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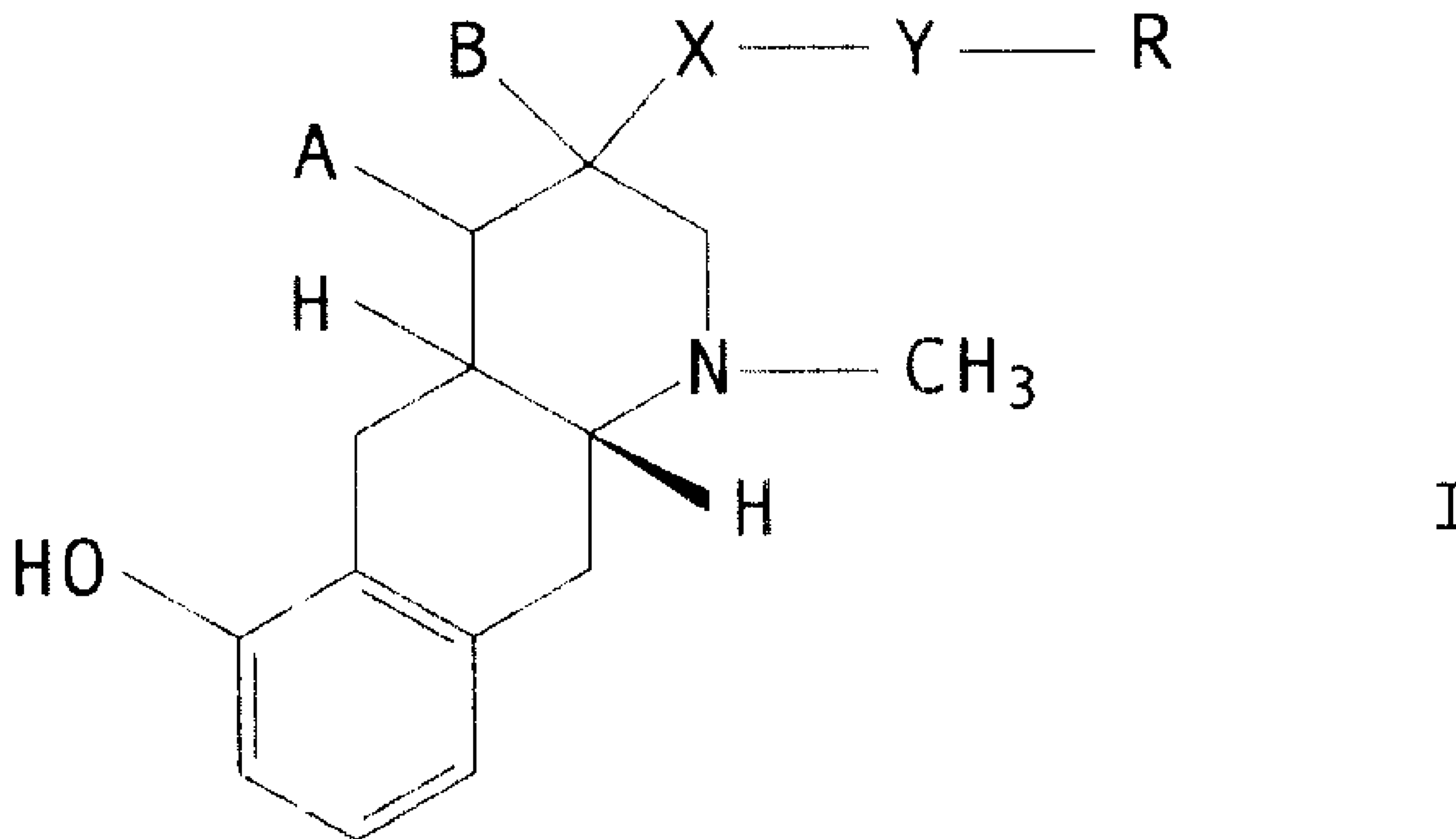
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(54) Titre : DERIVES DE BENZO[G]QUINOLINE  
 (54) Title: BENZO[G]QUINOLINE DERIVATIVES



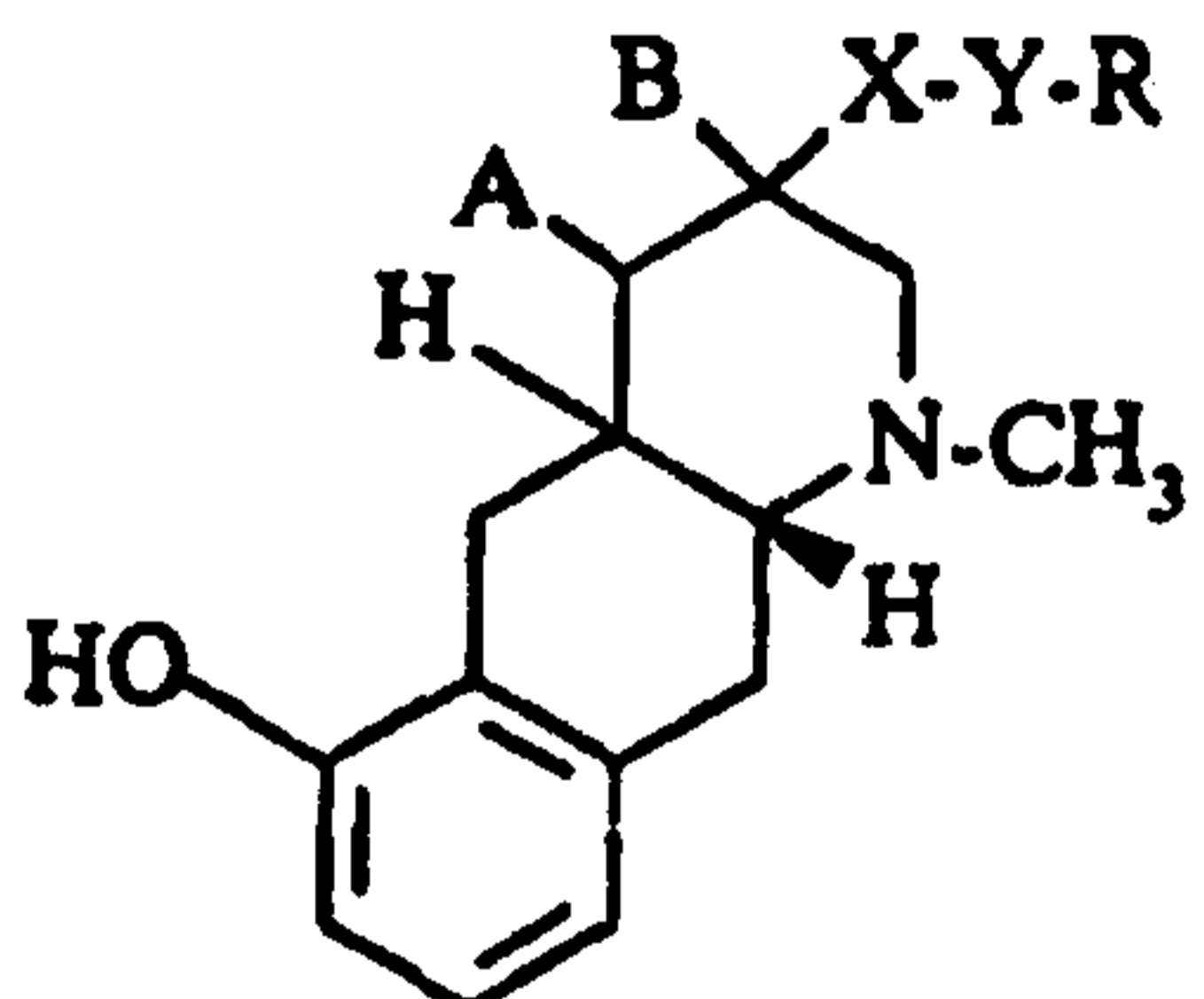
(57) Abrégé/Abstract:

The invention provides a compound of formula (I) wherein A, B, X, Y and R are as defined in the description, and a process for preparing them. The compounds of formula (I) are useful as pharmaceuticals for the treatment of glaucoma and myopia.

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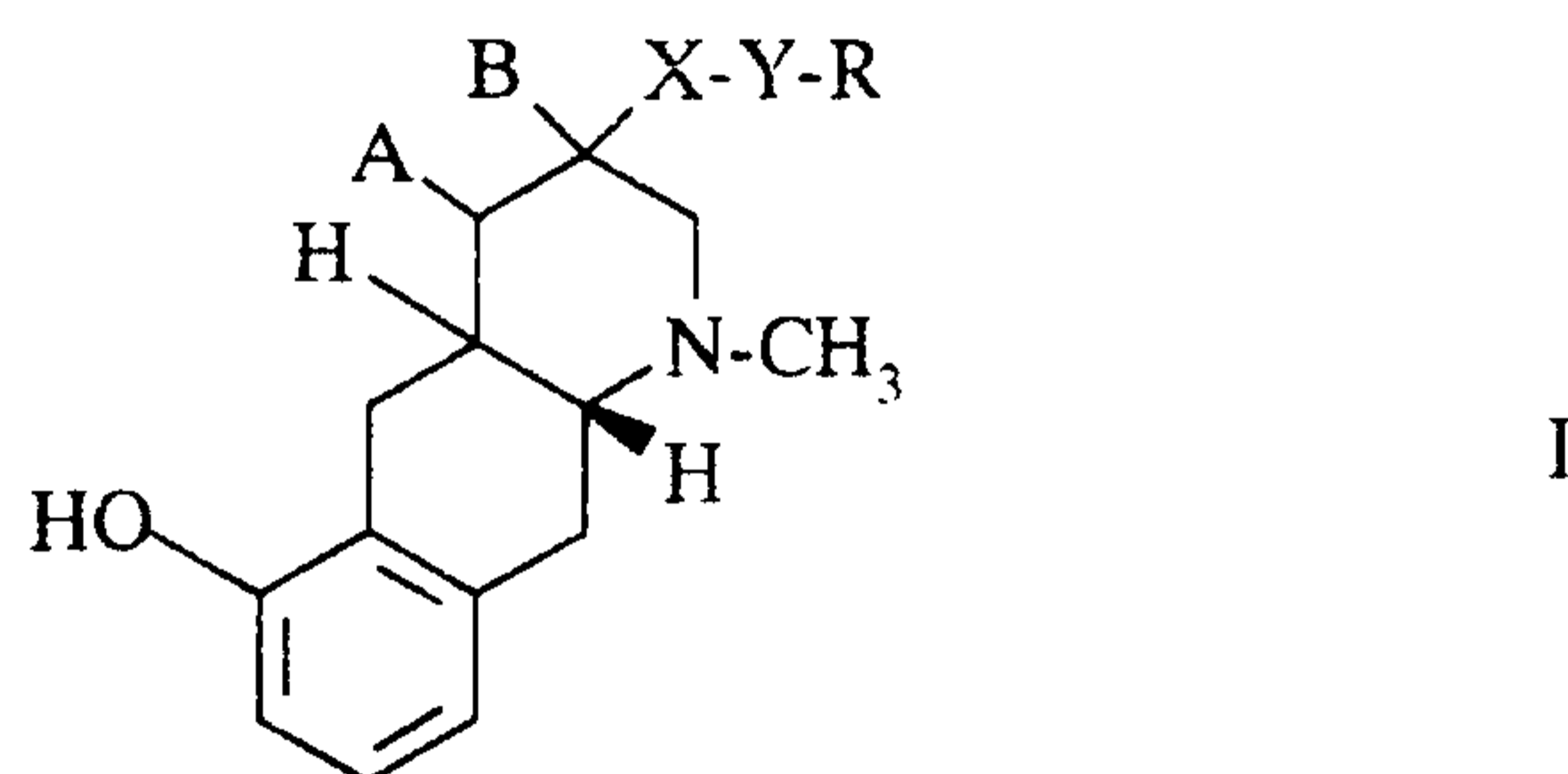
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |                                                                                                                                         |                        |    |           |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <p>(21) International Application Number: PCT/EP97/03582</p> <p>(22) International Filing Date: 7 July 1997 (07.07.97)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>9614282.3</td> <td>8 July 1996 (08.07.96)</td> <td>GB</td> </tr> <tr> <td>9626093.0</td> <td>16 December 1996 (16.12.96)</td> <td>GB</td> </tr> </table> <p>(71) Applicant (for all designated States except US): NOVARTIS AG [CH/CH]; Schwarzwaldallee 215, CH-4058 Basel (CH).</p> <p>(72) Inventors; and<br/>(75) Inventors/Applicants (for US only): GULL, Peter [CH/CH]; Moosackerweg 3, CH-4148 Pfeffingen (CH). MARKSTEIN, Rudolf [DE/DE]; Ernst-Reuter-Strasse 2, D-79618 Rheinfelden (DE). SEILER, Max, Peter [CH/CH]; Bockrainweg 16, CH-4125 Riehen (CH).</p> <p>(74) Agent: ROTH, Bernhard, M.; Novartis AG, Patent- und Markenabteilung, Klybeckstrasse 141, CH-4002 Basel (CH).</p> |                             | 9614282.3                                                                                                                               | 8 July 1996 (08.07.96) | GB | 9626093.0 | 16 December 1996 (16.12.96) | GB | <p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b><br/>With international search report.<br/>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p> |
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| 9626093.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16 December 1996 (16.12.96) | GB                                                                                                                                      |                        |    |           |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>(54) Title: BENZO[g]QUINOLINE DERIVATIVES</p> <p>(57) Abstract</p> <p>The invention provides a compound of formula (I) wherein A, B, X, Y and R are as defined in the description, and a process for preparing them. The compounds of formula (I) are useful as pharmaceuticals for the treatment of glaucoma and myopia.</p> <div style="text-align: right;">  <p>(I)</p> </div>                                                                                                                                                                                                                                                                                                                                                                                                           |                             |                                                                                                                                         |                        |    |           |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**BENZO[g]QUINOLINE DERIVATIVES**

The present invention relates to novel benzo[g]quinoline derivatives, their preparation, their use as pharmaceuticals and pharmaceutical compositions containing them.

More particularly the present invention provides a compound of formula I



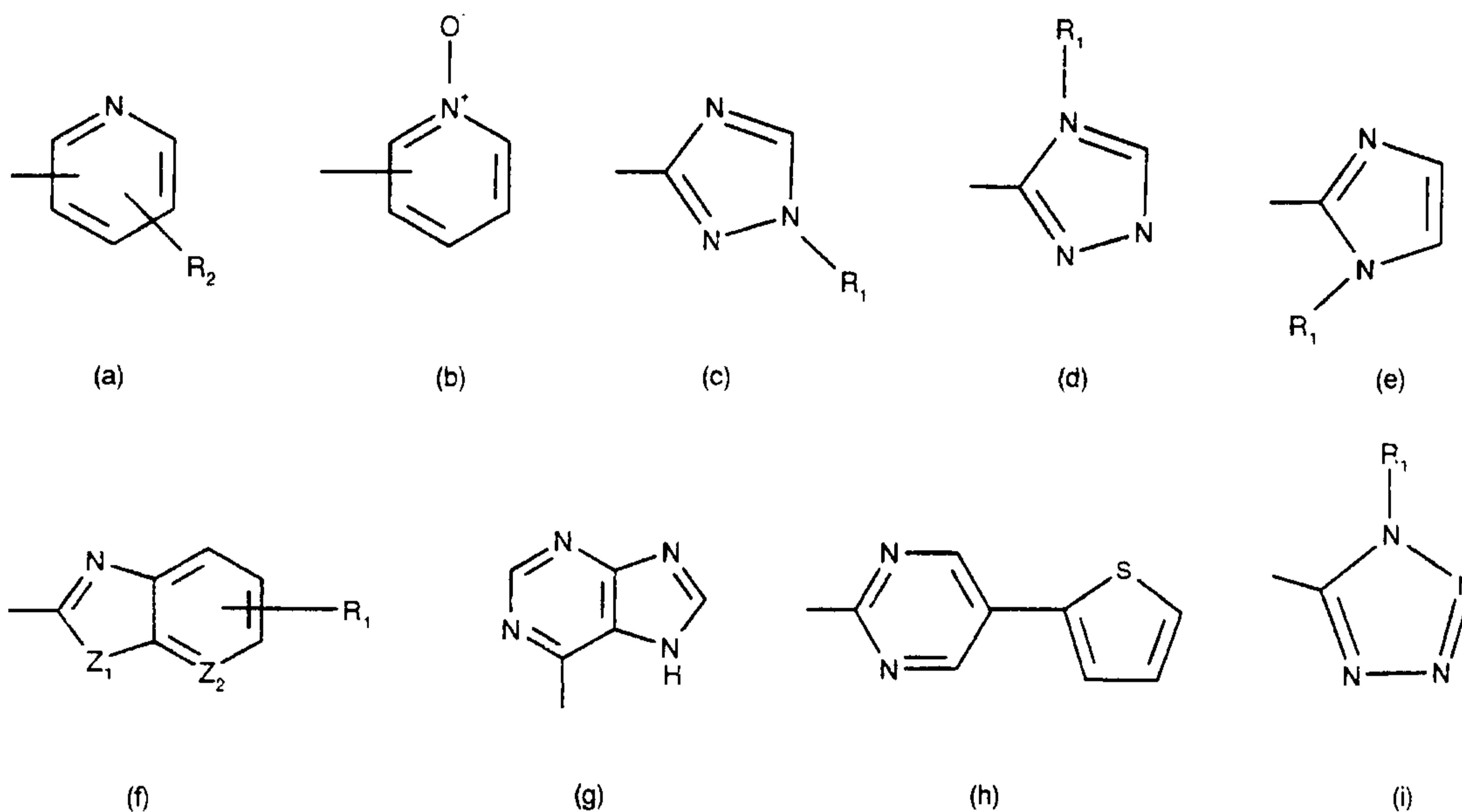
wherein

A and B are each H or form together an additional bond,

X is CH<sub>2</sub> or CO,

Y is O, S, S=O, NR<sub>1</sub> [R<sub>1</sub> being H or (C<sub>1-4</sub>)alkyl], CH<sub>2</sub> or O-CH<sub>2</sub>, and

R is of formula (a), (b), (c), (d), (e), (f), (g), (h) or (i)



wherein  $R_1$  is defined above,  $R_2$  is H or trifluoromethyl,  $Z_1$  is O, S or NH and  $Z_2$  is CH or N,

provided that if X is  $CH_2$ , Y is S and R is of formula (a) wherein the free bond is adjacent to the nitrogen and  $R_2$  is H, then A and B are not H, in free base or acid addition salt form.

The above-defined alkyl groups preferably represent methyl.

X preferably is  $CH_2$ .

Y preferably is O or S.

The compounds of the invention possess asymmetrical centers in positions 3, 4a and 10a, and possibly in the X-Y-R substituent. They may therefore appear in optically active form or in form of mixtures of optical isomers, e.g. in form of racemic mixtures. All optical isomers and their mixtures including the racemic mixture are part of the present invention.

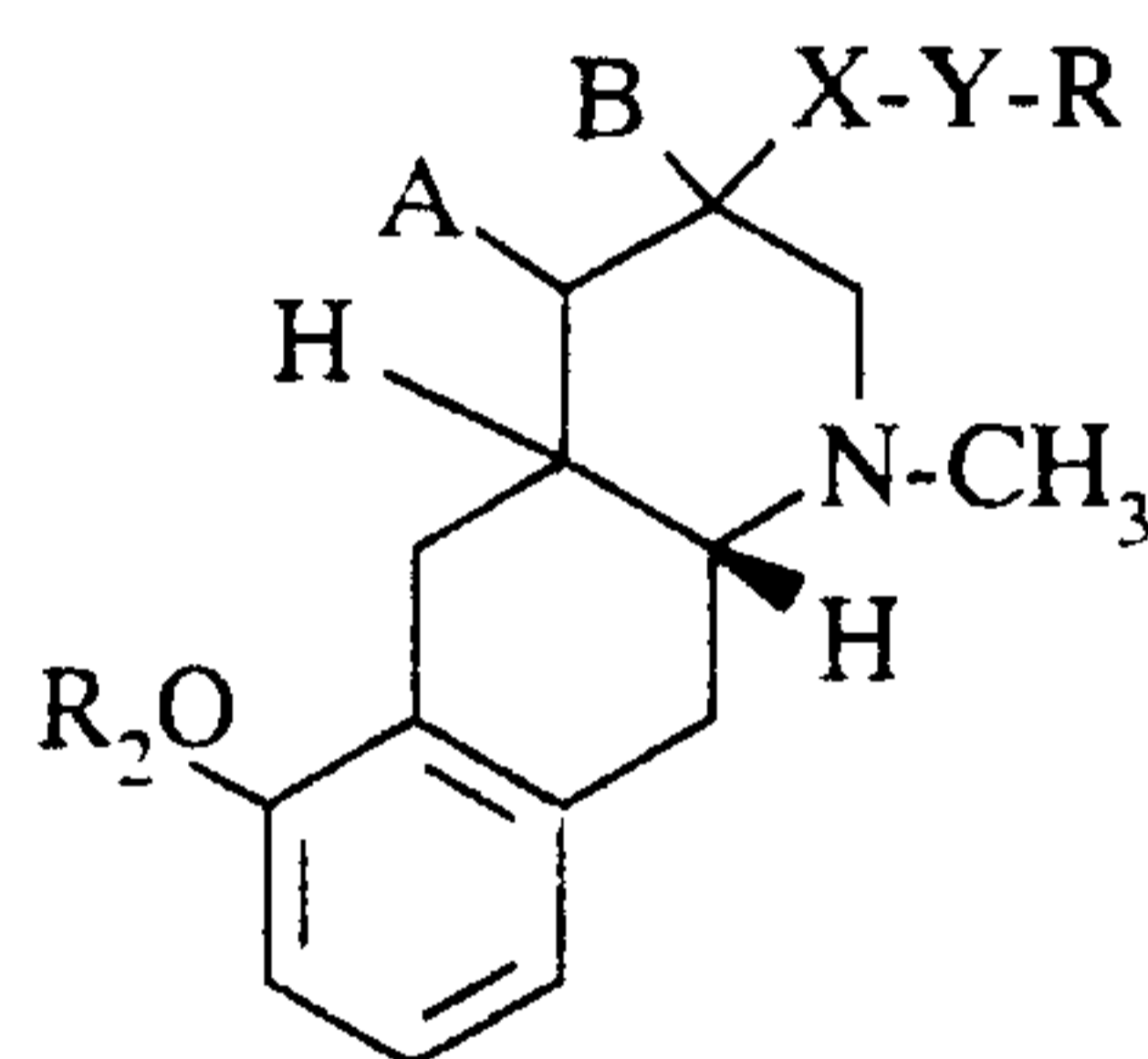
In a group of compounds of formula I, A and B are each hydrogen, X is  $CH_2$ , Y is O or S and R is of formula (b) or (c).

In a further group of compounds of formula I, A and B form together an additional bond, X is CH<sub>2</sub>, Y is O or S and R is of formula (a) or (e).

In still a further group, A and B and X are as defined above, Y is O, S, NR<sub>1</sub> [R<sub>1</sub> being H or (C<sub>1-4</sub>)alkyl], CH<sub>2</sub> or O-CH<sub>2</sub>, and R is of formula (a), (b), (c), (d), or (g), wherein R<sub>1</sub> is as defined above and R<sub>2</sub> is H, or of formula (e) or (f), wherein R<sub>1</sub> is H, Z<sub>1</sub> is O or S and Z<sub>2</sub> is CH.

When A and B are each H, the X-Y-R substituent preferably presents the configuration 3R.

In a further aspect the invention provides a process for the production of the compounds of formula I and their acid addition salts, whereby in a compound of formula II



II

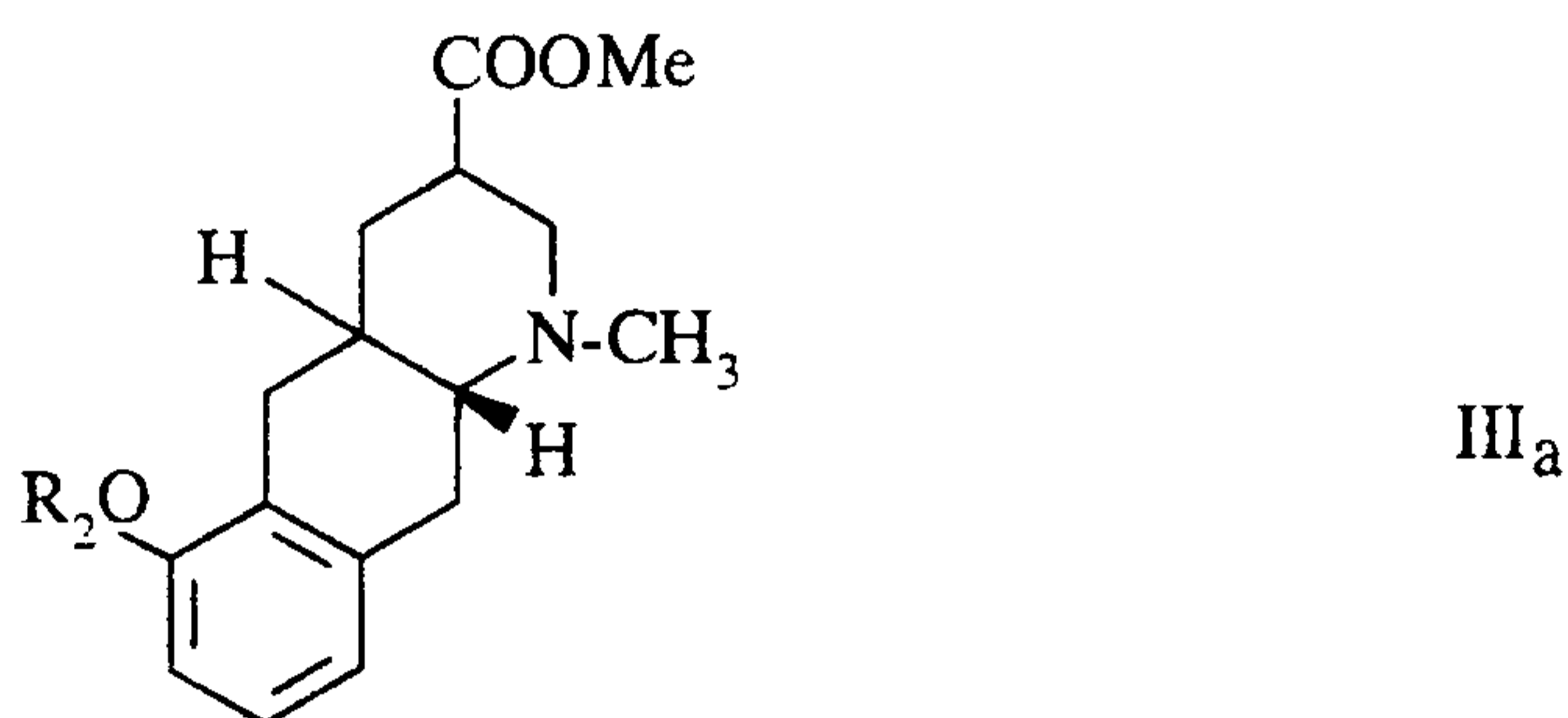
wherein A, B, X, Y and R are as defined above and R<sub>2</sub> is (C<sub>1-4</sub>)alkyl, the alkoxy group is converted into a hydroxy group, and the compounds of formula I thus obtained are recovered in free base or acid addition salt form.

The reaction can be effected according to known methods, e.g. using hydrobromide acid or boron tribromide. In formula II, R<sub>2</sub> is preferably methyl.

Working up the reaction mixtures obtained according to the above process and purification of the compounds thus obtained may be carried out in accordance to known procedures.

Acid addition salts may be produced from the free bases in known manner, and vice versa. Suitable acid addition salts for use in accordance with the present invention include for example the hydrochloride.

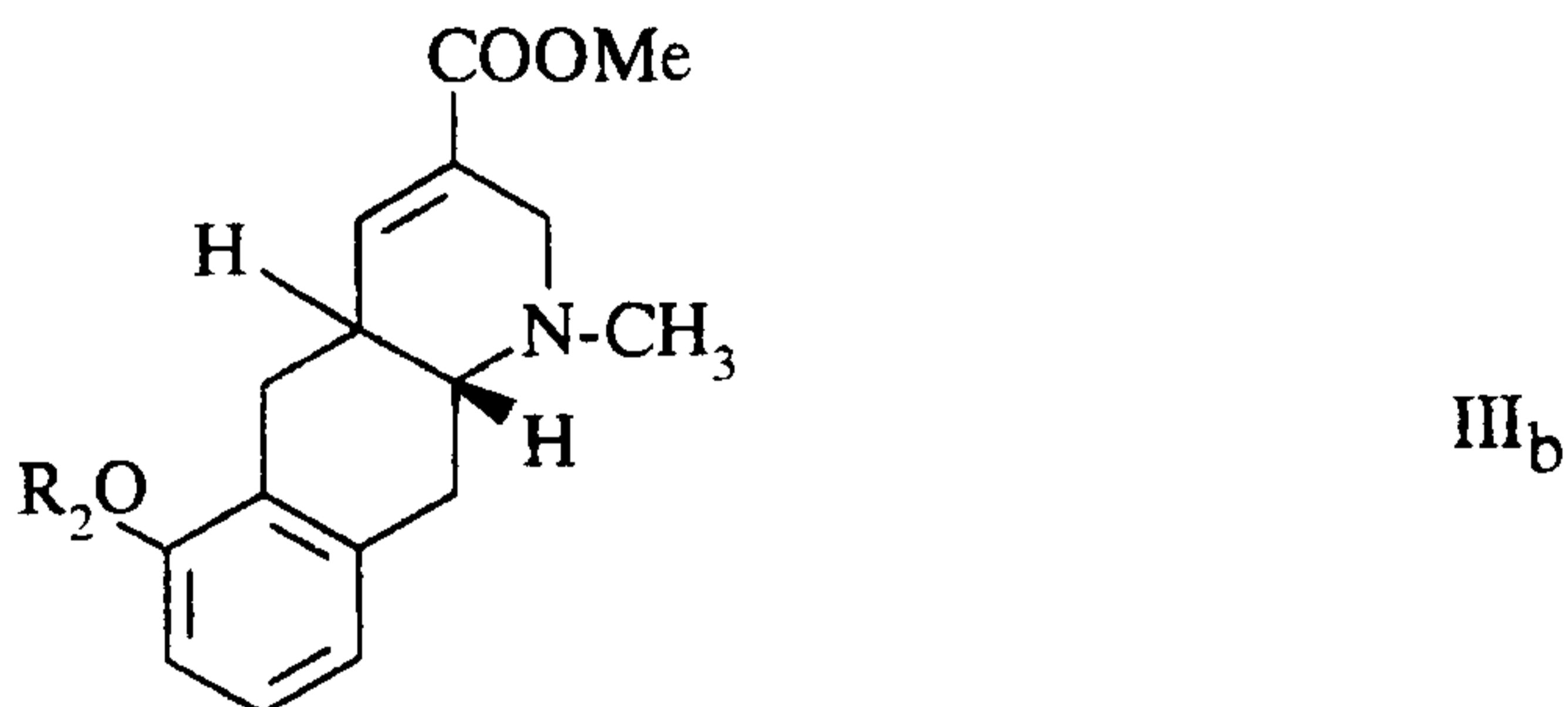
The starting compounds of formula II wherein A and B are each H may be produced from the corresponding compounds of formula III<sub>a</sub>



wherein R<sub>2</sub> is as defined above, for example as described in Example 1.

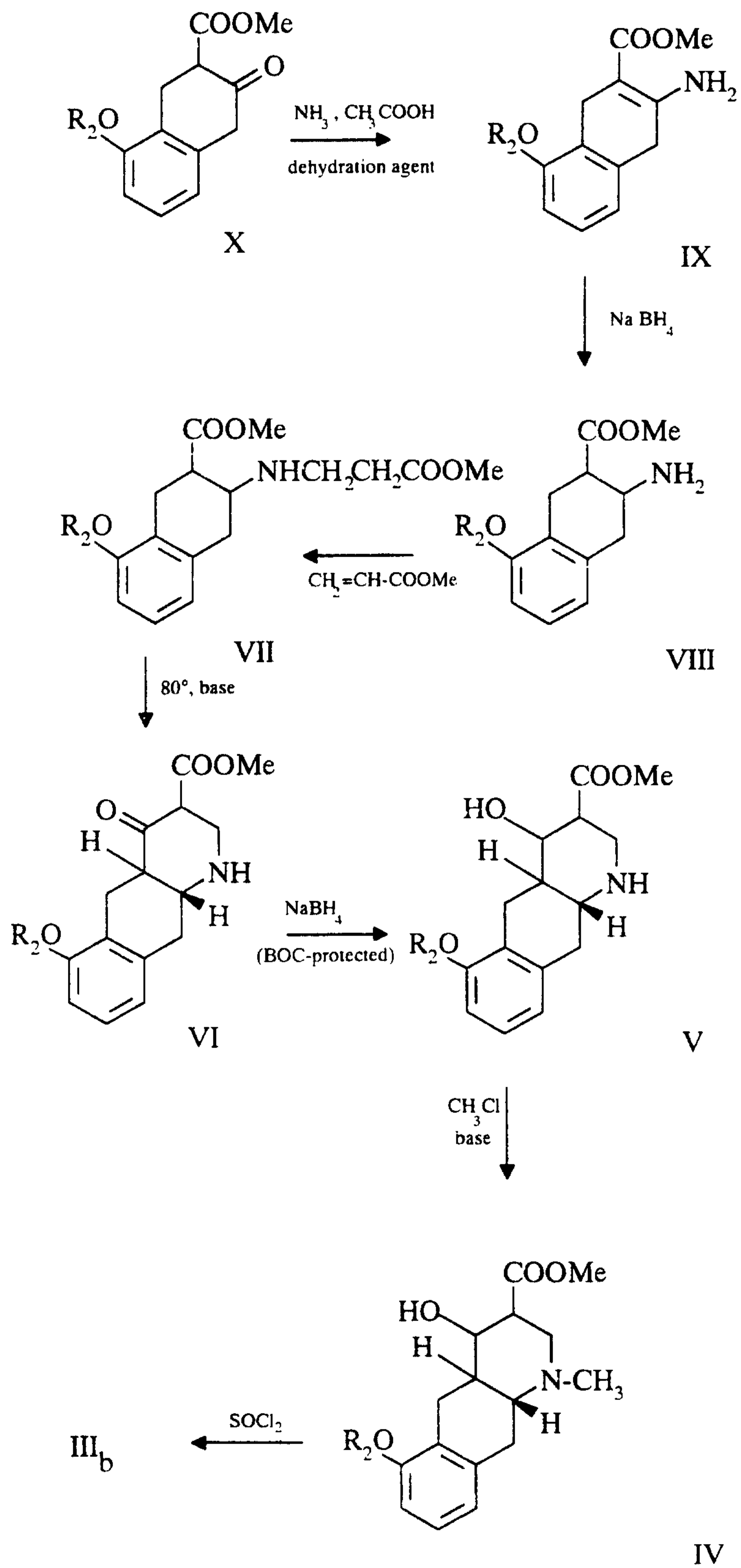
The compounds of formula III<sub>a</sub> are known or may be produced in analogous manner to known procedures.

The starting compounds of formula II wherein A and B together form an additional bond may be produced from the corresponding compounds of formula III<sub>b</sub>



wherein R<sub>2</sub> is as defined above, for example as described in Example 24.

The compounds of formula III<sub>b</sub> may be produced from compounds of formula X according to the following reaction scheme:



All the reactions in this scheme may be carried out according to known procedures.

The compounds of formula X are known or may be produced in analogous manner to known procedures.

The compounds of formula I and their physiologically acceptable acid addition salts, referred to hereinafter as agents of the invention, exhibit valuable pharmacological properties in animal tests and are therefore useful as pharmaceuticals.

In particular, the agents according to the invention effect a decrease on the intraocular pressure in rabbits, at doses of 0.1 to 100  $\mu$ mol. Male rabbits of ca. 3 to 6 kg are fixed in cages leaving their heads free. The solutions with the compound to be tested are applied to the right eye and the placebo solutions to the left eye (50  $\mu$ l each). The eyes are firstly anaesthetized with a drop of a solution containing 0.4% Novesine (Ciba Vision Ophthalmics, Switzerland) and the ocular pressure is determined at various intervals after administration (10, 30, 60, 120, 180 and 240 minutes), whereby a pneumatonometer (Mentor O & O Inc., Norwell, USA) is used.

The agents according to the invention are therefore useful in the treatment of glaucoma.

Moreover the agents of the invention increase the blood flow in the optic nerve, as indicated by experiments performed as described by M. Rudin and A. Sauter in Non-invasive determination of regional cerebral blood flow in rats using dynamic imaging with Gd(DTPA), *Magnetic Res. in Med.* 22, 32-46 (1991). In this test, rats are anesthetized with isoflurane. The femoral vein is cannulated for injection of the paramagnetic contrast agent Gd(diethylenetriaminepenta-acetate). Determination of blood flow (ml/100g/min.) by NMR imaging is performed immediately before and 30 min. after s.c. drug administration. Experiments are performed double blind in groups of 8-26 animals. In a first series of experiments, the whole optic nerve is measured. In



a second series, the effect on subregions of the optic nerve including the proximal part with the head of the optic nerve is determined.

In this test the agents of the invention at doses of 0.1 to 0.5 mg/kg s.c. significantly improve blood flow to the optic nerve but not in the striatum. In the second series of experiments, the agents of the invention at the indicated doses preferentially enhance blood perfusion in the proximal part of the optic nerve including the head and in the distal part.

The agents of the invention are therefore useful in conditions where prevention or delay of progressive atrophy of the optic nerve is desirable, for example in conditions where the visual fields are impaired and particularly in glaucoma forms which are not characterized by an increase of the intra-ocular pressure (low tension glaucoma), in which standard glaucoma therapy including  $\beta$ -blockers is ineffective.

The agent of the invention furthermore exhibit dopaminomimetic activity, as evidenced in vitro, e.g. by their ability to inhibit electrically evoked acetylcholine release from striatal slices [R. Markstein et al., J. Neural Transm. 103, 17-30 (1996)] at concentrations of 1 to 100nM.

Eye permeable dopaminamimetic compounds have been indicated to prevent development of myopia in man [P.M. Iuvone et al., Inv. Ophthal Vis. Sci. 32, 1674-1677 (1991)].

The agents of the invention are therefore useful in the treatment of myopia, as can be confirmed in standard tests, e.g. in the model according to R.A. Stone et al. [Proc. Natl. Acad. Sci. (USA) 86, 704-706 (1989)] wherein experimental myopia is produced in chicken, on administration of about 0.1 to about 1 mg/kg in eye drops.

For the above mentioned indications, the appropriate dosage will of course vary depending upon, for example, the compound employed, the host, the mode of

administration and the severity of the condition being treated. However, in general, satisfactory results in animals are indicated to be obtained at a daily dosage of from about 0.1 to about 100  $\mu\text{mol}$  in ophthalmological solution.. In larger mammals, for example humans , indicated daily dosages are in the same range, preferably in the range from about 0.1 to about 10  $\mu\text{mol}$  of the compound conveniently administered once or twice a day or in sustained release form.

The agents of the invention may be administered in free form or in pharmaceutically acceptable salt form. Such salts may be prepared in conventional manner and exhibit the same order of activity as the free compounds.

Accordingly the present invention provides an agent of the invention for use as a pharmaceutical, e.g. in the treatment of glaucoma and myopia.

The present invention furthermore provides a pharmaceutical composition comprising an agent of the invention in association with at least one pharmaceutically acceptable diluent or carrier. Such compositions may be formulated in conventional manner. Unit dosage forms contain, for example, from about 0.10 to about 2 mg of an agent according to the invention.

Agents according to the invention may be administered by any conventional route, for example parenterally e.g. in form of injectable solutions or suspensions, or enterally, e.g. in the form of tablets or capsules. Preferably, however, they are applied topically to the eye in ca. 0.01 to 0.5 % ophthalmological solutions.

The ophthalmic vehicle is such that the compound is maintained in contact with the ocular surface for a sufficient time period to allow the compound to penetrate the corneal and internal regions of the eye.

The pharmaceutically acceptable ophthalmic vehicle may be e.g. an ointment, vegetable oil, or an encapsulating material.

The preferred agents of the invention for the above-indicated uses are [3R, 4aR, 10aR]-1-methyl-3 $\beta$ -{4-methyl-(4H)-1,2,4-triazo-3-yl}thiomethyl-6-hydroxy-1,2,3,4,4 $\alpha$ , 5, 10, 10a $\beta$ -octahydrobenzo[g]quinoline (compound A), [4aS, 10aR]-1,2,4 $\alpha$ , 5, 10, 10a $\beta$ -hexahydro-6-hydroxy-1-methyl-3-(2-pyridyloxymethyl)-benzo[g]-quinoline (compound B), [4aS, 10aR]-1,2,4 $\alpha$ , 5, 10, 10a $\beta$ -hexahydro-6-hydroxy-1-methyl-3-(2-imidazolyl-thiomethyl)-benzo[g]quinoline (compound C) and [3R, 4aR, 10aR]-1-methyl-3 $\beta$ -(2-pyridyl-N-oxide)thiomethyl-6-hydroxy-1,2,3,4,4 $\alpha$ , 5, 10, 10a $\beta$ -octahydrobenzo[g]-quinoline (compound D), in free base or acid addition salt form, particularly compound C.

In the above-mentioned intraocular pressure (IOP) test, the compounds A, B, C and D in hydrochloride form reduce IOP in normal rabbits to a maximum of 3.3, 3.8, 3.3 and 4.5 mm Hg respectively, after administration of 0.9  $\mu$ mol in eye drops, whereas with the same dose of the standard  $\beta$ -blocker Timolol no decrease of IOP is observed. Additionally the duration of action of the 4 compounds is unexpectedly long.

In the above-mentioned blood flow test, compound C in hydrochloride form increases blood flow by 30% after administration of 0.1 mg/kg s.c., whereas at doses up to 0.5 mg/kg s.c. Timolol failed to increase blood flow.

The agents of the invention are well tolerated at the dosages administered in the above-indicated tests. Moreover compounds A, B, C and D show no mutagenicity in *Salmonella typhimurium* (i.e. are negative in the well-known Ames test).

In accordance with the foregoing, the present invention also provides an agent of the invention for use as a pharmaceutical in the treatment of glaucoma and myopia.

Moreover the present invention provides the use of an agent of the invention, for the manufacture of a medicament for the treatment of glaucoma and myopia.

In still a further aspect the present invention provides a method for the treatment of glaucoma and myopia in a subject in need of such treatment, which comprises administering to such subject a therapeutically effective amount of an agent of the invention.

The following examples illustrate the invention. The temperatures are given in degrees Celsius and are uncorrected.

**Example 1****[3R,4aR,10aR]-1-methyl-3β-{4-methyl-(4H)-1,2,4-triazo-3-yl}thiomethyl-6-hydroxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline**a) **[3R,4aR,10aR]-1-methyl-3β-hydroxymethyl-6-methoxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline**

To a solution of 5.78g (20 mM) [3R,4aR,10aR]-1-methyl-3β-methoxycarbonyl-6-methoxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline in 100 ml toluene, a solution of 12 ml SDBA (70 % in toluene, 42 mM) is added in drops under argon at room temperature within one hour. Then 10 ml NaOH (30 %) are added in drops to the ice cooled reaction mixture. The precipitated crystals are filtered off, washed with water and toluene and dried. The resulting title compound has a m.p. of 148°;  $[\alpha]_D^{20} = -120^\circ$  (c = 0.425 in ethanol).

b) **[3R,4aR,10aR]-1-methyl-3β-mesyloxymethyl-6-methoxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline**

12 ml (153 mM) methanesulfochloride are added in drops to a solution of 20 g (76,5 mM) of the compound obtained under a) in 150 ml pyridine at room temperature. The temperature is kept below 45° by ice cooling. After stirring for 2 hours at room temperature, the solution is adjusted to pH 7-8 with saturated KHCO<sub>3</sub> solution at 0° and extracted with ethylacetate. After drying over Na<sub>2</sub>SO<sub>4</sub>, filtering and concentrating by evaporation, the title compound is obtained as beige crystals and directly used for the next step.

c) **[3R,4aR,10aR]-1-methyl-3β-{4-methyl-(4H)-1,2,4-triazo-3-yl}thiomethyl-6-methoxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline**

A solution of 6 g (17.7 mM) of the compound obtained under b) and 3.1 g (27 mM) 3-mercapto-4-methyl-(4H)-1,2,4-triazole in 60 ml dimethylformamide is mixed with 6 ml 2N NaOH and stirred at 65° for 18 hours. The so obtained suspension is concentrated by evaporation. The crude product crystallises. The

suspension is cooled to 5-10°, washed with ethylacetate and dried. Chromatography on silicagel with ethylacetate containing 10 % ethanol and 0.01 % NH<sub>3</sub> yields the title compound as beige crystals with a m.p. of 205-207°;  $[\alpha]_D^{20} = -107^\circ$  (c = 0,70 in ethanol).

d) [3R,4aR,10aR]-1-methyl-3β-{4-methyl-(4H)-1,2,4-triazo-3-yl}thiomethyl-6-hydroxy-1,2,3,4,4α,5,10,10aβ-octahydrobenzo[g]quinoline

To a solution of 4 g (11.2 mM) of the product obtained under c) in 250 ml methylenechloride, 40 ml of boron tribromide (1 M in methylenechloride) are slowly added in drops at a temperature of -40°. The suspension is stirred for 2 hours at room temperature, neutralized with NH<sub>3</sub> and extracted with a mixture of 150 ml methylenechloride and 100 ml isopropanol. After drying over Na<sub>2</sub>SO<sub>4</sub>, filtering and concentration by evaporation, the title compound crystallises. The corresponding hydrochloride crystallises from methanol/ethanol 1:1 during evaporation. M.p. 185° (decomp.);  $[\alpha]_D^{20} = -77^\circ$  (c = 0,640 in ethanol/water 1:1).

The compounds of formula I as defined in the following table and wherein A and B are each hydrogen are prepared in analogous manner to Example 1:

| Ex. | X               | Y                | R                                                                                 | M.p.<br>(decomp.) |
|-----|-----------------|------------------|-----------------------------------------------------------------------------------|-------------------|
| 2   | CH <sub>2</sub> | O                | 3-(a) (R <sub>2</sub> =H)                                                         | 230° (1)          |
| 3   | "               | S                | 4-(a) (R <sub>2</sub> =H)                                                         | 260° (1)          |
| 4   | "               | "                | (f) (Z <sub>1</sub> = S, Z <sub>2</sub> =CH, R <sub>1</sub> =H)                   | 280° (1)          |
| 5   | "               | "                | " (Z <sub>1</sub> = O, Z <sub>2</sub> =CH, R <sub>1</sub> =H)                     | 270° (1)          |
| 6   | "               | "                | 2-(b)                                                                             | 260° (1)          |
| 7   | "               | "                | (c) (R <sub>1</sub> = H)                                                          | 275° (1)          |
| 8   | "               | "                | (e) (R <sub>1</sub> =H)                                                           | 200° (1)          |
| 9   | "               | "                | (g)                                                                               | 280° (1)          |
| 10  | "               | NH               | 2-(a) (R <sub>2</sub> =H)                                                         | 275° (1)          |
| 11  | "               | NCH <sub>3</sub> | "                                                                                 | 280° (2)          |
| 12  | CO              | NH               | "                                                                                 | 220° (1)          |
| 13  | "               | CH <sub>2</sub>  | "                                                                                 | 215° (1)          |
| 14  | "               | OCH <sub>2</sub> | "                                                                                 | 275° (2)          |
| 15  | CH <sub>2</sub> | S                | (h)                                                                               | 265° (1)          |
| 16  | "               | O                | 2-(b)                                                                             | 250° (1)          |
| 17  | "               | S                | (f) (R <sub>1</sub> =H, Z <sub>1</sub> =S, Z <sub>2</sub> =N)                     | 270° (1)          |
| 18  | "               | "                | (f), (R <sub>1</sub> =5-CH <sub>3</sub> , Z <sub>1</sub> =NH, Z <sub>2</sub> =CH) | 245° (1)          |
| 19  | "               | "                | (i) (R <sub>1</sub> =CH <sub>3</sub> )                                            | 260°              |
| 20  | "               | "                | 2-(a) (R <sub>2</sub> =0-CF <sub>3</sub> )                                        | 255° (1)          |
| 21  | "               | "                | 2-(a) (R <sub>2</sub> =p=CF <sub>3</sub> )                                        | 250° (1)          |
| 22  | "               | S=O              | 2-(a) (R <sub>2</sub> =H)*                                                        | 240° (1)          |
| 23  | "               | "                | 2-(a) (R <sub>2</sub> =H)**                                                       | 226° (1)          |

\* (+) - diastereomer

\*\* (-) - diastereomer

(1) Hydrochloride

(2) Dihydrochloride

**Example 24****[4aS,10aR]-1,2,4a $\alpha$ ,5,10,10a $\beta$ -hexahydro-6-hydroxy-1-methyl-3-(2-pyridyloxy-methyl)-benzo[g]quinoline**a) **[4aS,10aR]-1,2,4a $\alpha$ ,5,10,10a $\beta$ -hexahydro-3-hydroxymethyl-6-methoxy-1-methyl-benzo[g]quinoline**

A solution of 10 g of [4aS,10aR]-3-methoxycarbonyl-1,2,4a $\alpha$ ,5,10,10a $\beta$ -hexahydro-6-methoxy-1-methyl-benzo[g]quinoline in 50 ml tetrahydrofuran is added in drops at 5° to a suspension of 2.9 g lithiumaluminiumhydride in 200 ml of tetrahydrofuran and the reaction mixture is stirred at room temperature overnight. The excess of lithiumaluminiumhydride is hydrolysed by addition in drops of a water/tetrahydrofuran solution, the precipitate is filtered off, the filtrate is concentrated and the residue is triturated with ether. The title compound is obtained as crystals melting at 142-143°;  $[\alpha]_D^{20} = -222.8^\circ$  (c = 3.5 in dimethylformamide).

b) **[4aS,10aR]-1,2,4a $\alpha$ ,5,10,10a $\beta$ -hexahydro-6-methoxy-1-methyl-3-(2-pyridyloxymethyl)-benzo[g]quinoline**

4.62 g sodiumhydride (60% oil emulsion) are added in portions to a solution of 15 g of the compound obtained under a) in 500 ml dimethylformamide. The suspension is heated at 60° till termination of the hydrogen evolution, before addition of 12 ml of 2-chloropyridine. The reaction mixture is stirred for 6 hours at 60°, quenched with NH<sub>4</sub>Cl, concentrated by evaporation and extracted with water/methylenchloride, followed by flash chromatography of the organic phase on silicagel with methyl-t.butylether/MeOH (96/4). The crude title compound is transformed into its hydrochloride which cristallizes from EtOH/Et<sub>2</sub>O. M.p. = 244-247°;  $[\alpha]_D^{20} = -98.4^\circ$  (c = 0.62 in dimethylformamide).

c) **[4aS,10aR]-1,2,4a $\alpha$ ,5,10,10a $\beta$ -hexahydro-6-hydroxy-1-methyl-3-(2-pyridyloxymethyl)-benzo[g]quinoline**



The methylether cleavage is effected with boron tribromide analogously to Example 1d), starting from the compound obtained under b) above. The corresponding hydrochloride has a m.p. of 223-225°;  $[\alpha]_D^{20} = -125.6^\circ$  (c = 0.45 in dimethylformamide).

The compounds of formula I as defined in the following table and wherein A and B form together an additional bond are prepared in analogous manner to Example 1:

| Ex. | X               | Y | R                                      | M.p           |
|-----|-----------------|---|----------------------------------------|---------------|
| 25  | CH <sub>2</sub> | O | 2-(a) (R <sub>2</sub> =H)              | 223-225° (1)  |
| 26  | "               | S | (e) (R <sub>1</sub> =H)                | 226-228°* (1) |
| 27  | "               | " | 4-(a) (R <sub>2</sub> =H)              | 200-202° (2)  |
| 28  | "               | " | (c) (R <sub>1</sub> =H)                | 230°* (1)     |
| 29  | "               | " | (d) (R <sub>1</sub> =CH <sub>3</sub> ) | 230-232° (2)  |
| 30  | "               | O | 4-(a) (R <sub>2</sub> =H)              | 235°* (2)     |

\* (decomp.)

(1)hydrochloride

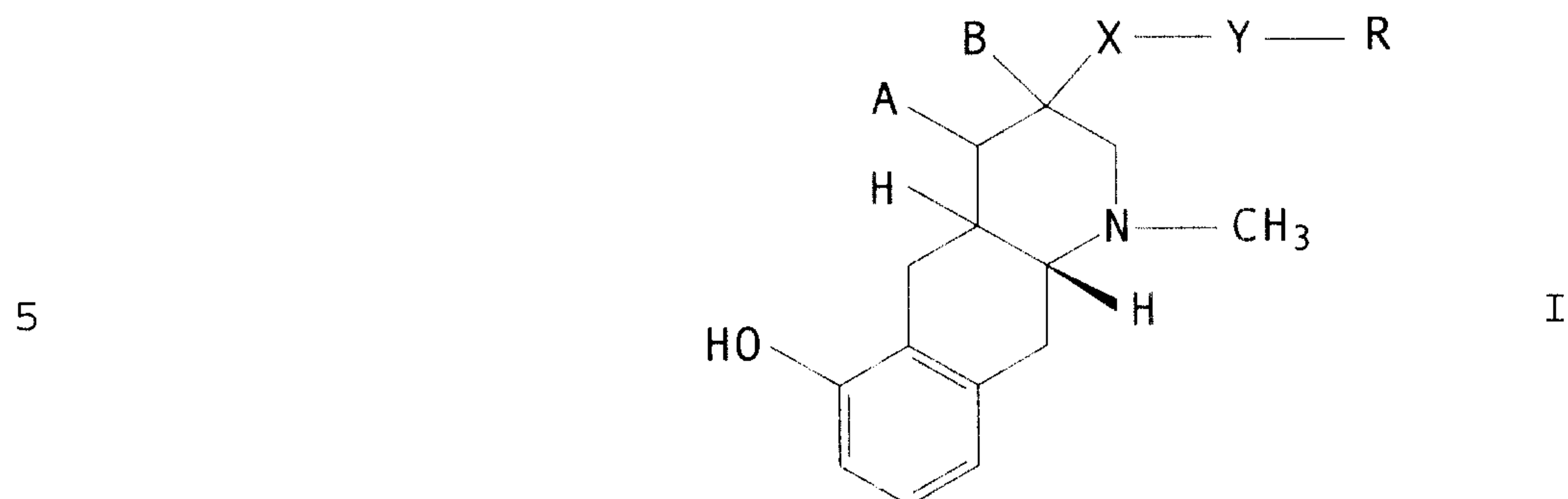
(2) dihydrochloride

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CLAIMS:

1. A compound of formula I



wherein

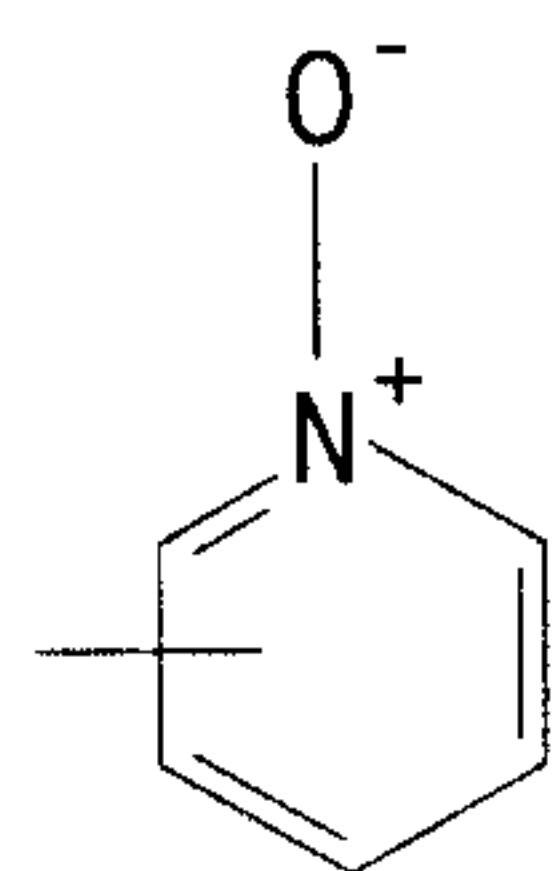
A and B are each H or form together an additional bond,

10 X is CH<sub>2</sub> or CO,

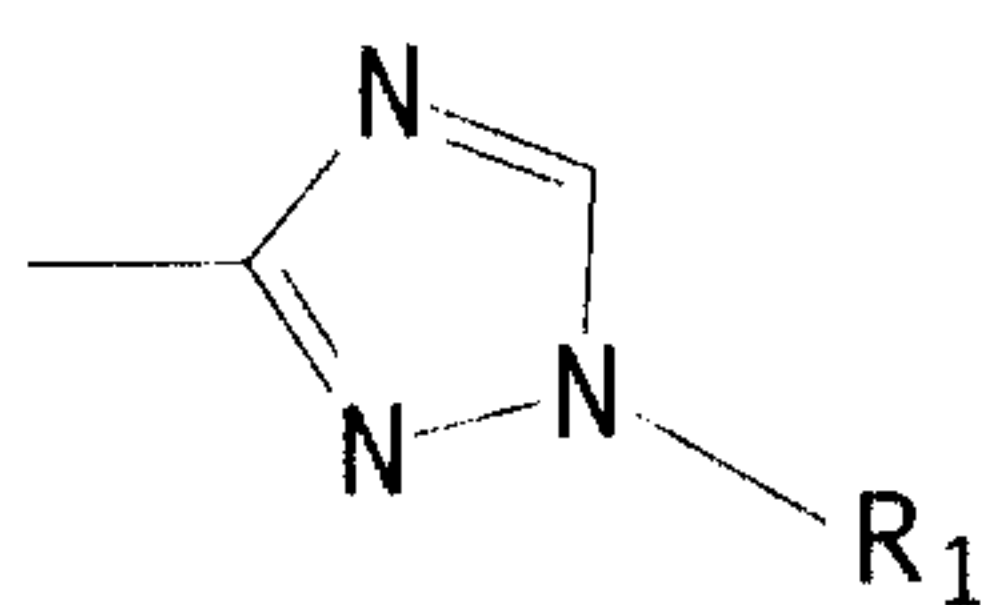
Y is O, S, S=O, NR<sub>1</sub> [R<sub>1</sub> being H or (C<sub>1-4</sub>)alkyl], CH<sub>2</sub> or O-CH<sub>2</sub>, and

R is of formula (b), (c), (d), (e), (f), (g), (h) or (i)

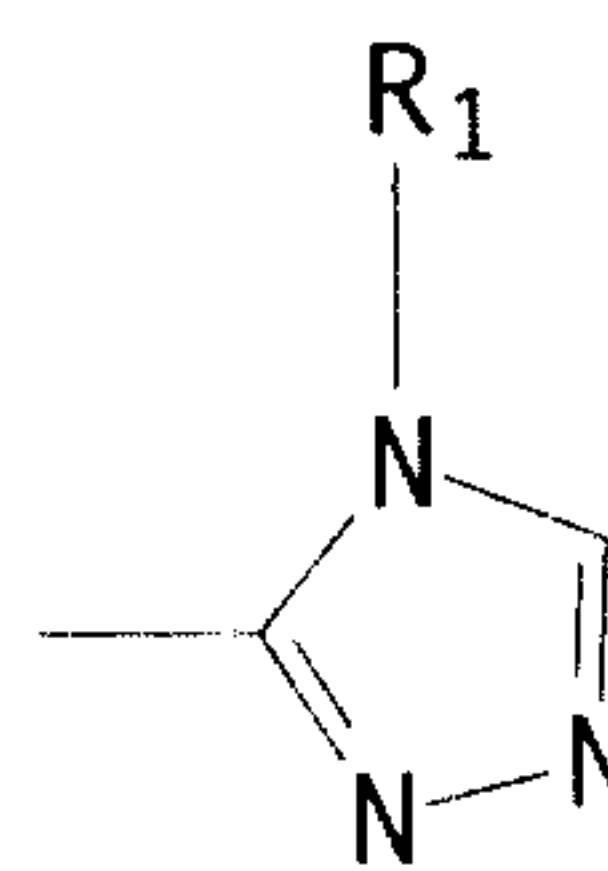
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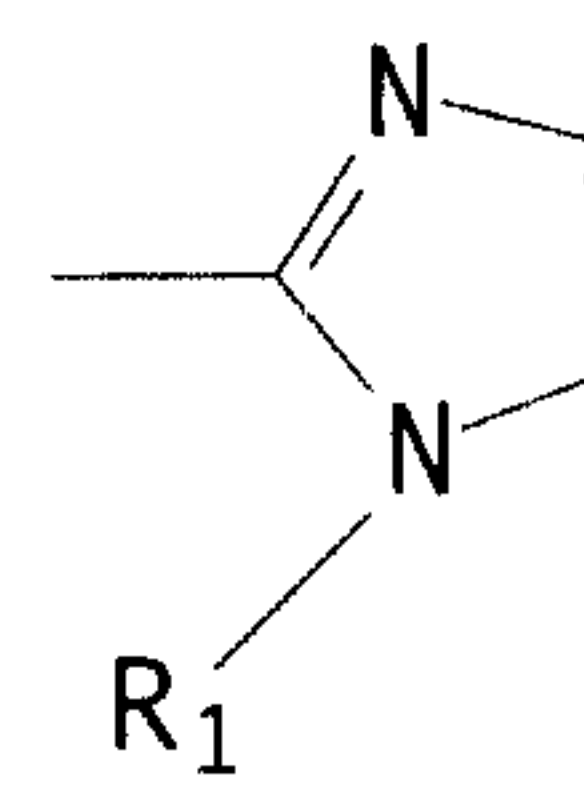
(b)



(c)

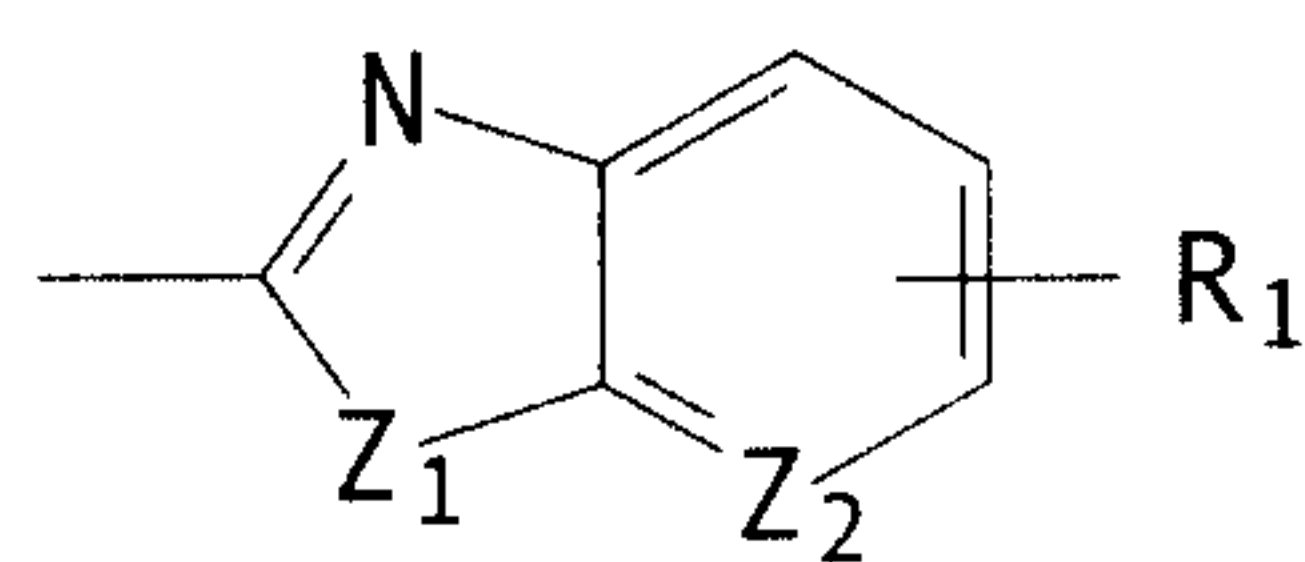


(d)

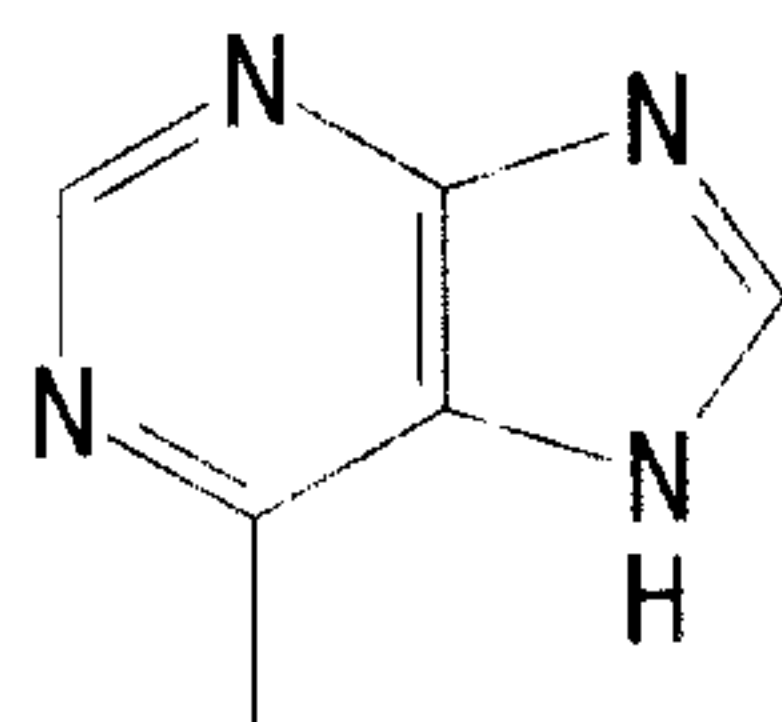


(e)

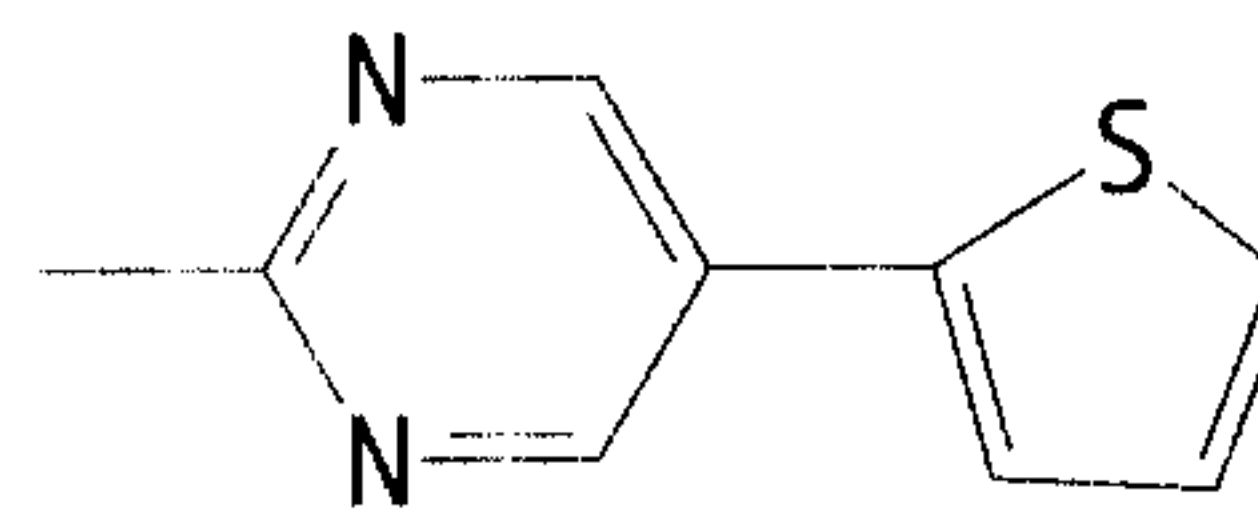
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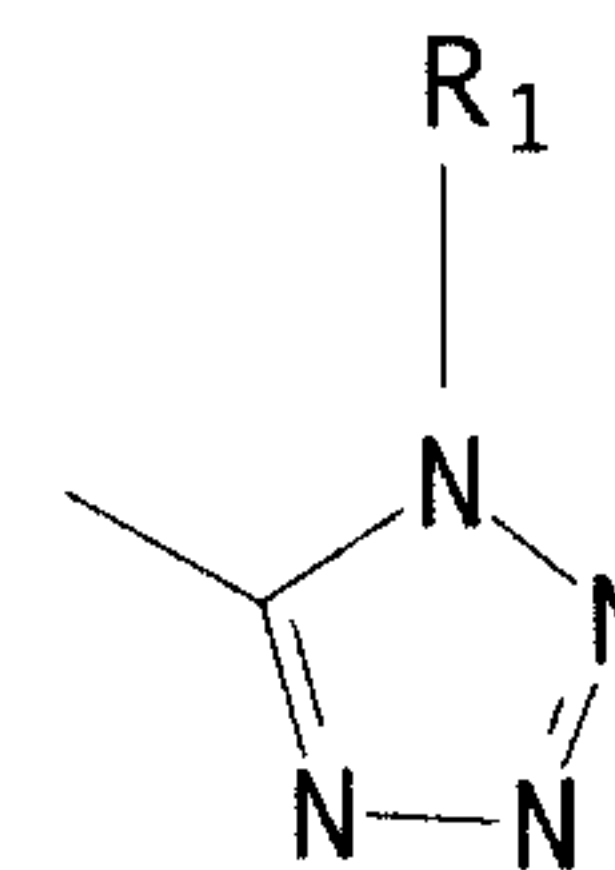
(f)



(g)



(h)



(i)

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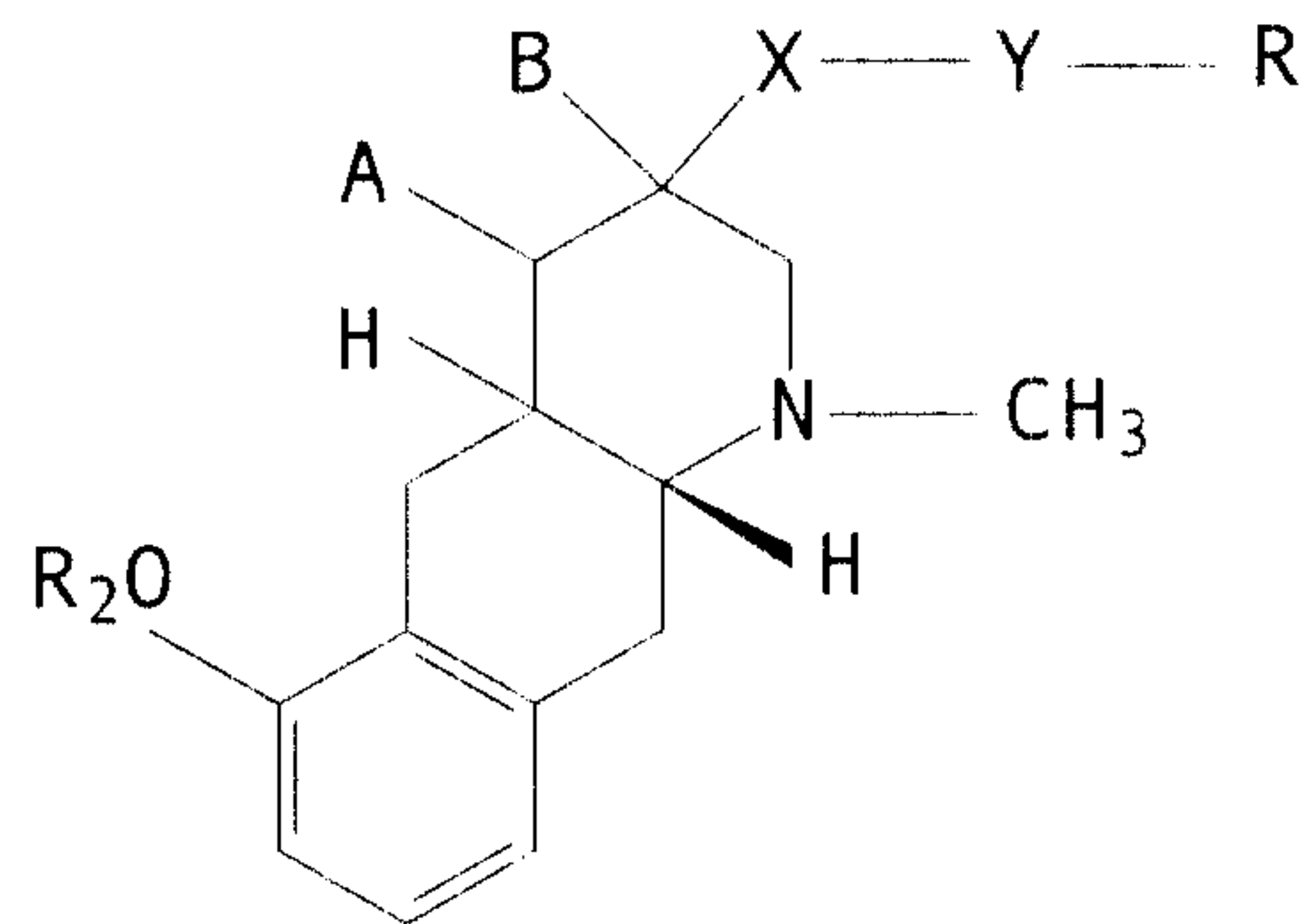
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wherein  $R_1$  is defined above,  $Z_1$  is O, S or NH and  $Z_2$  is CH or N, in free base or acid addition salt form.

2. The compound of formula I according to claim 1, wherein A and B and X are as defined in claim 1, Y is O, S,  
5  $NR_1$  [ $R_1$  being H or  $(C_{1-4})$ alkyl],  $CH_2$  or  $O-CH_2$ , and R is of formula (b), (c), (d) or (g) as defined in claim 1, wherein  $R_1$  is as defined above, or of formula (e) or (f) as defined in claim 1, wherein  $R_1$  is H,  $Z_1$  is O or S and  $Z_2$  is CH, in free base or acid addition salt form.
- 10 3. A compound of formula I according to claim 1, wherein A and B are each hydrogen, X is  $CH_2$ , Y is O or S and R is of formula (b) or (c) as defined in claim 1.
4. [3R, 4aR, 10aR]-1-methyl-3 $\beta$ -(4-methyl-(4H)-1,2,4-triazo-3-yl)thiomethyl-6-hydroxy-1,2,3,4,4 $\alpha$ ,5,10,10 $\alpha\beta$ -  
15 octahydrobenzo[g]quinoline, in free base or acid addition salt form.
5. [4aS, 10aR]-1,2,4 $\alpha$ ,5,10,10 $\alpha\beta$ -hexahydro-6-hydroxyl-1-methyl-3-(2-imidazolyl-thiomethyl)-benzo[g]quinoline, in free base or acid addition salt form.
- 20 6. [3R, 4aR, 10aR]-1-methyl-3 $\beta$ -(2-pyridyl-N-oxide)thiomethyl-6-hydroxy-1,2,3,4,4 $\alpha$ ,5,10,10 $\alpha\beta$ -octahydrobenzo[g]-quinoline, in free base or acid addition salt form.
7. A process for preparation of a compound of  
25 formula I as defined in claim 1, or a salt thereof, which includes the step of converting, in a compound of formula II

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II

5

wherein A, B, X, Y and R are as defined in claim 1 and R<sub>2</sub> is (C<sub>1-4</sub>)alkyl, the alkoxy group into a hydroxy group and recovering the thus obtained compound of formula I in free base or acid addition salt form.

10 8. The compound of any one of claims 1 to 6 in free base or pharmaceutically acceptable acid addition salt form.

9. The compound of any one of claims 1 to 6 in free base or pharmaceutically acceptable acid addition salt form, for use in the treatment of glaucoma or myopia.

15 10. A pharmaceutical composition comprising a compound of any one of claims 1 to 6 in free base or pharmaceutically acceptable acid addition salt form, in association with a pharmaceutically acceptable carrier or diluent.

20 11. A pharmaceutical composition for the treatment of glaucoma or myopia comprising a compound of any one of claims 1 to 6, in free base or pharmaceutically acceptable acid addition salt form, in association with a pharmaceutically acceptable carrier or diluent.

25 12. Use of a compound of any one of claims 1 to 6, in free base or pharmaceutically acceptable acid addition salt form, as a pharmaceutical for the treatment of glaucoma or myopia.

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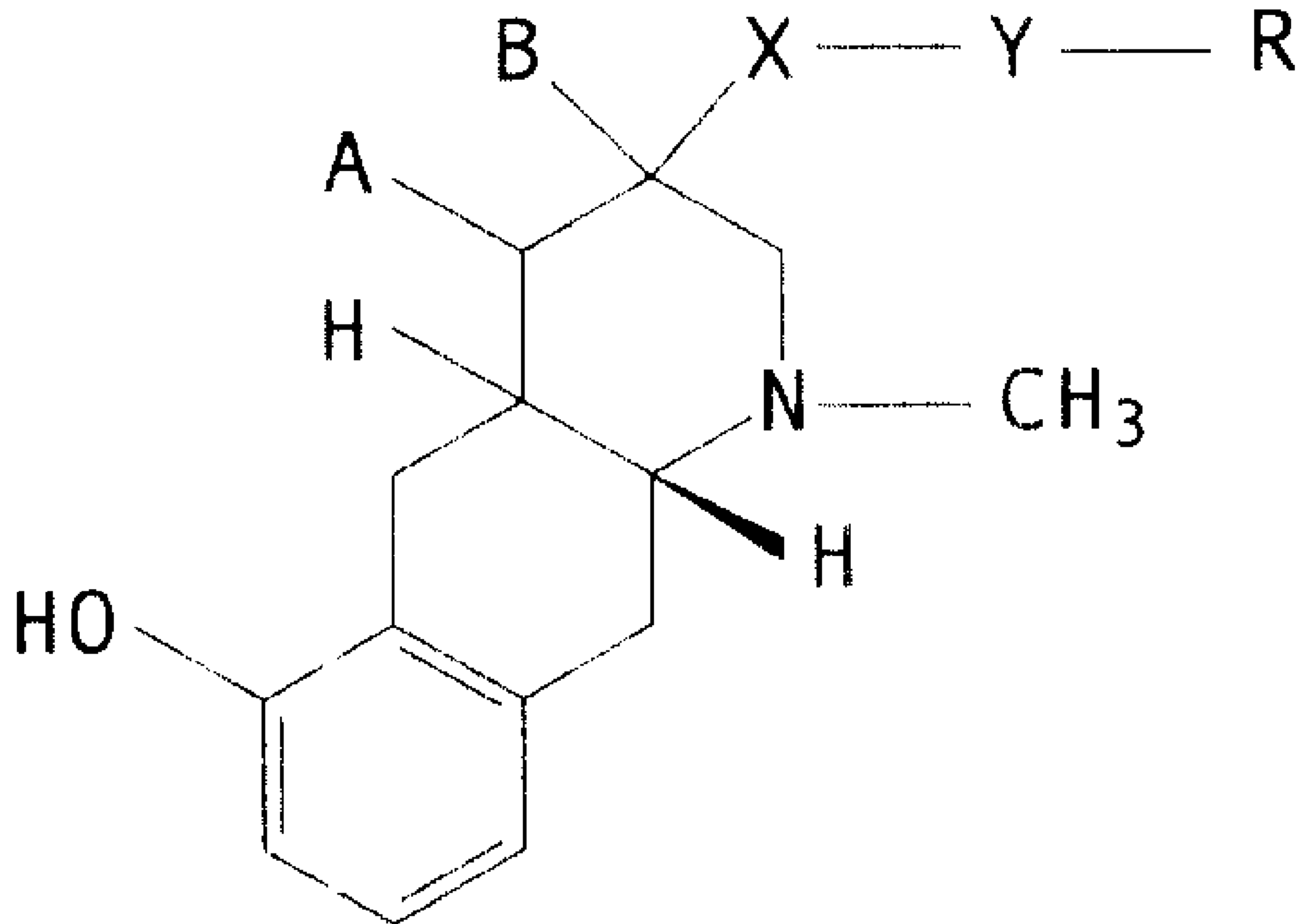
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13. Use of a compound of any one of claims 1 to 6, in free base or pharmaceutically acceptable acid addition salt form, for the manufacture of a medicament for the treatment of glaucoma or myopia.

FETHERSTONHAUGH & CO.

OTTAWA, CANADA

PATENT AGENTS



I