

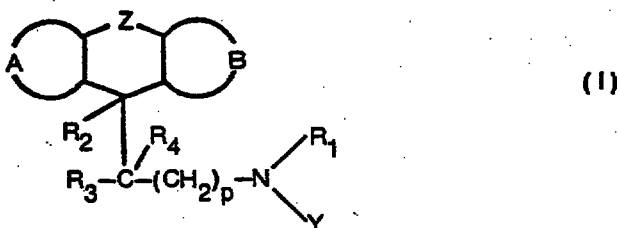
Description

This invention relates to novel antihistamines, to processes for their preparation and to pharmaceutical compositions comprising the novel compounds.

United States Patent Nos. 3,464,983 and 3,491,103 and Helvetica Chimica Acta 49, No. 1, 1966 pages 214—234 name various 4H - benzo[4,5]cyclohepta[1,2 - b]thiophenes and their 9,10-dihydro derivatives and 6-chloro derivatives having esterified carboxy aminoalkylidene or N-esterified carboxy piperidylidene groups attached at the 4-position, a typical compound being 4 - (3 - methyl - 3 - ethoxycarbonylaminoethylidene) - 9,10 - dihydro - 4H - benzo[4,5]cyclohepta[1,2 - b]thiophene. Such compounds are mentioned as intermediates in the production of derivatives in which the esterified carboxy function is replaced by hydrogen or alkyl, the resulting derivatives being antidepressants (3,464,983), or are antihistamines (3,491,103 and Helvetica Chimica Acta). United States Patent No. 3,326,924 describes various aza-dibenzo[a,b]cycloheptenes, and 9,10 derivatives, typically 4 - aza - 5 - (N - methyl - 4 - piperidylidene) - 10,11 - dihydro - 5H - dibenzo[a,d]cycloheptene; such compounds are characterized by their antihistaminic, antiserotonin and antianaphylactic action.

United States Patents No. 3,264,342, 3,435,073, 3,513,201, 3,786,095, 3,917,669, 3,952,017 and 3,763,169 describe various 5H-dibenzo[a,d]cycloheptenes or 10,11-dihydro derivatives thereof bearing a side chain in the 5-position which is typically 3-N-methyl-N-carboethoxy aminopropyl. Such compounds are described as intermediates in the formation of derivatives in which for instance the carboethoxy function is replaced by hydrogen or an alkyl group, the derivatives being variously described as having gastric antisecretory properties (3,763,169 and 3,435,073), antidepressant properties (3,952,017, 3,786,095, 3,917,669, 3,513,201) and antihistaminic properties (3,264,342).

The compounds of this invention are of the general formula I



wherein

A represents the group of atoms required for completing a fused aromatic 5- or 6-membered heterocyclic ring or a fused benzene ring;

B represents the group of atoms required for completing a fused pyridine, benzene or X-substituted benzene ring wherein X is halogen, with the proviso that, when A defines a nitrogen-containing heterocyclic ring, then B defines a fused benzene or X-substituted benzene ring;

Z represents a single bond or a substituted or unsubstituted methylene or ethylene group, the substituent being an oxo or hydroxy group, or Z represents vinylene;

R₂ represents hydrogen or an alkyl group having 1 to 3 carbon atoms and

R₃ represents hydrogen, or

R₂ and R₃ form together a second bond;

R₄ represents hydrogen and

R₁ represents an alkyl group having 1 to 6 carbon atoms, or

R₁ and R₄ form together a second bridge $-(CH_2)_2-$ between the carbon atom and the nitrogen atom to which they are attached;

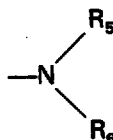
p represents 1 or 2; and

Y represents either of the groups $-COOR_8$ and $-SO_2R_8$

wherein

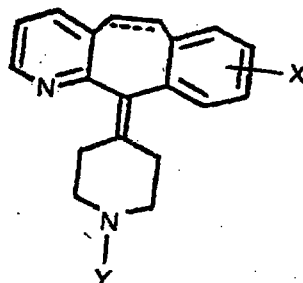
R₇ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl; phenyl, phenylloweralkyl or 2-, 3- or 4-piperidyl and

R₈ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl, phenyl or phenylloweralkyl, whereby the alkyl, cycloalkyl, cycloalkylalkyl and alkenyl groups represented by R₇ may optionally be substituted by the group



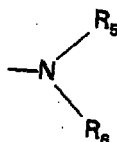
wherein R_5 and R_6 each represents hydrogen or an alkyl group having 1 to 6 carbon atoms, the piperidyl groups represented by R_7 may be substituted at the nitrogen atom by a lower alkyl group having 1 to 4 carbon atoms, and whereby the phenyl groups and the phenyl moiety of the phenylloweralkyl groups represented by R_7 and/or R_8 may be substituted by halogen or lower alkyl having 1 to 4 carbon atoms, subject to the following further provisos:

- (i) that when A is a group of atoms required to form a fused [1,2-b] thiophene ring, Z is $-\text{CH}_2-\text{CH}_2-$ or $-\text{CH}=\text{CH}-$, p is 2 and either
 - 1) B is a group of atoms required to form a fused benzene ring, R_2 and R_3 are both hydrogen or form a double bond, R_4 is hydrogen and R_1 is C_1-C_4 alkyl or R_4 and R_1 form the second bridge $(-\text{CH}_2-)_2$; or
 - 2) B is an X-substituted benzene ring, R_2 and R_3 form a double bond, R_4 is hydrogen and R_1 is Me; then R_7 cannot be C_1-C_4 alkyl or phenyl (C_1-C_4 alkyl); and
 - (ii) when A and B represent, respectively a fused benzene ring and a fused benzene or X-substituted benzene ring then R_1 and R_4 form together a second bridge $(-\text{CH}_2-)_2$ between the carbon atom and nitrogen atom to which they are attached.
- The alkyl and alkenyl groups in the above definitions of Y are such having up to 12 carbon atoms, most preferably up to 6 carbon atoms, and the loweralkyl groups (in the phenylloweralkyl groups) are such having 1 to 4 carbon atoms. The cycloalkyl groups have 3 to 7 and the cycloalkylalkyl groups 4 to 12 carbon atoms. All lower alkyl, alkyl and alkenyl groups referred to in the above definitions may be straight or branched chains.
- In a preferred aspect Z represents unsubstituted or substituted ethylene, preferably unsubstituted ethylene, or vinylene.
- Another preferred group of compounds are those wherein R_2 and R_3 together form a second bond. The preferred definition of R_1 and R_4 is that R_1 and R_4 together form a second bridge of the formula $(-\text{CH}_2)_2$.
- Of the aromatic heterocyclic rings defined by A, the sulfur or nitrogen containing rings are preferred. Most preferably the heterocyclic ring is a thiophene or pyridine ring. In the thiophene ring the sulfur atom may be in either of the two possible positions and in the pyridine ring the nitrogen atom may be in any of the 4 possible positions.
- The preferred definition of B is the one which provides a fused benzene or X-substituted benzene ring.
- A most preferred group of compounds may be defined by the following formula II



(III)

wherein the dotted line represents an optional double bond and X and Y are as hereinabove defined for formula I. Preferably Y represents an alkoxy carbonyl or alkoxy sulfonyl group wherein the alkyl moiety has 1 to 12, preferably 1 to 6 carbon atoms. The alkyl groups may be as defined above, i.e. straight, branched or cyclic or they may be straight or branched chains containing a cyclic moiety. In addition, the alkyl moiety of the alkoxy carbonyl groups may be substituted by an amino group,

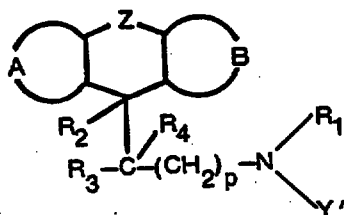


as hereinabove defined.

The present invention also provides novel pharmaceutical compositions comprising a compound chosen from the compounds of formula I as defined above and those compounds excluded from formula I by provisos (i) and (ii) in admixture with a pharmaceutically acceptable carrier or excipient.

The compounds of this invention (including these excluded from the definition of formula I by provisos (i) and (ii)) may be prepared by methods generally known in the art.

The preferred process comprises reacting a compound of the general formula III



(III)

wherein A, B, Z, R₁, R₂, R₃, R₄ and p are as defined for formula I and Y' represents a replaceable group, with a compound of formula IV

TY

(IV),

wherein Y is as defined for formula I and T represents a group capable of being eliminated together with Y'.

Preferably, one of T and Y' is a reactive in organic or organic ester or ether group, and the other is either hydrogen or methyl.

Thus, for the preparation of compounds of general formula I or, in particular, of formula II wherein Y represents COOR₇ with R₇ being as defined above, a compound wherein Y' represents methyl may be reacted with a compound of the formula TCOOR₇ wherein T represents halogen, preferably chlorine.

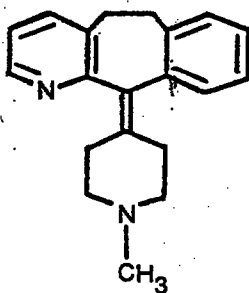
The reaction is conveniently carried out by heating the starting materials in an inert solvent, preferably at reflux temperature. Typical representatives of inert solvents are benzene, toluene, tetrahydrofuran, chloroform etc.

In a further embodiment of the general process outlined above, a compound of formula III wherein Y' represents H is reacted with a compound of formula TCOOR₇ wherein T represents OR₇, whereby R₇ is as defined above, preferably, however, t-butyl.

The compounds of formula I wherein Y represents SO₂R₈ are preferably prepared by reacting a compound of formula III wherein Y' represents H with a compound of formula IV wherein T represents halogen, preferably chlorine, and Y represents SO₂R₈. The reaction is preferably carried out at room temperature in an inert solvent such as benzene and toluene in the presence of a base such as K₂CO₃, Na₂CO₃, NaH, NaOH, triethylamine or other strong organic bases. The inorganic bases are preferred.

As is apparent from the nature of the group Y in the compounds of formula I, certain ester groups obtained according to the procedures outlined above may be transformed into other ester groups by transesterification. Thus for example a compound wherein Y represents —COO  may be reacted with NaOR₇ to give a compound wherein Y represents COOR₇ (R₇ being different from phenyl).

The starting compounds of formula III are partly known compounds which are available on the market, e.g. azatadine:



Other starting compounds of formula III may be prepared according to methods described in the literature, e.g. in U.S. Patent 3,326,924 and Belgian Patent 647,043 or according to analogous methods.

As is obvious from the chemical structure, compounds of this invention have assymetric centers (e.g. position 11 in formula II).

In the preparation, a mixture of the optical isomers (d and l), is obtained which can be separated by methods well known in the art.

The following examples illustrate the process variations described above:

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Example 1

A. 11-(N-Carboethoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

To a solution of 10.9 g (0.1 mole) of ethylchloroformate in 300 ml of anhydrous benzene is added dropwise, with stirring at room temperature, a solution of 14.5 g (0.05M) of 11 - (N - methyl - 4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine (hereinafter referred to as Compound IIA) in 200 ml of benzene. The solution is stirred and is heated under reflux overnight (16—20 hrs.). The mixture is cooled and is poured into ice water and the organic layer is separated, washed with water, dried, and then concentrated to dryness. The residue is triturated with petroleum ether and a white solid having a melting point of 106—107°C is recrystallized from isopropyl ether after decolorization with decolorizing carbon.

B. 11-(N-Carboethoxy-4-piperidylidene)-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

Using the procedure of Example 1A, react 16.2 g of the 8-chloro derivative of Compound IIA and 10.9 g (0.1 mole) of ethylchloroformate to prepare the title compound, having a melting point of 128—130°C. The 7-, 9- and 10-chloro analogues are similarly prepared.

C. 11-(N-Carbomethoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

Using the procedure of Example 1A, react 14.5 g of Compound IIA and 9.4 g of methylchloroformate to prepare the title compound, having a melting point of 116—118°C.

D. 11-(β-N-Methyl-N-carboethoxy)ethyl-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

Using the procedure of Example 1A react a solution of 15.1 g (0.05 mole) of 11 - (β - dimethyl-aminoethyl) - 8 - chloro - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine in 300 ml of anhydrous benzene with 10.9 g of ethylchloroformate at room temperature to prepare the title compound.

E. 11-(β-N-Methyl-N-carboethoxy)ethylidene-6,11-dihydro-[5H]-benzo[5,6]cyclohepta[1,2-b]pyridine

Prepare the title compound by the procedure of Example 1A using 14.9 g of dimethylamino ethylidene - 6,11 - dihydro - [5H] - benzo[5,6]cyclohepta[1,2 - b]pyridine and 10.9 g of ethylchloroformate at room temperature in benzene.

F. 4-(N-Carboethoxy-piperidylidene)4H-benzo[4,5]cyclohepta[1,2-b]thiophene-10(9H)-one

Using the procedure of Example 1A, react 21.3 g of N - methylpiperidylidene - 4H - benzo[4,5]cyclohepta[1,2 - b]thiophene - 10(9H) - one in 300 ml of benzene with a solution of 10.9 g of ethylchloroformate in 300 ml benzene to prepare the title compound.

Example 2

11-(N-Carbophenoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine (Compound IIB)

To a solution of 29.1 g (0.1 mole) of Compound IIA in 150 ml of anhydrous carbon tetrachloride is added 17 g of phenylchloroformate in an equal volume of anhydrous carbon tetrachloride. Heat under reflux for 15 minutes with stirring and pour into water. Separate and wash the organic layer with water and remove solvent. Extract the residue with ether, filter off the insoluble material and remove the ether. The residue is recrystallized from isopropyl ether to yield the title compound having a melting point of 127—130°C. Similarly, prepare the 7-, 8-, 9- or 10-chloro derivatives of the title compound using this procedure.

Example 3

11-(N-Carboisopropoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

Dissolve 0.5 g sodium metal in 50 ml isopropanol and add 7.9 g of Compound IIB from Example 2. Heat with stirring for 5 hours on the steam bath at 90—95° and allow to cool overnight.

Add ice water to precipitate the product and extract 3 times with ether and once with chloroform. Wash with water, distill off solvents, triturate with hexane and recrystallize from isopropylether. The melting point is 147—148°C.

Using this procedure, and replacing the isopropanol with n-butanol, cyclopentanol, allyl alcohol, cyclopropylmethanol, benzylalcohol, p-chlorobenzylalcohol, phenethylalcohol, dimethylaminoethylalcohol or N-methyl-4-hydroxy-piperidine prepare the corresponding esters. Similarly, using the 7-, 8-, 9- and 10-chloro derivatives of Compound IIB and the sodium salts of the aforementioned alcohols, prepare the corresponding 7-, 8-, 9- and 10-chloro compounds.

Example 4

11-(N-Carbo-t-butoxy-4-piperidylidene-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

Dissolve 13.8 g of 11 - (4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine (Compound IIC), prepared according to the method of Villani et al., J. Med. Chem. 15, 750 (1972), in 250 ml of dry tetrahydrofuran. With stirring, add 12 g of di-butyl carbonate and stir at room temperature overnight. The mixture is poured into water, is extracted with ether and is washed with water and the solvent is removed. Recrystallize the residue from isopropyl ether. The melting point is 144—145°C.

Example 5

N-Methanesulfonyl-4-piperidylidene-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine

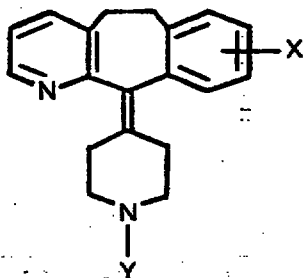
To 10 g of compound IIC in 200 ml of dry toluene add 13 g of anhydrous potassium carbonate. After several minutes of stirring at room temperature, add dropwise a solution of 6 g of methanesulfonyl chloride in 20 ml of toluene. Continue stirring for 16 to 20 hours and then filter. Recrystallize the solid material from ethanol. The melting point is 223—224°C.

Using this procedure and adjusting the weight of the requisite sulfonyl chloride so that 0.04 moles of said alkanesulfonyl chloride are used, the ethanesulfonyl, n-propylsulfonyl, n-butylsulfonyl, cyclopropylsulfonyl, heptylsulfonyl, dodecylsulfonyl, phenylsulfonyl, p-methylphenyl-sulfonyl, p-fluorophenylsulfonyl, p-chlorophenylsulfonyl, benzylsulfonyl, p-chlorobenzylsulfonyl, p-tertbutylphenylsulfonyl and cyclopentylsulfonyl compounds of formula I wherein Y is SO₂R are obtained. Similarly, prepare the tricyclic ring substituted chloro derivatives.

Substituting the appropriate starting material having a double bond between the 5 and 6 positions of the ring system, and using the procedures set forth in Examples 1 to 5 above (which show the preparation of the 6,11-dihydro compounds), the corresponding 6,11-dehydro compounds are prepared.

Also, by substituting an appropriate bromo or other halo analogue for the 7-, 8-, 9- or 10-chloro-substituted starting material mentioned above, other desired halo compounds of the formula I may be prepared.

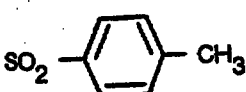
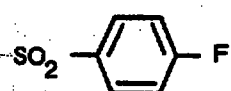
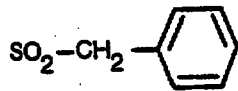
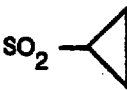
Typical representatives of compounds from the preferred group having the general formula II



are listed in the table below:

Compound No.	X	Y	m.p.
1	H	COOC_2H_5	106–107°C
2	H	$\text{COOCH}_2\text{CCl}_3$	147°C
3	H	$\text{COO}-\text{C}_6\text{H}_5$	127–130°C
4	H	$\text{COOCH}(\text{CH}_3)_2$	147–148°C
5	H	$\text{COO}(\text{CH}_2)_2\text{N}(\text{CH}_3)_2$	84–87°C
6	H	COOCH_3	116–118°C
7	H	$\text{COO}(\text{CH}_2)_3\text{CH}_3$	86–89°C
8	H	$\text{COOC}(\text{CH}_3)_3$	144–145°C
9	H	$\text{COO}-\text{C}_6\text{H}_{11}\text{N-CH}_3$	158–160°C
10	H	$\text{COOCH}_2-\text{C}_6\text{H}_5$	106–108°C
11	8-Cl	COOC_2H_5	128–130°C
12	H	$\text{COOCH}_2\text{CH}=\text{CH}_2$	88–91°C
13	H	$\text{COOCH}_2-\text{C}_6\text{H}_4\text{Cl}$	131–134°C
14	H	$\text{COO}(\text{CH}_2)_2-\text{C}_6\text{H}_5$	101–104°C
15	H	$\text{COOCH}_2-\text{C}_3\text{H}_5$	126–127°C
16	H	$\text{COO}-\text{C}_4\text{H}_8$	162–164°C
17	H	$\text{SO}_2-\text{C}_6\text{H}_4-\text{CH}_3$	197–199°C

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Compound No.	X	Y	m.p.
18	8-Cl		185-187°C
19	H		186-187°C
20	H	SO ₂ CH ₃	223-224°C
21	H	SO ₂ (CH ₂) ₂ CH ₃	183-184°C
22	H	SO ₂ CH ₂ CH ₃	173-174°C
23	H	SO ₂ (CH ₂) ₃ CH ₃	185-186°C
24	H		185-186°C
25	H		157-158°C

The compounds of the present invention (including those excluded from the definition of formula I by provisos (i) and (ii)) are useful as non-sedating antihistamines. Such compounds act as anti-allergic agents in the treatment of such conditions as perennial; and seasonal allergic rhinitis and chronic urticaria, and can be administered in pharmaceutical formulations comprising the compound in admixture with a pharmaceutical carrier suitable for enteral or parenteral administration. The formulations may be in solid form, as for example tablets and capsules, or in liquid form as for example syrups, elixirs, emulsions, and injectables. In the formulation of pharmaceutical dosage forms there generally is utilized excipients; for example, water, gelatin, lactose, starches, magnesium stearate, talc, vegetable oils, benzyl alcohols, gums, polyalkylene glycols, and petroleum jelly. Preferred formulations are more fully illustrated in Example 6.

Although the required dosage will be determined by such factors as the patient's age, sex, weight and the severity of the allergic reaction to be treated, the preferred human dosage range is likely to be 4 to 50 mg of the effective compound 1 to 3 times per day. The preferred dosage ranges for other animals can readily be determined by using standard testing methods.

The following data show the pharmaceutical effect of the compounds of this invention. (The data were elaborated with the compound 8 - chloro - 6,11 - dihydro - 11 - (1 - carboethoxy - 4 - piperidylidene) - 5 - H - benzo[5,6]cyclohepta[1,2 - b]pyridine).

Oral ED₅₀ for preventing histamine induced lethality in guinea pigs is 0.19 mg/kg. The acute toxicity is very low (e.g. >320 mg/kg in mice; >60 mg/kg in dogs etc.). Oral ED₅₀ for preventing histamine-induced paw edema in mice is 1.3 mg/kg.

The compound showed very little or no CNS activity in mice, rats, dogs or monkeys, eg. no physostigmine lethality in mice at doses up to 320 mg/kg; no overt behavioral or neurologic or autonomic effects in mice or rats after doses of 10-300 mg/kg, in dogs after doses of 15-60 mg/kg or in monkeys at doses of 30-90 mg/kg.

The following examples are illustrative of the aforementioned pharmaceutical compositions:

Example 6

A syrup comprising a compound of the present invention (Active Compound), e.g. 11 - (N - carboethoxy - 4 - piperidylidene) - 8 - chloro - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 -

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b]pyridine, 11 - (N - methanesulfonyl - 4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine, 11 - (N - carboethoxy - 4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine, 11 - (N - carbomethoxy - 4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine or 11 - (N - carbophenoxy - 4 - piperidylidene) - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine is prepared from the following ingredients:

		per ml
10	Active Compound	0.100 mg
	Sucrose	600 mg
	Sorbitol	140 mg
15	Propylene Glycol	20.0 mg
	Methylparaben	1.00 mg
20	Propylparaben	0.200 mg
	F.D. & C. Yellow No. 6	0.225 mg
	Alcohol USP	0.0021 ml
25	Imitation Black Currant Flavor	0.001 ml
	Purified Water USP	q.s.
30		1.0 ml

The syrup is prepared by combining the above ingredients according to standard techniques.

Example 7

A tablet comprising a compound of the present invention (Active Compound) is prepared by a spray-dry process from the following ingredients:

Component I	Tablet I (mg/tablet)	Tablet II (mg/tablet)
40 Active Compound*	1.00	10.00
Lactose, Hydrous USP (Impalpable Powder)	212	180.00
45 Povidone NF	10.0	—
Corn Starch (Food Grade)	15.0	6.0
Purified Water USP (Evaporates)	0.102 ml	0.1
50 Additional Components		
Corn Starch (Food Grade)	11.5	6.0
55 Magnesium Stearate USP	0.500	1.2
Gelatine	—	2.5

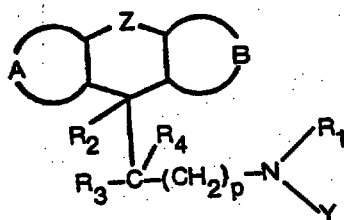
The materials of Component I are combined and spray dried by standard techniques. The resulting spray dried material is combined with the additional components listed above and processed to form tablets.

*) e.g. 11 - (N - carboethoxy - 4 - piperidylidene) - 8 - chloro - 6,11 - dihydro - 5H - benzo[5,6]cyclohepta[1,2 - b]pyridine.



Claims for the Contracting States: BE CH DE FR GB IT LI LU NL SE

1. Compounds of the general formula I



15 wherein

A represents the group of atoms required for completing a fused aromatic 5- or 6-membered heterocyclic ring or a fused benzene ring;

B represents the group of atom required for completing a fused pyridine, benzene or X-substituted benzene ring wherein X is halogen, with the proviso that, when A defines a nitrogen-containing heterocyclic ring, then B defines a fused benzene or X-substituted benzene ring;

Z represents a single bond or a substituted or unsubstituted methylene or ethylene group, the substituent being an oxo or hydroxy group, or Z represents vinylene;

R₂ represents hydrogen or an alkyl group having 1 to 3 carbon atoms and

R₃ represents hydrogen, or

R₂ and R₃ form together a second bond;

R₄ represents hydrogen and

R₁ represents an alkyl group having 1 to 6 carbon atoms, or

R₁ and R₄ form together a second bridge $-(CH_2)_2-$ between the carbon atom and the nitrogen atom to which they are attached;

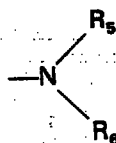
p represents 1 or 2; and

Y represents either of the groups $-COOR_7$ and $-SO_2R_8$

wherein

R₇ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl, phenyl, phenylloweralkyl or 2-, 3- or 4-piperidyl and

R₈ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl, phenyl or phenylloweralkyl, whereby the alkyl, cycloalkyl, cycloalkylalkyl and alkenyl groups represented by R₇ may optionally be substituted by the group



45 wherein R₅ and R₆ each represent hydrogen or an alkyl group having 1 to 6 carbon atoms, the piperidyl groups represented by R₇ may be substituted at the nitrogen atom by a lower alkyl group having 1 to 4 carbon atoms, and whereby the phenyl groups and the phenyl moiety of the phenylloweralkyl groups represented by R₇ and/or R₈ may be substituted by halogen or lower alkyl having 1 to 4 carbon atoms, subject to the following further provisos:

50 (i) that when A is a group of atoms required to form a fused [1,2-b] thiophene ring, Z is $-CH_2-CH_2-$ or $-CH=CH-$; p is 2 and either

1) B is a group of atoms required to form a fused benzene ring, R₂ and R₃ are both hydrogen or form a double bond, R₄ is hydrogen and R₁ is C₁-C₄ alkyl or R₄ and R₁ form the second bridge $-(CH_2)_2-$; or

55 2) B is an X substituted benzene ring, R₂ and R₃ form a double bond, R₄ is hydrogen and R₁ is Me; then R₇ cannot be C₁-C₄ alkyl or phenyl (C₁-C₄ alkyl); and

(ii) when A and B represent respectively a fused benzene ring and a fused benzene or X-substituted benzene ring then R₁ and R₄ form together a second bridge $-(CH_2)_2-$ between the carbon atom and nitrogen atom to which they are attached;

60 and wherein, in Y, the alkyl and alkenyl groups have up to 12 carbon atoms; the loweralkyl groups (in the phenylloweralkyl groups) have 1 to 4 carbon atoms, the cycloalkyl groups have 3 to 7 carbon atoms, and the cycloalkylalkyl groups have 4 to 12 carbon atoms.

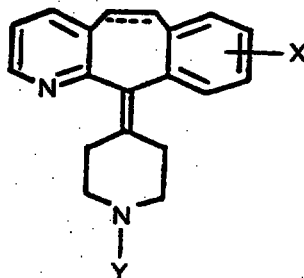
2. Compounds according to claim 1, wherein Z represents an ethylene or vinylene group.

3. Compounds according to claim 1 or 2, wherein R₂ and R₃ together form a second bond.



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4. Compounds according to any one of claims 1 to 3, wherein R_1 and R_4 together form a bridge of the formula $-(CH_2)_2-$.
5. Compounds according to any one of claims 1 to 4, wherein the ring defined by A is a thiophene or pyridine ring.
6. Compounds according to any one of claims 1 to 5, wherein the ring defined by B is a fused benzene or X-substituted benzene ring with X being as defined in claim 1.
7. Compounds according to any one of claims 1 to 6 having the general formula II



(II)

wherein the dotted line represents an optional double bond and X and Y are as defined in claim 1.

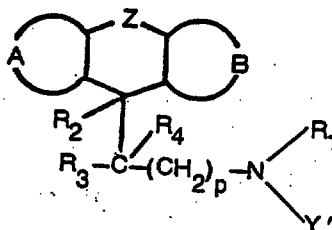
8. Compounds according to any one of claims 1 to 7, wherein there is a single bond between the 5 and 6-positions.

9. Compounds according to any one of claims 1 to 8, wherein X represents hydrogen, 8-chlorine or 8-bromine.

10. Compounds according to any one of claims 1 to 9, said compounds being
- 11-(N-carboethoxy-4-piperidylidene)-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine;
- 11-(N-methanesulfonyl-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine;
- 11-(N-carboethoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine;
- 11-(N-carbomethoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine; or
- 11-(N-carbophenoxy-4-piperidylidene)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine.

11. Pharmaceutical compositions comprising as an active ingredient a compound chosen from compounds of formula I as defined in claim 1 and those compounds excluded from claim 1 by provisos (i) and (ii) therein, in admixture with a pharmaceutically acceptable carrier or excipient.

12. Process for preparing compounds of formula I as defined in claim 1, characterized in that a compound of the general formula III



III

wherein A, B, Z, R_1 , R_2 , R_3 , R_4 and p are as defined in claim 1 and Y' represents a replaceable group, with a compound of formula IV

TY

(IV),

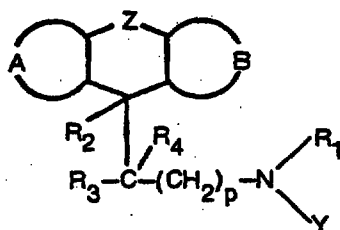
wherein Y is as defined in claim 1, and T represents a group capable of being eliminated together with Y' and that, if desired, a so obtained compound of formula I is transferred into another compound of formula I by transesterification of the group Y.

13. The compounds of formula I as defined in claim 1 and those excluded from claim 1 by provisos (i) and (ii) therein for use as antihistamines.



Claims for the Contracting State: AT

1. Process for the preparation of compounds of the general formula I



(I)

15 wherein

A represents the group of atoms required for completing a fused aromatic 5- or 6-membered heterocyclic ring or a fused benzene ring;

B represents the group of atoms required for completing a fused pyridine, benzene or X-substituted benzene ring wherein X is halogen, with the proviso that, when A defines a nitrogen-containing heterocyclic ring, then B defines a fused benzene or X-substituted benzene ring;

Z represents a single bond or a substituted or unsubstituted methylene or ethylene group, the substituent being an oxo or hydroxy group, or Z represents vinylene;

R₂ represents hydrogen or an alkyl group having 1 to 3 carbon atoms and

R₃ represents hydrogen, or

25 R₂ and R₃ form together a second bond;

R₄ represents hydrogen and

R₁ represents an alkyl group having 1 to 6 carbon atoms, or

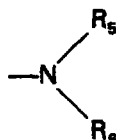
R₁ and R₄ form together a second bridge $-(CH_2)_2-$ between the carbon atom and the nitrogen atom to which they are attached;

30 p represents 1 or 2; and

Y represents either of the groups $-COOR_7$ and $-SO_2R_8$ wherein

R₇ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl, phenyl, phenylloweralkyl or 2-, 3- or 4-piperidyl and

35 R₈ represents alkyl, cycloalkyl, cycloalkylalkyl, alkenyl, phenyl or phenylloweralkyl, whereby the alkyl, cycloalkyl, cycloalkylalkyl and alkenyl groups represented by R₇ may optionally be substituted by the group



45 wherein R₅ and R₆ each represent hydrogen or an alkyl group having 1 to 6 carbon atoms, the piperidyl groups represented by R₇ may be substituted at the nitrogen atom by a lower alkyl group having 1 to 4 carbon atoms, and whereby the phenyl groups and the phenyl moiety of the phenylloweralkyl groups represented by R₇ and/or R₈ may be substituted by halogen or lower alkyl having 1 to 4 carbon atoms, subject to the following further provisos:

50 (i) that when A is a group of atoms required to form a fused [1,2-b] thiophene ring, Z is $-CH_2-CH_2-$ or $-CH=CH-$, p is 2 and either

1) B is a group of atoms required to form a fused benzene ring, R₂ and R₃ are both hydrogen or form a double bond, R₄ is hydrogen and R₁ is C₁-C₄ alkyl or R₄ and R₁ form the second bridge $-(CH_2)_2-$; or

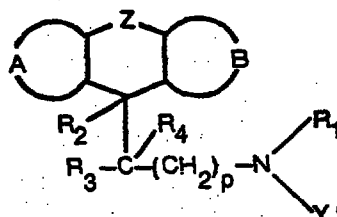
2) B is an X substituted benzene ring, R₂ and R₃ form a double bond, R₄ is hydrogen and R₁ is Me; then R₇ cannot be C₁-C₄ alkyl or phenyl (C₁-C₄ alkyl); and

55 (ii) when A and B represent respectively a fused benzene ring and a fused benzene or X substituted benzene ring then R₁ and R₄ form together a second bridge $-(CH_2)_2-$ between the carbon atom and nitrogen atom to which they are attached;

60 and wherein, in Y, the alkyl and alkenyl groups have up to 12 carbon atoms, the loweralkyl groups (in the phenylloweralkyl groups) have 1 to 4 carbon atoms, the cycloalkyl groups have 3 to 7 carbon atoms, and the cycloalkylalkyl groups have 4 to 12 carbon atoms, characterised in that a compound of the general formula III



0 042 544



(III)

wherein A, B, Z, R₁, R₂, R₃, R₄ and p are as defined in claim 1 and Y' represents a replaceable group, with a compound of formula IV

TY

(IV),

wherein Y is as defined in claim 1 and T represents a group capable of being eliminated together with Y', and that, if desired, a so obtained compound of formula I is transferred into another compound of formula I by transesterification of the group Y.

2. Process according to claim 1, characterized in that a compound of formula III wherein Y' is methyl is reacted with a compound of the formula

T COOR₇

with T being halogen, preferably chlorine, and R₇ being as defined in claim 1.

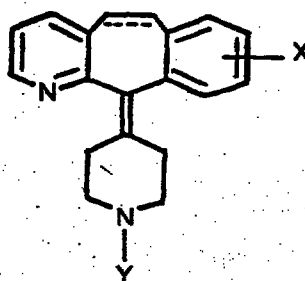
3. Process according to claim 1, characterized in that a compound of formula III wherein Y' is hydrogen is reacted with a compound of the formula

T COOR₇

with T representing the group OR₇ and R₇ being as defined in claim 1.

4. Process according to claim 1, characterized in that a compound of formula III wherein Y' represents hydrogen is reacted with a compound of formula IV wherein T represents halogen, preferably chlorine, and Y represents the group SO₂R₈ with R₈ being as defined in claim 1.

5. Process according to any one of claims 1 to 4, characterized in that as a starting compound is used a compound of the formula II'



(II')

wherein X is as defined in claim 1 and Y' is as defined in any one of claims 1 to 4.

6. Process according to claim 5, characterized in that a compound of formula II' wherein X represents hydrogen or 8-chlorine is reacted with a compound of the formula

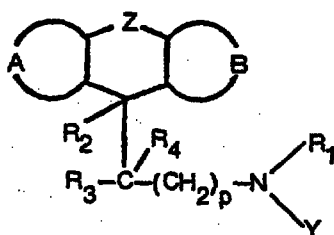
TCOOC₂H₅

whereby Y' and T are as defined in any one of claims 1 to 4.

7. A process for making a pharmaceutical composition which comprises mixing a compound chosen from the compounds of formula I as defined in claim 1 and those compounds excluded from claim 1 by provisos (I) and (II) therein, in admixture with a pharmaceutically acceptable carrier or excipient.

Patentansprüche für die Vertragsstaaten: BE CH DE FR GB IT LI LU NL SE

1. Verbindungen der allgemeinen Formel I



(I)

in der

A die zur Vervollständigung eines anellierten aromatischen 5- oder 6-gliedrigen heterocyclischen Rings oder eines anellierten Benzol-Rings erforderliche Gruppe von Atomen bezeichnet,

B die zur Vervollständigung eines anellierten Pyridin-, Benzol- oder X-substituierten Benzol-Rings, worin X Halogen ist, erforderliche Gruppe von Atomen bezeichnet, mit der Maßgabe, daß B einen anellierten Benzol- oder X-substituierten Benzol-Ring darstellt, wenn A für einen stickstoffhaltigen heterocyclischen Ring steht,

Z eine Einfach-Bindung oder eine substituierte oder unsubstituierte Methylen- oder Ethylen-Gruppe bezeichnet, worin der Substituent eine Oxo- oder Hydroxy-Gruppe ist, oder Z Vinylen bezeichnet,

R₂ Wasserstoff oder eine Alkyl-Gruppe mit 1 bis 3 Kohlenstoff-Atomen bezeichnet und

R₃ Wasserstoff bezeichnet oder

R₂ und R₃ gemeinsam eine zweite Bindung bilden,

R₄ Wasserstoff bezeichnet und

R₁ eine Alkyl-Gruppe mit 1 bis 6 Kohlenstoff-Atomen bezeichnet oder

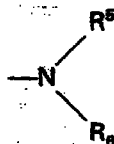
R₁ und R₄ gemeinsam eine zweite Brücke $-(CH_2)_2-$ zwischen dem Kohlenstoff-Atom und dem Stickstoff-Atom, an die sie jeweils gebunden sind, bilden,

p für 1 oder 2 steht,

Y eine der Gruppen $-COOR_7$ und $-SO_2R_8$ bezeichnet, worin

R₇ für Alkyl, Cycloalkyl, Cycloalkylalkyl, Alkenyl, Phenyl, Phenylniederalkyl oder 2-, 3- oder 4-Piperidyl steht und

R₈ für Alkyl, Cycloalkyl, Cycloalkylalkyl, Alkenyl, Phenyl oder Phenylniederalkyl steht, wobei die durch R₇ dargestellten Alkyl-, Cycloalkyl-, Cycloalkylalkyl- oder Alkenyl-Gruppen gegebenenfalls substituiert sein können durch die Gruppe



in der R₅ und R₆ jeweils für Wasserstoff oder eine Alkyl-Gruppe mit 1 bis 6 Kohlenstoff-Atomen stehen, wobei die durch R₇ dargestellte Piperidyl-Gruppe an dem Stickstoff-Atom durch eine niedere Alkyl-Gruppe mit 1 bis 4 Kohlenstoff-Atomen substituiert sein kann und wobei die durch R₇ und/oder R₈ dargestellten Phenyl-Gruppen und die Phenyl-Struktureinheiten der Phenylniederalkyl-Gruppen durch Halogen oder Niederalkyl mit 1 bis 4 Kohlenstoff-Atomen substituiert sein können, mit den weiteren Maßgaben, daß,

(i) wenn A eine zur Bildung eines anellierten [1,2-b]-Thiophen-Rings erforderliche Gruppe ist, Z $-CH_2-CH_2-$ oder $-CH=CH-$ ist, p 2 ist und entweder

1) B eine zur Bildung eines anellierten Benzol-Rings erforderliche Gruppe von Atomen ist, R₂ und R₃ beide Wasserstoff sind oder eine Doppelbindung bilden, R₄ Wasserstoff ist und R₁ C₁-C₄-Alkyl ist oder R₄ und R₁ die zweite Brücke $-(CH_2)_2-$ bilden oder

2) B eine X-substituierter Benzol-Ring ist, R₂ und R₃ eine Doppelbindung bilden, R₄ Wasserstoff ist und R₁ Me ist,

dann R₇ nicht C₁-C₄-Alkyl oder Phenyl (C₁-C₄-alkyl) sein kann, und

(ii) wenn A und B jeweils einen anellierten Benzol-Ring und einen anellierten Benzol- oder X-substituierten Benzol-Ring bezeichnen,

dann R₁ und R₄ zusammen eine zweite Brücke $-(CH_2)_2-$ zwischen dem Kohlenstoff-Atom und dem Stickstoff-Atom, an die sie jeweils gebunden sind, bilden,

und worin in Y die Alkyl- und Alkenyl-Gruppen bis zu 12 Kohlenstoff-Atome, die Niederalkyl-Gruppen



(13)

(in den Phenylniederalkyl-Gruppen) 1 bis 4 Kohlenstoff-Atome, die Cycloalkyl-Gruppen 3 bis 7 Kohlenstoff-Atome und Cycloalkylalkyl-Gruppen 4 bis 12 Kohlenstoff-Atome aufweisen.

2. Verbindung nach Anspruch 1, dadurch gekennzeichnet, daß eine Ethylen- oder Vinylengruppe bezeichnet.

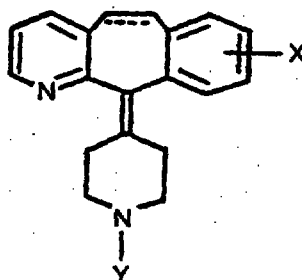
3. Verbindungen nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß R_2 und R_3 zusammen eine zweite Bindung bilden.

4. Verbindungen nach irgendeinem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß R_1 und R_4 zusammen eine Brücke der Formel $-(CH_2)_2-$ bilden.

5. Verbindungen nach irgendeinem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der durch A bezeichnete Ring eine Thiophen- oder Pyridin-Ring ist.

6. Verbindungen nach irgendeinem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß der durch B bezeichnete Ring ein anellierter Benzol- oder X-substituierter Benzol-Ring ist, wobei X die in Anspruch 1 angegebene Bedeutung hat.

7. Verbindungen nach irgendeinem der Ansprüche 1 bis 6 mit der allgemeinen Formel II



(II)

in der

die gestrichelte Linie eine wahlweise Doppelbindung bezeichnet und X und Y die in Anspruch 1 angegebenen Bedeutungen haben.

8. Verbindungen nach irgendeinem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß sich zwischen der 5- und der 6-Stellung eine Einfach-Bindung befindet.

9. Verbindungen nach irgendeinem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß X für Wasserstoff, 8-Chlor oder 8-Brom steht.

10. Verbindungen nach irgendeinem der Ansprüche 1 bis 9, nämlich

11-(N-Carboethoxy-4-piperidyliden)-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin,

11-(N-Methansulfonyl-4-piperidyliden)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin,

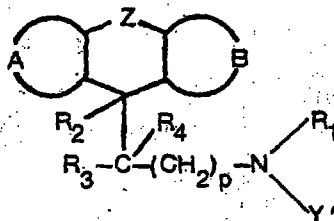
11-(N-Carboethoxy-4-piperidyliden)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin,

11-(N-Carbomethoxy-4-piperidyliden)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin oder

11-(N-Carbophenoxy-4-piperidyliden)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridin.

11. Pharmazeutische Zusammensetzungen, enthaltend als Wirkstoff eine Verbindung ausgewählt aus Verbindungen der Formel I wie in Anspruch 1 definiert und solchen Verbindungen, die durch die in Anspruch 1 genannten Maßgaben (i) und (ii) ausgeschlossen sind, im Gemisch mit einem pharmazeutisch unbedenklichen Träger oder Streckmittel.

12. Verfahren zur Herstellung von Verbindungen der Formel I nach Anspruch 1, dadurch gekennzeichnet, daß eine Verbindung der Formel III



(III)

in der A, B, Z, R_1 , R_2 , R_3 , R_4 und p die in Anspruch 1 angegebenen Bedeutungen haben und Y' eine ersetzbare Gruppe bezeichnet, mit einer Verbindung der Formel IV

TY

(IV),

in der Y die in Anspruch 1 angegebene Bedeutung hat und T eine Gruppe bezeichnet, die sich zusammen mit Y' eliminieren läßt, umgesetzt wird und daß gewünschtenfalls eine so erhaltene Verbin-



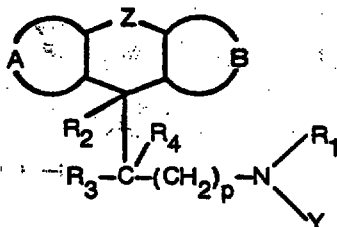
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derung der Formel I durch Umesterung der Gruppe Y in eine andere Verbindung der Formel I umgewandelt wird.

13. Verwendung der Verbindungen der Formel I nach Anspruch 1 und solcher Verbindungen, die durch die in Anspruch 1 genannten Maßgaben (i) und (ii) ausgeschlossen sind, als Antihistamine.

Patentansprüche für den Vertragsstaat: AT

1. Verfahren zur Herstellung von Verbindungen der allgemeinen Formel I



(I)

in der

A die zur Vervollständigung eines anellierten aromatischen 5- oder 6-gliedrigen heterocyclischen Rings oder eines anellierten Benzol-Rings erforderliche Gruppe von Atomen bezeichnet,

B die zur Vervollständigung eines anellierten Pyridin-, Benzol- oder X-substituierten Benzol-Rings, worin X Halogen ist, erforderliche Gruppe von Atomen bezeichnet, mit der Maßgabe, daß B einen anellierten Benzol- oder X-substituierten Benzol-Ring darstellt, wenn A für einen stickstoffhaltigen heterocyclischen Ring steht,

Z eine Einfach-Bindung oder eine substituierte oder unsubstituierte Methylen- oder Ethylen-Gruppe bezeichnet, worin der Substituent eine Oxo- oder Hydroxy-Gruppe ist, oder Z Vinylen bezeichnet,

R₂ Wasserstoff oder eine Alkyl-Gruppe mit 1 bis 3 Kohlenstoff-Atomen bezeichnet und

R₃ Wasserstoff bezeichnet oder

R₂ und R₃ gemeinsam eine zweite Bindung bilden,

R₄ Wasserstoff bezeichnet und

R₁ eine Alkyl-Gruppe mit 1 bis 6 Kohlenstoff-Atomen bezeichnet oder

R₁ und R₄ gemeinsam zweite Brücke $-(CH_2)_2-$ zwischen dem Kohlenstoff-Atom und dem Stickstoff-Atom, an die sie jeweils gebunden sind, bilden,

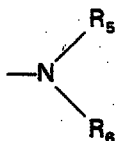
p für 1 oder 2 steht,

Y eine der Gruppen $-COOR_7$ und $-SO_2R_8$ bezeichnet, worin

R₇ für Alkyl, Cycloalkyl, Cycloalkylalkyl, Alkenyl, Phenyl, Phenylniederalkyl oder 2-, 3- oder 4-Piperidyl steht und

R₈ für Alkyl, Cycloalkyl, Cycloalkylalkyl, Alkenyl, Phenyl oder Phenylniederalkyl steht,

wobei die durch R₇ dargestellten Alkyl-, Cycloalkyl-, Cycloalkylalkyl- oder Alkenyl-Gruppen gegebenenfalls substituiert sein können durch die Gruppe



in der R₅ und R₆ jeweils für Wasserstoff oder eine Alkyl-Gruppe mit 1 bis 6 Kohlenstoff-Atomen stehen, wobei die durch R₇ dargestellte Piperidyl-Gruppe an dem Stickstoff-Atom durch eine niedere Alkyl-Gruppe mit 1 bis 4 Kohlenstoff-Atomen substituiert sein kann und wobei die durch R₇ und/oder R₈ dargestellten Phenyl-Gruppen und die Phenyl-Struktureinheiten der Phenylniederalkyl-Gruppen durch Halogen oder Niederalkyl mit 1 bis 4 Kohlenstoff-Atomen substituiert sein können, mit den weiteren Maßgaben, daß

(i) wenn A eine zur Bildung eines anellierten [1,2-b]-Thiophen-Rings erforderliche Gruppe ist, Z $-CH_2-CH_2-$ oder $-CH=CH-$ ist, p 2 ist und entweder

1) B eine zur Bildung eines anellierten Benzol-Rings erforderliche Gruppe von Atomen ist, R₂ und R₃ beide Wasserstoff sind oder eine Doppelbindung bilden, R₄ Wasserstoff ist und R₁ C₁-C₄-Alkyl ist oder R₄ und R₁ die zweite Brücke $-(CH_2)_2-$ bilden oder

2) B ein X-substituierter Benzol-Ring ist, R₂ und R₃ eine Doppelbindung bilden, R₄ Wasserstoff ist und R₁ Me ist,

dann R₇ nicht C₁-C₄-Alkyl oder Phenyl (C₁-C₄-alkyl) sein kann, und

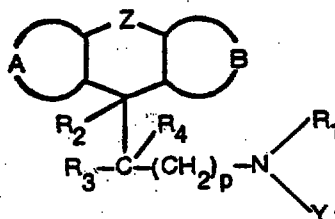


(115)

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(ii) wenn A und B jeweils einen anellierten Benzol-Ring und einen anellierten Benzol- oder X-substituierten Benzol-Ring bezeichnen,

dann R_1 und R_4 zusammen eine zweite Brücke $(-CH_2-)_2$ zwischen dem Kohlenstoff-Atom und dem Stickstoff-Atom, an die sie jeweils gebunden sind, bilden, und worin in Y die Alkyl- und Alkenyl-Gruppen bis zu 12 Kohlenstoff-Atome, die Niederalkyl-Gruppen (in den Phenylniederalkyl-Gruppen) 1 bis 4 Kohlenstoff-Atome, die Cycloalkyl-Gruppen 3 bis 7 Kohlenstoff-Atome und Cycloalkylalkyl-Gruppen 4 bis 12 Kohlenstoff-Atome aufweisen, dadurch gekennzeichnet, daß eine Verbindung der Formel III



(III)

in der A, B, Z, R_1 , R_2 , R_3 , R_4 und p die oben angegebenen Bedeutungen haben und Y' eine ersetzbare Gruppe bezeichnet, mit einer Verbindung der Formel IV

TY

(IV)

in der Y die oben angegebene Bedeutung hat und T eine Gruppe bezeichnet, die sich zusammen mit Y' eliminieren läßt, umgesetzt wird und daß gewünschtenfalls eine so erhaltene Verbindung der Formel I durch Umesterung der Gruppe Y in eine andere Verbindung der Formel I umgewandelt wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß eine Verbindung der Formel III, in der Y' Methyl ist, mit einer Verbindung der Formel



umgesetzt wird, in der T Halogen, vorzugsweise Chlor, ist und R_7 die in Anspruch 1 angegebene Bedeutung hat.

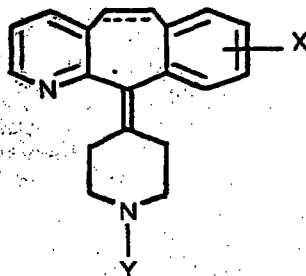
3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß eine Verbindung der Formel III, in der Y' Wasserstoff ist, mit einer Verbindung der Formel



umgesetzt wird, in der T für die Gruppe OR_7 steht und R_7 die in Anspruch 1 angegebene Bedeutung hat.

4. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß eine Verbindung der Formel III, in der Y' Wasserstoff ist, mit einer Verbindung der Formel IV umgesetzt wird, in der T Halogen, vorzugsweise Chlor, bezeichnet und Y für die Gruppe SO_2R_8 steht, in der R_8 die in Anspruch 1 angegebene Bedeutung hat.

5. Verfahren nach irgendeinem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß als Ausgangs-Verbindung eine Verbindung der Formel II'



(II')

eingesetzt wird, in der X die in Anspruch 1 angegebene Bedeutung hat und Y' die in irgendeinem der Ansprüche 1 bis 4 angegebene Bedeutung hat.

6. Verfahren nach Anspruch 5, dadurch gekennzeichnet, daß eine Verbindung der Formel II', in der X für Wasserstoff oder 8-Chlor steht, mit einer Verbindung der Formel

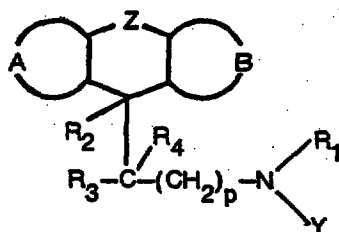


umgesetzt wird, in der Y' und T die in irgendeinem der Ansprüche 1 bis 4 angegebenen Bedeutungen haben.

7. Verfahren zur Herstellung einer pharmazeutischen Zusammensetzung, dadurch gekennzeichnet, daß eine Verbindung, die ausgewählt ist aus den Verbindungen der Formel I nach Anspruch 1 und solchen Verbindungen, die in Anspruch 1 durch die dort genannten Maßgaben (i) und (ii) ausgeschlossen sind, mit einem pharmazeutisch unbedenklichen Träger oder Streckmittel vermischt wird.

Revendications pour les Etats contractants: BE CH DE FR GB IT LI LU NL SE

1. Composés caractérisés en ce qu'ils sont représentés par la formule générale I



(I)

dans laquelle

A représente le groupe d'atomes requis pour former un anneau condensé aromatique hétérocyclique à 5 ou 6 membres ou un anneau benzène condensé;

B représente le groupe d'atomes requis pour former un anneau condensé pyridine, benzène ou benzène X-substitué dans lequel X est un halogène, avec la condition que B représente un anneau condensé benzène ou benzène X-substitué quand A représente un anneau hétérocyclique contenant de l'azote;

Z représente une liaison simple ou un groupe méthylène ou éthylène substitué ou non-substitué, le substituant étant un groupe oxo ou hydroxy, ou bien Z représente un vinylène;

R₂ représente l'hydrogène ou un groupe alkyle ayant 1 à 3 atomes de carbone;

R₃ représente l'hydrogène, ou

R₂ et R₃ forment ensemble une seconde liaison;

R₄ représente l'hydrogène;

R₁ représente un groupe alkyle ayant 1 à 6 atomes de carbone, ou

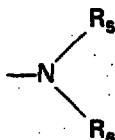
R₁ et R₄ forment ensemble un second pont $-(\text{CH}_2)_2-$ entre l'atome de carbone et l'atome d'azote auxquels ils sont fixés;

p représente 1 ou 2;

Y représente l'un des groupes $-\text{COOR}_7$ ou $-\text{SO}_2\text{R}_8$ dans lesquels

R₇ représente un groupe alkyle, cycloalkyle, cycloalkylalkyle, alkényle, phényle, phénylalkyle inférieur ou 2-, 3- ou 4- pipéridyle et

R₈ représente un groupe alkyle, cycloalkyle, cycloalkylalkyle, alkényle, phényle ou phénylalkyle inférieur, dans lequel les groupes alkyles, cycloalkyles, cycloalkylalkyles et alkényles représentés par R₇ peuvent être éventuellement substitués par le groupe



dans lequel R₅ et R₆ représentent chacun l'hydrogène ou un groupe alkyle ayant 1 à 6 atomes de carbone, les groupes pipéridyles représentés par R₇ peuvent être substitués sur l'atome d'azote par un groupe alkyle inférieur ayant 1 à 4 atomes de carbone, et les groupes phényles et la partie phényle des groupes phénylalkyles inférieurs représentés par R₇ et/ou R₈ peuvent être substitués par un halogène ou un alkyle inférieur ayant 1 à 4 atomes de carbone;

la formule étant soumise aux conditions complémentaires suivantes:

(i) quand A est un groupe d'atomes requis pour former un anneau condensé [1,2-b]thiophène, Z est $-\text{CH}_2-\text{CH}_2-$ ou $-\text{CH}=\text{CH}-$, p est 2, et soit:

1) B est un groupe d'atomes requis pour former un anneau benzène condensé, R₂ et R₃ sont tous deux l'hydrogène ou forment une double liaison, R₄ est l'hydrogène et R₁ est un alkyle C₁-C₄ ou R₄ et R₁ forment le second pont $-(\text{CH}_2)_2-$; ou



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2) B est un anneau benzène X-substitué, R_2 et R_3 forment une double liaison, R_4 est l'hydrogène et R_1 est Me; alors R_7 ne peut être un groupe alkyle C_1-C_4 ou phényle (alkyle C_1-C_4);

(ii) quand A et B représentent respectivement un anneau benzène condensé et un benzène condensé ou un anneau benzène X-substitué, alors R_1 et R_4 forment ensemble un second pont ($-CH_2-$)₂ entre l'atome de carbone et l'atome d'azote auxquels ils sont fixés;

et, dans les définitions de Y ci-dessus, les groupes alkyles et alkényles possèdent jusqu'à 12 atomes de carbone, les groupes alkyles inférieurs (dans les groupes phénylalkyles inférieurs) possèdent 1 à 4 atomes de carbone, les groupes cycloalkyles possèdent 3 à 7 atomes de carbone et les groupes cycloalkylalkyles ont 4 à 12 atomes de carbone.

2. Composés suivant la revendication 1, caractérisés en ce que Z représente un groupe éthylène ou vinylène.

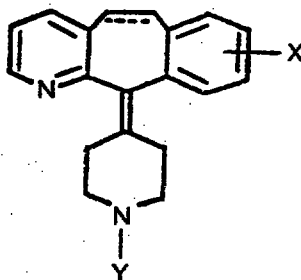
3. Composés suivant la revendication 1 ou 2, caractérisés en ce que R_2 et R_3 forment ensemble une seconde liaison.

4. Composés suivant n'importe laquelle des revendications 1 à 3, caractérisés en ce que R_1 et R_4 forment ensemble un pont de formule $-(CH_2)_2-$.

5. Composés suivant n'importe laquelle des revendications 1 à 4, caractérisés en ce que l'anneau défini par A est un anneau thiophène ou pyridine.

6. Composés suivant n'importe laquelle des revendications 1 à 5, caractérisés en ce que l'anneau défini par B est un anneau benzène condensé ou benzène X-substitué, X étant comme défini dans la revendication 1.

7. Composés suivant n'importe laquelle des revendications 1 à 6, caractérisés en ce qu'ils sont représentés par la formule générale II



(II)

dans laquelle la ligne pointillée représente une double liaison facultative et X et Y sont comme définis dans la revendication 1.

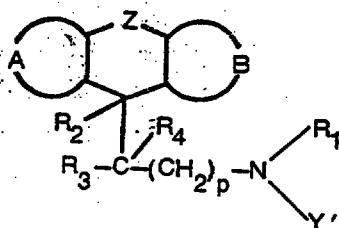
8. Composés suivant n'importe laquelle des revendications 1 à 7, caractérisés en ce qu'il existe une simple liaison entre les positions 5 et 6.

9. Composés suivant n'importe laquelle des revendications 1 à 8, caractérisés en ce que X représente l'hydrogène, le chlore-8 et le brome-8.

10. Composés suivant n'importe laquelle des revendications 1 à 9, caractérisés en ce qu'ils sont 11-(N-carboéthoxy-4-pipéridylidène)-8-chloro-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine; 11-(N-méthanesulfonyl-4-pipéridylidène)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine; 11-(N-carboéthoxy-4-pipéridylidène)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine; 11-(N-carbométhoxy-4-pipéridylidène)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine; ou 11-(N-carbophénoxy-4-pipéridylidène)-6,11-dihydro-5H-benzo[5,6]cyclohepta[1,2-b]pyridine.

11. Compositions pharmaceutiques caractérisées en ce qu'elles contiennent comme ingrédient actif un composé choisi parmi les composés de formule I suivant la revendication 1, et les composés exclus de la revendication 1 par les conditions (i) et (ii), en mélange avec un agent ou excipient pharmaceutiquement acceptable.

12. Procédé de fabrication de composés de formule I suivant la revendication 1, caractérisé en ce qu'un composé de formule générale III



(III)



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(118)

dans laquelle A, B, Z, R₁, R₂, R₃, R₄ et p sont comme définis dans la revendication 1, et Y' représente un groupe remplaçable, est soumis à réaction avec un composé de formule IV

TY

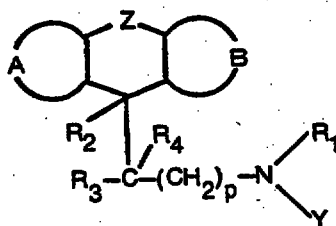
(IV)

dans laquelle Y est comme défini dans la revendication 1 et T représente un groupe pouvant être éliminé en même temps que Y', et, si on le désire, le composé de formule I ainsi obtenu peut être transformé en un autre composé de formule I par une transestérification du groupe Y.

13. Composés de formule I définis dans la revendication 1 et ceux exclus de la revendication 1 par les conditions (i) et (ii), caractérisés en ce qu'ils sont utilisés comme antihistaminiques.

Revendications pour l'Etat contractant: AT

1. Procédé de fabrication de composés de formule générale I



(II)

dans laquelle

A représente le groupe d'atomes requis pour former un anneau condensé aromatique hétérocyclique à 5 ou 6 membres ou un anneau benzène condensé;

B représente le groupe d'atomes requis pour former un anneau condensé pyridine, benzène ou benzène X-substitué dans lequel X est un halogène, avec la condition que B représente un anneau condensé benzène ou benzène X-substitué quand A représente un anneau hétérocyclique contenant de l'azote;

Z représente une liaison simple ou un groupe méthylène ou éthylène substitué ou non-substitué, le substituant étant un groupe oxo ou hydroxy, ou bien Z représente un vinyène;

R₂ représente l'hydrogène ou un groupe alkyle ayant 1 à 3 atomes de carbone;

R₃ représente l'hydrogène, ou

R₂ et R₃ forment ensemble une seconde liaison;

R₄ représente l'hydrogène;

R₁ représente un groupe alkyle ayant 1 à 6 atomes de carbone, ou

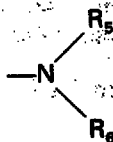
R₁ et R₄ forment ensemble un second pont $-(CH_2)_2-$ entre l'atome de carbone et l'atome d'azote auxquels ils sont fixés;

p représente 1 ou 2;

Y représente l'un des groupes $-COOR_7$ ou $-SO_2R_8$ dans lesquels

R₇ représente un groupe alkyle, cycloalkyle, cycloalkylalkyle, alkényle, phényle, phénylalkyle inférieur ou 2-, 3- ou 4 pipéridyle et

R₈ représente un groupe alkyle, cycloalkyle, cycloalkylalkyle, alkényle, phényle ou phénylalkyle inférieur, dans lequel les groupes alkyles, cycloalkyles, cycloalkylalkyles et alkényles représentés par R₇ peuvent être éventuellement substitués par le groupe



dans lequel R₅ et R₆ représentent chacun l'hydrogène ou un groupe alkyle ayant 1 à 6 atomes de carbone, les groupes pipéridyles représentés par R₇ peuvent être substitués sur l'atome d'azote par un groupe alkyle inférieur ayant 1 à 4 atomes de carbone, et les groupes phényles et la partie phényle des groupes phénylalkyles inférieurs représentés par R₇ et/ou R₈ peuvent être substitués par un halogène ou un alkyle inférieur ayant 1 à 4 atomes de carbone;

la formule étant soumise aux conditions complémentaires suivantes:

(i) quand A est un groupe d'atomes requis pour former un anneau condensé [1,2-b] thiophène, Z est $-CH_2-CH_2-$ ou $-CH=CH-$, p est 2, et soit:

1) B est un groupe d'atomes requis pour former un anneau benzène condensé, R₂ et R₃ sont tous



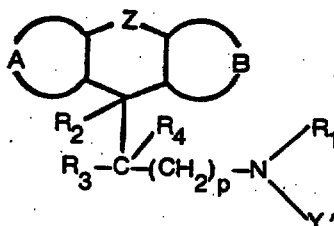
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deux l'hydrogène ou forment une double liaison, R_4 est l'hydrogène et R_1 est un alkyle C_1-C_4 ou R_4 et R_1 forment le second pont $(-CH_2-)_2$; ou

- 2) B est un anneau benzène X-substitué, R_2 et R_3 forment une double liaison, R_4 est l'hydrogène et R_1 est Me; alors R_7 ne peut être un groupe alkyle C_1-C_4 ou phényle (alkyle C_1-C_4);

(ii) quand A et B représentent respectivement un anneau benzène condensé et un benzène condensé ou un anneau benzène X-substitué, alors R_1 et R_4 forment ensemble un second pont $(-CH_2-)_2$ entre l'atome de carbone et l'atome d'azote auxquels ils sont fixés, et, dans les définitions de Y ci-dessus, les groupes alkyles et alkényles possèdent jusqu'à 12 atomes de carbone, les groupes alkyles inférieurs (dans les groupes phénylalkyles inférieurs) possèdent 1 à 4 atomes de carbone, les groupes cycloalkyles possèdent 3 à 7 atomes de carbone et les groupes cycloalkylalkyles ont 4 à 12 atomes de carbone, caractérisé en ce qu'on fait réagir un composé de formule générale III



(III),

dans laquelle A, B, Z, R_1 , R_2 , R_3 , R_4 et p sont comme définis dans la revendication 1, et Y' représente un groupe remplaçable, avec un composé de formule IV

TY

(IV)

dans laquelle Y est comme défini dans la revendication 1 et T représente un groupe pouvant être éliminé en même temps que Y', et, si on le désire, le composé de formule I ainsi obtenu peut être transformé en un autre composé de formule I par une transestérification du groupe Y.

2. Procédé suivant la revendication 1, caractérisé en ce qu'on fait réagir un composé de formule III dans laquelle Y' est méthyle, avec un composé de formule

T COOR,

dans laquelle T est un halogène, de préférence le chlore, et R_7 est comme défini dans la revendication 1.

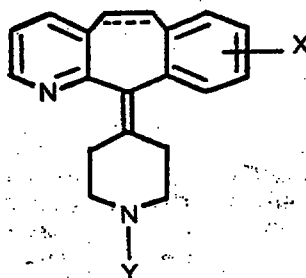
3. Procédé suivant la revendication 1, caractérisé en ce qu'on fait réagir un composé de formule générale III dans laquelle Y' est l'hydrogène, avec un composé de formule

T COOR,

dans laquelle T représente le groupe OR, R_7 étant comme défini dans la revendication 1.

4. Procédé suivant la revendication 1, caractérisé en ce qu'on fait réagir un composé de formule III dans laquelle Y' représente l'hydrogène, avec un composé de formule IV dans laquelle T représente un halogène, de préférence le chlore, et Y représente le groupe SO_2R_8 , R_8 étant comme défini dans la revendication 1.

5. Procédé suivant n'importe laquelle des revendications 1 à 4, caractérisé en ce qu'on utilise comme composé de départ, un composé de formule II'



(II')

dans laquelle X est comme défini dans la revendication 1 et Y' est comme défini comme dans n'importe laquelle des revendications 1 à 4.



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6. Procédé suivant la revendication 5, caractérisé en ce qu'on fait réagir un composé de formule II' dans laquelle X représente l'hydrogène ou le chlore-8, avec un composé de formule



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Y' et T étant comme définis dans n'importe laquelle des revendications 1 à 4.

7. Procédé de fabrication d'une composition pharmaceutique, caractérisé en ce qu'on mélange un composé choisi parmi les composés de formule 1 comme définis dans la revendication 1 et ceux exclus de la revendication 1 par les conditions (i) et (ii), avec un agent ou excipient pharmaceutiquement acceptable.

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