
176	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2-F, 6-Cl
177	-C(NH_2)=N$OCHF_2$	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
178	4-methyl-thiazol-2-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
179	-C(O)NH_2	4-methyl-piperidin-1-yl	Cl	2,6-F_2
180	-C(O)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2
181	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2, 4-OCH_3
182	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2, 4-OCH_3
183	-C(O)NH_2	(S)-NHCH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-OCH_3
184	-C(O)NHC(O)CH_3	4-methyl-piperidin-1-yl	Cl	2,6-F_2
185	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-OCH_3
186	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-OCH_3
187	3-amino-4-cyano-pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2-F, 6-Cl
188	-C(O)NH_2	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
189	-C(O)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2, 4-OCH_3

Example	R^4	NR^1R^2	Y	$(L)_m$
190	-C(NH_2)=NOH	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
191	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2, 4-OCH_3
192	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-NO_2
193	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-F
194	-C(NH_2)=NOH	4-methyl-piperidin-1-yl	Cl	2,6-F_2
195	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2
196	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2
197	-C(NH_2)=NOCH_3	4-methyl-piperidin-1-yl	Cl	2,6-F_2, 4-OCH_3
198	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2, 4-OCH_3
199	-C(O)NH_2	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2,6-F_2, 4-OCH_3
200	-C(CH_3)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-OCH_3
201	-C(NH_2)=NOH	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 5-F
202	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 5-F
203	-C(S)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2, 4-OCH_3
204	-ON=C(CH_3)$_2$	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
205	1,2,3-triazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
206	1,2,3-triazol-1-yl	N(CH_3)($CH_2CH=CH_2$)	Cl	2,4,6-F_3
207	pyrazol-1-yl	(S)-NHCH(CH_3)(CF_3)	Br	2,4,6-F_3
208	-C(NH_2)=NOH	2-methyl-pyrrolidin-1-yl	Cl	2-Cl, 4-F
209	-C(CH_3)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2,4,6-F_3
210	2-oxo-pyrrolidin-1-yl	NHCH_2CF_3	Cl	2,4,6-F_3
211	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 4-F
212	1,2,3-triazol-1-yl	NHCH_2CF_3	Cl	2,4,6-F_3
213	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2,6-F_2

Example	R^4	NR^1R^2	Y	$(L)_m$
214	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2-F, 6-Cl
215	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 4-OCH_3
216	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 4-OCH_3
217	-C(O)NH_2	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 4-OCH_3
218	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-F
219	-C(NH_2)=NOCH_3	(S)-NH-CH(CH_3)CH(CH_3)$_2$	Cl	2-Cl, 4-NO_2
220	-C(NH_2)=NOH	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 5-F
221	-C(NH_2)=NOCH_3	(S)-NHCH(CH_3)(CF_3)	Cl	2-Cl, 5-F

Measurement of the cell cycle inhibition in HeLa cells - test procedure:

HeLa B cells are grown in DMEM (Life Technologies Cat No 21969-035) supplemented with 10% Fetal Calf Serum (FCS, Life Technologies Cat No 10270-106) in 180 cm^2 Flasks at 37°C, 92% humidity and 7% CO_2.

Cells are seeded at $5x10^4$cells per well in a 24-well plate. Twenty hours later the compounds are added such that the final concentration is $1x10^{-6}$, $3.3x10^{-7}$, $1.1x10^{-7}$, $3.7x10^{-8}$, $1.2x10^{-8}$ and $1x10^{-9}$ M in a final volume of 500µl. DMSO alone is added to 6 wells as a control. Cells are incubated with the compounds as above for 20h. Then cells are observed under the microscope to check for cell death, and the 24-well plate is then centrifuged at 1200 rpm for 5 min at 20°C, acceleration position 7 and break position 5 (Eppendorf centrifuge 5804R).

The supernatant is removed and the cells lysed with 0.5ml RNase Buffer (10mM NaCitrate, 0.1% Nonidet NP40, 50µg/ml RNase, 10µg/ml Propidium iodide) per well. The plates are then incubated for at least 30 min in the dark at RT and the samples then transferred to FACS tubes. Samples are measured in a FACS machine (Beckton Dickinson) at the following settings:

Instrument Settings of the FACS Calibur:

Run Modus: high

Parameter	**Voltage**	**Amp Gain**	**Mode**
FSC	E01	2,5	lin
SSC	350	1	lin
Fl 1			
Fl 2	430	2	lin
Fl 3			
Fl 2 - A	---	1	lin
Fl 2 - W	---	3	lin
	DDM Parameter		Fl 2

The ratio of cells in G_0/G_1-phase to G_2/M phase is calculated and compared to the value for the controls (DMSO) only. Results are given in table 2 as the IC_{50} value calculated from the concentration curve plotted against the cell cycle ratio and indicate the compound concentration at which 50% of cells are in cell cycle arrest after treatment with the compound.

Test on other cell lines (MCF-7 and COLO 205) were done in the same way except that they were incubated with the growth medium recommended by the American Tissue Culture collection for that cell type.

Example	IC_{50} [nM]
1	4.8
2	48
3	31
4	41
5	4.6
6	17
7	21
8	13
9	13
10	47
11	42
12	6.9
13	16
14	14
15	43
16	46
17	45
18	39
19	16
20	39
21	25
22	32
23	39
24	50
25	24
26	38
27	3.5
28	17
29	17
30	48
31	49
32	43
33	11
34	25
35	36
36	7.4
37	32
38	24

Example	IC_{50} [nM]
39	26
40	23
41	38
42	18
43	19
44	18
45	17
46	38
47	26
48	13
49	10
50	9.1
51	6.5
52	22
53	26
54	23
55	26
56	11
57	5.8
58	26
59	43
60	19
61	21
62	23
63	22
64	21
65	20
66	37
67	13
68	20
69	21
70	35
71	25
72	46
73	11
74	13
75	14
76	7.6
77	35

Example	IC_{50} [nM]
78	21
79	21
80	26
81	34
82	30
83	37
84	27
85	21
86	24
87	39
88	44
89	47
90	27
91	20
92	26
93	39
94	25
95	39
96	29
97	13
98	46
99	39
100	40
101	33
102	50
103	39
104	47
105	45
106	12
107	39
108	16
109	25
110	25
111	29
112	21
113	49
114	41
115	23
116	42

Example	IC_{50} [nM]
117	19
118	32
119	48
120	25
121	50
122	46
123	49
124	45
125	38
126	38
127	37
128	38
129	14
130	1.8
131	48
132	46
133	41
134	50
135	18
136	29
137	1.5
138	23
139	26
140	20
141	46
142	39
143	32
144	25
145	23
146	32
147	41
148	34
149	41
150	50
151	8.3
152	24
153	27
154	26
155	22

Example	IC_{50} [nM]
156	15
157	19
158	44
159	23
160	31
161	50
162	17
163	30
164	48
165	30
166	42
167	20
168	36
169	41
170	59
171	54
172	21
173	18
174	42
175	18
176	20
177	21
178	20
179	53
180	41
181	6.0
182	11
183	53
184	51
185	30
186	33
187	39
188	30
189	30
190	26
191	12
192	30
193	9.0
194	21

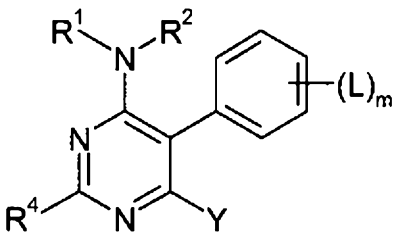
Example	IC_{50} [nM]
195	20
196	38
197	42
198	15
199	33
200	47
201	30
202	38
203	47
204	23
205	8.3
206	20
207	15
208	56
209	18
210	39
211	24
212	53
213	51
214	18
215	14
216	27
217	23
218	29
219	29
220	36
221	30

Test Report

The compounds of the formula I-A, wherein R^4, Y, NR^1R^2 and $(L)_m$ are as defined in the rows of the following table 1 were tested with regard to their capability of inhibiting cell cycle of human HeLa cells. In table 1, the prefix in the definition of $(L)_m$ indicates the position of the respective substituent on the phenyl ring.

The tests were performed by the method described on page 36 of WO 2006/079556. The final concentration of the tested compound in the assay was 3.3×10^{-7} M. All of the compounds listed in table 1 showed at least 50 % cell cycle inhibition at the concentration of 3.3×10^{-7} M.

Table 1:



(I-A)

#	R^4	NR^1R^2	Y	$(L)_m$
1	$C(O)NH_2$	$N(CH_2CH_2CH_3)(CH_2CH=CH_2)$	Cl	2-Cl; 4-$C(O)NH_2$
2	$C(O)NH_2$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	4-F; 2-CH_3
3	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	Cl	3-F; 4-OCH_3; 6-CH_3
4	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	4-F; 2-CH_3
5	$C(O)NH_2$	$NHCH_2CF_3$	Cl	3,4-F_2; 6-CH_3
6	$C(O)NH_2$	$N(CH_2CH_2CH_3)(CH_2CH=CH_2)$	Cl	2-Cl; 4-CN
7	$C(NH_2)(=N\text{-}OCH_3)$	$N(CH(CH_3)C_2H_5)(C_2H_5)$	Cl	2-Cl; 4-$C(O)OCH_3$
8	$C(NH_2)(=N\text{-}OCH_3)$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	2-Cl; 4-NO_2
9	$C(O)NH_2$	$NHCH(CH_3)(CF_3)$	Cl	2-Cl; 4-NO_2
10	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	CH_3	4-F; 2-CH_3
11	$C(NH_2)(=N\text{-}OCH_3)$	$N(CH_2CH_2CH_3)(CH_2CH=CH_2)$	Cl	2-Cl; 4-CN
12	$C(NH_2)(=N\text{-}OCH_3)$	$N(CH(CH_3)C_2H_5)(CH_2CH_2CH_3)$	Cl	2-Cl; 4-$C(O)OCH_3$
13	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	Cl	2-Cl; 4-CH_3
14	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	Cl	2-Cl; 4-CN
15	$C(NH_2)(=N\text{-}OCH_3)$	$N(CH_2CH_2CH_3)(CH_2CH=CH_2)$	Cl	2-Cl; 4-$C(O)OCH_3$
16	$C(O)NH_2$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	2-Cl; 4-NO_2

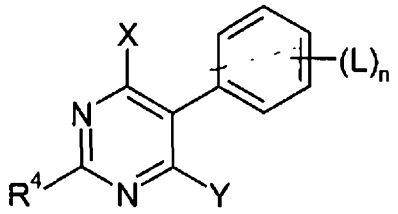
#	R^4	NR^1R^2	Y	$(L)_m$
17	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	3,4-F_2; 6-CH_3
18	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	4-F; 2-$OCHF_2$
19	$C(NH_2)(=N\text{-}OCH_3)$	4-methylpiperidin-1-yl	Cl	4-F; 2-CH_3
20	$C(NH_2)(=N\text{-}OH)$	$NHCH(CH_3)(CF_3)$	Cl	2-Cl; 4-NO_2
21	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	2-Cl; 4-NO_2
22	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	Cl	3,4-F_2; 6-CH_3
23	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	2-Cl; 4-CH_3
24	$C(O)NH_2$	$N(CH(CH_3)C_2H_5)(C_2H_5)$	Cl	2-Cl; 4-$C(O)NH_2$
25	$C(O)NH_2$	4-methylpiperidin-1-yl	Cl	2-Cl; 4-NO_2
26	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	CH_3	4-F; 2-CH_3
27	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH_2CF_3$	Cl	2-F; 6-CH_3
28	$C(O)NH_2$	$N(CH(CH_3)C_2H_5)(C_2H_5)$	Cl	2-Cl; 4-CN
29	$C(NH_2)(=N\text{-}OCH_3)$	$NHCH(CH_3)(CF_3)$	Cl	2,4-F_2; 6-$N(CH_3)_2$
30	$C(NH_2)(=N\text{-}OH)$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	2-Cl; 4-NO_2
31	$C(NH_2)(=N\text{-}OCH_3)$	$N(CH(CH_3)C_2H_5)(C_2H_5)$	Cl	2-Cl; 4-CN
32	$C(NH_2)(=N\text{-}OH)$	$NHCH(CH_3)(CF_3)$	Cl	4-F; 2-$OCHF_2$
33	$C(NH_2)(=N\text{-}OH)$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	2-Cl; 4-NO_2
34	$C(NH_2)(=N\text{-}OCH_3)$	$NH\text{-}CH(CH_3)CH(CH_3)_2$	Cl	2-Cl; 4-NO_2

Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

2006208621 23 Jun 2011

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. The use of substituted 5-phenyl pyrimidines of the formula I and their pharmaceutically acceptable salts in the manufacture of a medicament for therapy of cancer or cancerous diseases:



(I)

wherein

X is a group of the formula NR^1R^2, OR^{1a} or SR^{1a}, in which

R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or

the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1–C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; wherein

R^{a1} is halogen, oxo, nitro, cyano, hydroxy, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA), N(A')A, N(A')-C(=O)-A, N(A'')-C(=O)-N(A')A, $S(=O)_m$-A, $S(=O)_m$-O-A, $S(=O)_m$-N(A')A, phenyl or 5- or 6-membered heteroaryl, containing 1, 2, 3 or 4 nitrogen atoms as ring members or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, where the phenyl and the hetaryl moiety may carry one to three radicals selected from the group consisting of halogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-halogenalkyl, C_1-C_6-alkoxy,

cyano, nitro, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA) or N(A')A,

wherein m is 0,1 or 2;

A, A' and A" independently of each other are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by nitro, cyanato, cyano or C_1-C_4-alkoxy; or A and A' together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

R^{1a} has one of the meanings given for R^1 except for hydrogen;

Y is a radical selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

L is a radical which comprises from 1 to 10 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 0 to 4 and which is selected from the group consisting of;
halogen, cyano, cyanato (OCN), nitro, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, wherein

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic

heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L or A^1, A^2 or A^3, respectively,for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

n is 0, 1, 2, 3, 4 or 5;

R^4 is a radical which comprises from 1 to 15 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 1 to 4, wherein the radical R^4 is selected from radicals R^{4a}, R^{4c} and R^{4d}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae -ON=CR^aR^b, -CR^c=NOR^a, -NR^cN=CR^aR^b, -NR^cNR^aR^b, -NOR^a; -NR^cC(=NR^d)-NR^aR^b, -NR^cC(=O)-NR^aR^b, -NR^aC(=O)R^c, -NR^aC(=NOR^c)-R^d, -O(C=O)R^c, - C(=O)-OR^a, -C(=O)-NR^aR^b, -C(=NOR^c)-NR^aR^b, -CR^c(=NNR^aR^b), wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may

also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond, it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x;

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)=NOR^\beta$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl.

R^{4c} corresponds to one of the formulae

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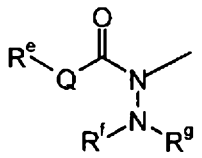
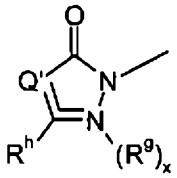




where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

..... may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

R^{4d} corresponds to one of the formulae

where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

2. The use of substituted 5-phenyl pyrimidines I according to claim 1, wherein R^4 is a radical R^{4a}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae -$ON=CR^aR^b$, -$CR^c=NOR^a$, -$NR^cN=CR^aR^b$, -$NR^cNR^aR^b$, -NOR^a; -$NR^cC(=NR^d)$-NR^aR^b, -$NR^cC(=O)$-NR^aR^b, -$NR^aC(=O)R^c$, -$NR^aC(=NOR^c)$-R^d, -$O(C=O)R^c$, - $C(=O)$-OR^a, -$C(=O)$-NR^aR^b, -$C(=NOR^c)$-NR^aR^b,

$-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, Hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)=NOR^\beta$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

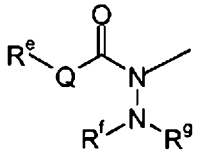
R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

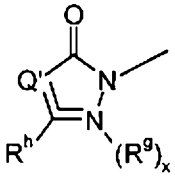
R^{α}, R^{β} denote hydrogen or C_1-C_6-alkyl.

3. The use of substituted 5-phenyl pyrimidines I according to claim 2, wherein R^4 is selected from a radical of the groups
cyano, -ON=CR^aR^b, -CR^c=NOR^a, -NR^cN=CR^aR^b,
-$NR^cNR^aR^b$, -NR^cC(=O)-NR^aR^b, -NR^aC(=O)R^c, -NR^aC(=NOR^c)-R^d, -C(=O)-NR^aR^b,
-C(=NOR^c)-NR^aR^b and -CR^c(=NNR^aR^b), wherein R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond.

4. The use of substituted 5-phenyl pyrimidines I according to claim 1, wherein R^4 is a radical R^{4c}, in which

R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

⋯ may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

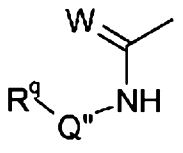
R^h together with the carbon to which it is attached may be a carbonyl group;

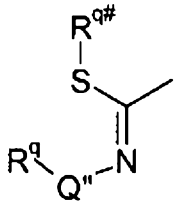
where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

5. The use of substituted 5-phenyl pyrimidines I according to claim 1, wherein R^4 is a radical R^{4d}, in which

R^{4d} corresponds to one of the formulae





where

Q'' is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

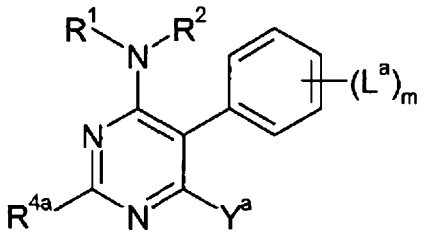
$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

6. The use of substituted 5-phenyl pyrimidines I according to claim 1, which are of formula Ia



(Ia)

in which R^1 and R^2 have the meanings given in claim 1,

m is 1, 2, 3, 4 or 5;

Y^a denotes halogen, cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1–C_4-haloalkoxy or C_3–C_6-alkenyloxy;

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which

may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)$-OR^β or $OC(R^\alpha)_2$-$C(R^\beta)=NOR^\beta$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl; and

L^a denotes, independently of each other, halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy and C_1-C_6-haloalkyl.

7. The use of substituted 5-phenyl pyrimidines I according to claim 1, which are of formula Ic

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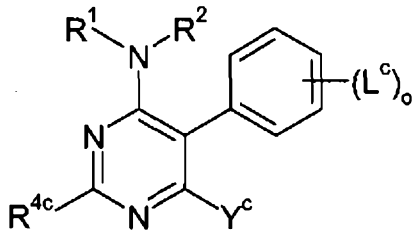


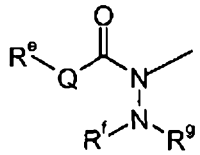
(Ic)

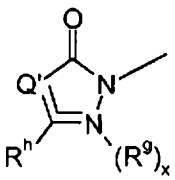
in which R^1 and R^2 have the meanings given in claim 1,

o is 1, 2, 3, 4 or 5

Y^c is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy or C_3-C_4-alkynyloxy, where the alkyl, alkenyl and alkynyl radicals of Y^c may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

---- may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano;

R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S; and

L^c is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1,

p is 0, 1 or 2;

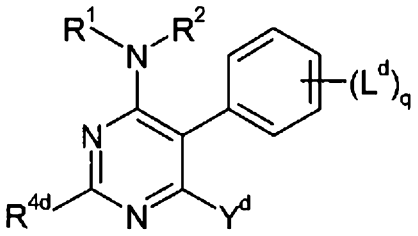
A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L^c for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1,

$N(A^2)$-C(=O)-A^1, $N(A^3)$-C(=O)-$N(A^2)A^1$, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-$N(A^2)A^1$, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

8. The use of substituted 5-phenyl pyrimidines I according to claim 1, which are of formula Id



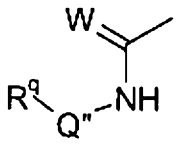
(Id)

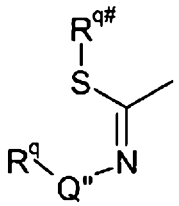
in which R^1 and R^2 have the meanings given in claim 1,

q is 1, 2, 3, 4 or 5

Y^d is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^d may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

L^d is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_8-alkyenyloxy, C_2-C_8-alkynyloxy, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl, C_3-C_6-cycloalkyloxy, C_4-C_6-cycloalkenyloxy, nitro, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1,

p is 0, 1 or 2;

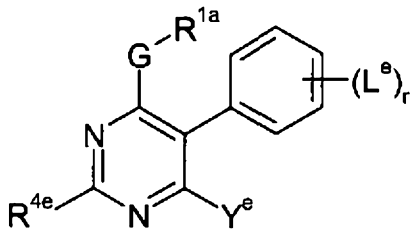
A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_8-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or

$S(=O)_p$-$N(A^2)A^1$, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

9. The use of substituted 5-phenyl pyrimidines I according to claim 1, which are of formula Ie



(Ie)

in which R^{1a} is as defined in claim 1,

r is 1, 2, 3, 4 or 5;

Y^e is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^e may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

G denotes O or S;

L^e is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_8-alkyenyloxy, C_2-C_8-alkynyloxy, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl, C_3-C_6-cycloalkyloxy, C_4-C_6-cycloalkenyloxy, nitro, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-$N(A^2)A^1$, $C(A^2)$(=N-OA^1), $N(A^2)A^1$, $N(A^2)$-C(=O)-A^1, $N(A^3)$-C(=O)-$N(A^2)A^1$, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-$N(A^2)A^1$,

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic

heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

R^{4e} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae -ON=CR^aR^b, -CR^c=NOR^a, -NR^cN=CR^aR^b, -NR^cNR^aR^b, -NOR^a; -NR^cC(=NR^d)-NR^aR^b, -NR^cC(=O)-NR^aR^b, -NR^aC(=O)R^c, -NR^aC(=NOR^c)-R^d, -O(C=O)R^c, - C(=O)-OR^a, -C(=O)-NR^aR^b, -C(=NOR^c)-NR^aR^b, -CR^c(=NNR^aR^b), wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, Hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl,

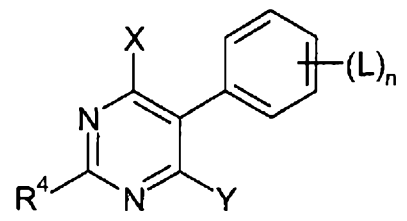
C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, C(=NOR$^{\alpha}$)-OR$^{\beta}$ or OC(R$^{\alpha}$)$_2$-C(R$^{\beta}$)=NOR$^{\beta}$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or C(=NOR$^{\alpha}$)-OR$^{\beta}$; and

R$^{\alpha}$, R$^{\beta}$ denote hydrogen or C_1-C_6-alkyl.

10. A method of providing therapy for cancer or cancerous diseases to a subject in need thereof, which method includes administering to a subject substituted 5-phenyl pyrimidines of the formula I and their pharmaceutically acceptable salts"



(I)

11.

wherein

X is a group of the formula NR^{1}R^2, OR^{1a} or SR^{1a}, in which

R^1, R^2, independently of each other, denote hydrogen, C_1-C_{10}-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_1-C_{10}-haloalkyl, C_3-C_8-cycloalkyl, C_3-C_8-halocycloalkyl, phenyl, or 5- or 6-membered heteroaryl or 5- or 6-membered heterocyclyl, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which radicals may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; or

the radical NR^1R^2 may also form a 5- or 6-membered optionally substituted heterocyclic ring, containing 1, 2, 3 or 4 nitrogen atoms or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, which are non-adjacent to the nitrogen of NR^1R^2, in which two adjacent C atoms or one N atom and one adjacent C atom can be linked by a C_1–C_4-alkylene chain and wherein the heterocyclic ring may be unsubstituted or may carry 1, 2, 3 or 4 radicals R^{a1}; wherein

R^{a1} is halogen, oxo, nitro, cyano, hydroxy, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-alkylthio, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA), N(A')A, N(A')-C(=O)-A, N(A")-C(=O)-N(A')A, $S(=O)_m$-A, $S(=O)_m$-O-A, $S(=O)_m$-N(A')A, phenyl or 5- or 6-membered heteroaryl, containing 1, 2, 3 or 4 nitrogen atoms as ring members or 1, 2 or 3 nitrogen atoms and one sulfur or oxygen atom as ring members, where the phenyl and the hetaryl moiety may carry one to three radicals selected from the group consisting of halogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_6-cycloalkyl, C_1-C_6-halogenalkyl, C_1-C_6-alkoxy, cyano, nitro, -C(=O)-A, -C(=O)-O-A, -C(=O)-N(A')A, C(A')(=N-OA) or N(A')A,

wherein m is 0,1 or 2;

A, A' and A" independently of each other are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by nitro, cyanato, cyano or C_1-C_4-alkoxy; or A and A' together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

R^{1a} has one of the meanings given for R^1 except for hydrogen;

Y is a radical selected from the group consisting of halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

L is a radical which comprises from 1 to 10 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 0 to 4 and which is selected from the group consisting of;
halogen, cyano, cyanato (OCN), nitro, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-N(A^2)A^1, wherein

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L or A^1, A^2 or A^3, respectively,for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, $S(=O)_p$-A^1, $S(=O)_p$-O-A^1 or $S(=O)_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

n is 0, 1, 2, 3, 4 or 5;

R^4 is a radical which comprises from 1 to 15 atoms which are selected from carbon, halogen, nitrogen, oxygen and sulfur, the number of carbon atoms being from 0 to 10, the number of halogen atoms being from 0 to 5 and the number of heteroatoms that are different from halogen being from 1 to 4, wherein the radical R^4 is selected from radicals R^{4a}, R^{4c} and R^{4d}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond, it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x;

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl,

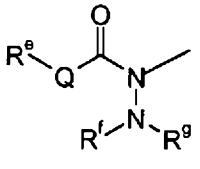
C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^{\alpha})$-OR^{β} or $OC(R^{\alpha})_2$-$C(R^{\beta})=NOR^{\beta}$,

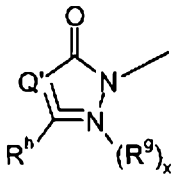
wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^{\alpha})$-OR^{β}; and

R^{α}, R^{β} denote hydrogen or C_1-C_6-alkyl.

R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-$C(R^h)$=N;

Q is oxygen or N-$R^{e\#}$;

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Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

⋯⋯ may be a double bond or a single bond;

Z is oxygen;

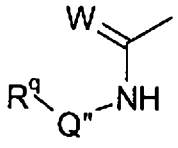
R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

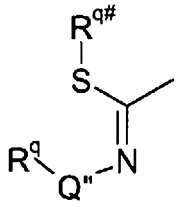
R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

11. The method according to claim 10, wherein R^4 is a radical R^{4a}, wherein

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, Hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl,

C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^{\alpha})$-OR^{β} or $OC(R^{\alpha})_2$-$C(R^{\beta})=NOR^{\beta}$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

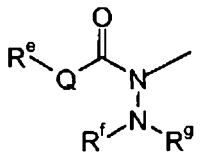
R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^{\alpha})$-OR^{β}; and

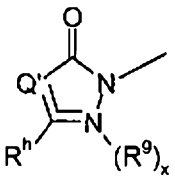
R^{α}, R^{β} denote hydrogen or C_1-C_6-alkyl.

12. The method according to claim 11, wherein R^4 is selected from a radical of the groups
cyano, $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$ and $-CR^c(=NNR^aR^b)$, wherein R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond.

13. The method according to claim 10, wherein R^4 is a radical R^{4c}, in which

R^{4c} corresponds to one of the formulae





where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_8-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

 may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano; or

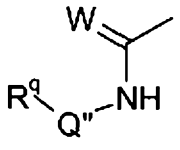
R^h together with the carbon to which it is attached may be a carbonyl group;

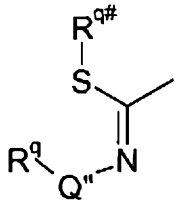
where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S.

14. The method according to claim 10, wherein R^4 is a radical R^{4d}, in which

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

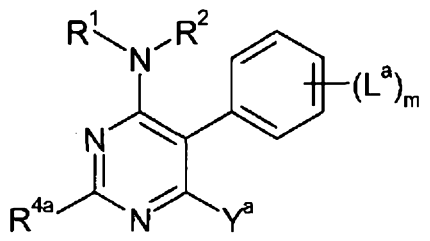
$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

15. The method according to claim 10, wherein the substituted 5-phenyl pyrimidines are of formula Ia



(Ia)

in which R^1 and R^2 have the meanings given in claim 1,

m is 1, 2, 3, 4 or 5;

Y^a denotes halogen, cyano, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1–C_4-haloalkoxy or C_3–C_6-alkenyloxy;

R^{4a} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio, C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)-OR^\beta$ or $OC(R^\alpha)_2-C(R^\beta)=NOR^\beta$,

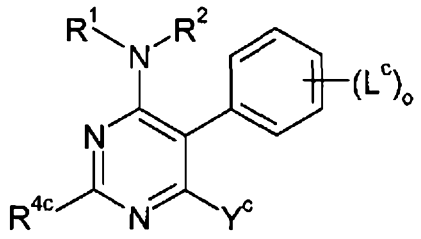
wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl, C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^\alpha)$-OR^β; and

R^α, R^β denote hydrogen or C_1-C_6-alkyl; and

L^a denotes, independently of each other, halogen, C_1-C_6-alkyl, C_1-C_6-alkoxy and C_1-C_6-haloalkyl.

16. The method according to claim 10, wherein the substituted 5-phenyl pyrimidines are of formula Ic



(Ic)

in which R^1 and R^2 have the meanings given in claim 1,

o is 1, 2, 3, 4 or 5

Y^c is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy or C_3-C_4-alkynyloxy, where the alkyl, alkenyl and alkynyl radicals of Y^c may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

R^{4c} corresponds to one of the formulae

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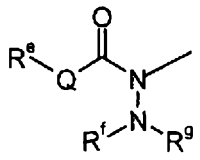
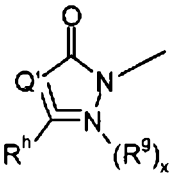




where

x is 0 or 1;

R^e, R^f, R^g, $R^{e\#}$ independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkynyl, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl,

R^f, R^g together with the nitrogen atom to which they are attached may have the meaning R^e-Z-C(R^h)=N;

Q is oxygen or N-$R^{e\#}$;

Q' is C(H)-R^k, C-R^k , N-N(H)-$R^{e\#}$ or N-$R^{e\#}$;

⋯ may be a double bond or a single bond;

Z is oxygen;

R^h, R^k have the same meanings as R^e and may additionally be halogen or cyano;

R^h together with the carbon to which it is attached may be a carbonyl group;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of R^e, $R^{e\#}$, R^f, R^g, R^h or R^k for their part may be partially or fully halogenated or may carry one to four groups R^v:

R^v is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, and where two of the radicals R^f, R^g, R^e or $R^{e\#}$ together with the atoms to which they are attached may form a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S; and

L^c is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1,

$C(A^2)(=N\text{-}OA^1)$, $N(A^2)A^1$, $N(A^2)\text{-}C(=O)\text{-}A^1$, $N(A^3)\text{-}C(=O)\text{-}N(A^2)A^1$, $S(=O)_p\text{-}A^1$, $S(=O)_p\text{-}O\text{-}A^1$ or $S(=O)_p\text{-}N(A^2)A^1$,

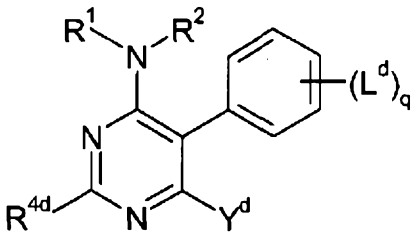
p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L^c for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, $-C(=O)\text{-}A^1$, $-C(=O)\text{-}O\text{-}A^1$, $-C(=O)\text{-}N(A^2)A^1$, $C(A^2)(=N\text{-}OA^1)$, $N(A^2)A^1$, $N(A^2)\text{-}C(=O)\text{-}A^1$, $N(A^3)\text{-}C(=O)\text{-}N(A^2)A^1$, $S(=O)_p\text{-}A^1$, $S(=O)_p\text{-}O\text{-}A^1$ or $S(=O)_p\text{-}N(A^2)A^1$, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u;

17. The method according to claim 1, wherein the substituted 5-phenyl pyrimidines are of formula Id



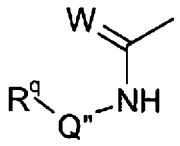
(Id)

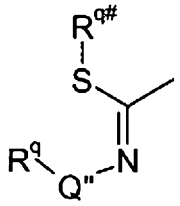
in which R^1 and R^2 have the meanings given in claim 1,

q is 1, 2, 3, 4 or 5

Y^d is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^d may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

R^{4d} corresponds to one of the formulae





where

Q" is a direct bond, -(C=O)-, -(C=O)-NH, -(C=O)-O-, -O-, -NR^p-, where the molecule moiety to the left in each case is attached to the nitrogen atom;

R^p is hydrogen, methyl or C_1-C_4-acyl and

R^q is hydrogen, methyl, benzyl, trifluoromethyl, allyl, propargyl or methoxymethyl;

$R^{q\#}$ is hydrogen, C_1-C_6-alkyl; C_2-C_6-alkynyl;

W is S or $NR^{q\#}$;

where the aliphatic groups of the radical definitions of R^p, R^q and/or $R^{q\#}$ for their part may carry one or two groups R^w:

R^w is halogen, OR^z, NHR^z, C_1-C_6-alkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-acyl-amino, [1,3]dioxolane-C_1-C_4-alkyl, [1,3]dioxane-C_1-C_4-alkyl, where R^z is hydrogen, methyl, allyl or propargyl.

L^d is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_8-alkyenyloxy, C_2-C_8-alkynyloxy, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl, C_3-C_6-cycloalkyloxy, C_4-C_6-cycloalkenyloxy, nitro, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1,

$C(A^2)(=N\text{-}OA^1)$, $N(A^2)A^1$, $N(A^2)\text{-}C(=O)\text{-}A^1$, $N(A^3)\text{-}C(=O)\text{-}N(A^2)A^1$, $S(=O)_p\text{-}A^1$, $S(=O)_p\text{-}O\text{-}A^1$ or $S(=O)_p\text{-}N(A^2)A^1$,

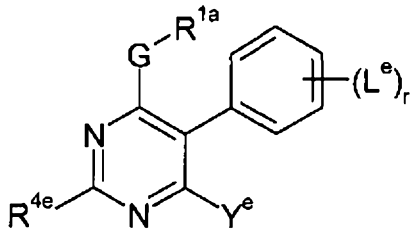
p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, $-C(=O)\text{-}A^1$, $-C(=O)\text{-}O\text{-}A^1$, $-C(=O)\text{-}N(A^2)A^1$, $C(A^2)(=N\text{-}OA^1)$, $N(A^2)A^1$, $N(A^2)\text{-}C(=O)\text{-}A^1$, $N(A^3)\text{-}C(=O)\text{-}N(A^2)A^1$, $S(=O)_p\text{-}A^1$, $S(=O)_p\text{-}O\text{-}A^1$ or $S(=O)_p\text{-}N(A^2)A^1$, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

18. The method according to claim 1, wherein the substituted 5-phenyl pyrimidines are of formula Ie



(Ie)

in which R^{1a} is as defined in claim 1,

r is 1, 2, 3, 4 or 5;

Y^e is halogen, cyano, C_1-C_4-alkyl, C_2-C_4-alkenyl, C_2-C_4-alkynyl, C_3-C_6-cycloalkyl, C_1-C_4-alkoxy, C_3-C_4-alkenyloxy, C_3-C_4-alkynyloxy, C_1-C_6-alkylthio, di-(C_1-C_6-alkyl)amino or C_1-C_6-alkylamino, where the alkyl, alkenyl and alkynyl radicals of Y^e may be substituted by halogen, cyano, nitro, C_1-C_2-alkoxy or C_1-C_4-alkoxycarbonyl;

G denotes O or S;

L^e is halogen, cyano, cyanato (OCN), C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_8-alkyenyloxy, C_2-C_8-alkynyloxy, C_3-C_6-cycloalkyl, C_4-C_6-cycloalkenyl, C_3-C_6-cycloalkyloxy, C_4-C_6-cycloalkenyloxy, nitro, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1,

p is 0, 1 or 2;

A^1, A^2, A^3 independently of one another are hydrogen, C_1-C_6-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl, C_3-C_8-cycloalkyl, C_3-C_8-cycloalkenyl, phenyl, where the organic radicals may be partially or fully halogenated or may be substituted by cyano or C_1-C_4-alkoxy; or A^1 and A^2 together with the atoms to which they are attached are a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S;

where the aliphatic, alicyclic or aromatic groups of the radical definitions of L for their part may be partially or fully halogenated or may carry one to four groups R^u:

R^u is halogen, cyano, C_1-C_8-alkyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, C_1-C_6-alkoxy, C_2-C_{10}-alkenyloxy, C_2-C_{10}-alkynyloxy, C_3-C_6-cycloalkyl, C_3-C_6-cycloalkenyl, C_3-C_6-cycloalkoxy, C_3-C_6-cycloalkenyloxy, -C(=O)-A^1, -C(=O)-O-A^1, -C(=O)-N(A^2)A^1, C(A^2)(=N-OA^1), N(A^2)A^1, N(A^2)-C(=O)-A^1, N(A^3)-C(=O)-N(A^2)A^1, S(=O)$_p$-A^1, S(=O)$_p$-O-A^1 or S(=O)$_p$-N(A^2)A^1, where p, A^1, A^2, A^3 are as defined above and where the aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups R^{ua}, R^{ub} having the same meaning as R^u.

R^{4e} denotes cyano, hydroxy, mercapto, N_3, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_3-C_8-alkenyloxy, C_3-C_8-alkinyloxy, C_1-C_6-haloalkoxy, C_1-C_6-alkylthio, C_3-C_8-alkenylthio,

C_3-C_8-alkinylthio, C_1-C_6-haloalkylthio, or a radical of the formulae $-ON=CR^aR^b$, $-CR^c=NOR^a$, $-NR^cN=CR^aR^b$, $-NR^cNR^aR^b$, $-NOR^a$; $-NR^cC(=NR^d)-NR^aR^b$, $-NR^cC(=O)-NR^aR^b$, $-NR^aC(=O)R^c$, $-NR^aC(=NOR^c)-R^d$, $-O(C=O)R^c$, $-C(=O)-OR^a$, $-C(=O)-NR^aR^b$, $-C(=NOR^c)-NR^aR^b$, $-CR^c(=NNR^aR^b)$, wherein

R^a, R^b, R^c, R^d independently of each other denote hydrogen, C_1-C_6-alkyl, C_2-C_8-alkenyl, C_2-C_8-alkinyl, C_1-C_6-haloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, a cyclic radical selected from C_3-C_{10}-cycloalkyl, phenyl and five- to ten-membered saturated, partially unsaturated or aromatic mono– or bicyclic heterocycles comprising 1, 2, 3 or 4 heteroatoms selected from the group consisting of O, N or S, R^a may also be C_1-C_6-alkylcarbonyl, or R^a and R^b together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond or R^a and R^c together form a C_2-C_4-alkylene group which may be interrupted by an oxygen atom and/or comprise a double bond; it being possible for C_1-C_6-alkyl and for the cyclic radical to be partially or fully halogenated or to be substituted by 1, 2 or 3 identical or different radicals R^x:

R^x denote cyano, nitro, amino, aminocarbonyl, aminothiocarbonyl, Hydroxy, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkyloxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, phenyl, phenoxy, benzyl, benzyloxy, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, $C(=NOR^\alpha)-OR^\beta$ or $OC(R^\alpha)_2-C(R^\beta)=NOR^\beta$,

wherein the cyclic radicals R^x may be unsubstituted or substituted by 1, 2 or 3 radicals R^y:

R^y cyano, nitro, halogen, hydroxy, amino, aminocarbonyl, aminothiocarbonyl, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylsulfoxyl, C_3-C_6-cycloalkyl, C_1-C_6-alkoxy, C_1-C_6-haloalkoxy, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylthio, C_1-C_6-alkylamino, di-C_1-C_6-alkylamino, C_1-C_6-alkylaminocarbonyl, di-C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkylaminothiocarbonyl, di-C_1-C_6-alkylaminothiocarbonyl, C_2-C_6-alkenyl, C_2-C_6-alkenyloxy, C_3–C_6–cycloalkyl,

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C_3–C_6–cycloalkenyl, phenyl, phenoxy, phenylthio, benzyl, benzyloxy, , 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl or 5- or 6-membered heteroaryloxy, or $C(=NOR^{\alpha})$-OR^{β}; and

R^{α}, R^{β} denote hydrogen or C_1-C_6-alkyl.

19. A pharmaceutical composition when used for therapy of cancer or cancerous diseases the composition comprising a 5-phenyl pyrimidine of the formula I as defined in the method of any one of the preceding claims or a pharmaceutically acceptable salt thereof, together with a pharmaceutically acceptable carrier

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