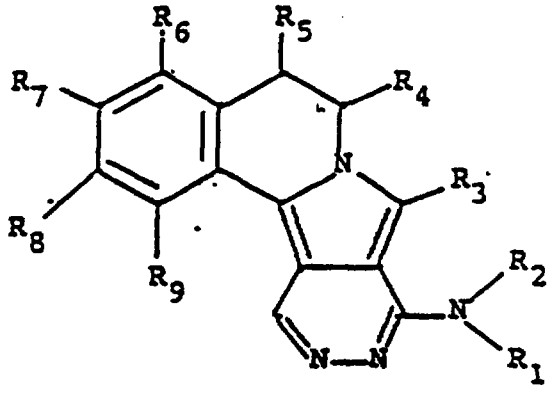
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The invention relates to new 12-amino-pyridazino-[4',5':3,4]-pyrrolo[2,1-a]isoquinolines of general formula (I)



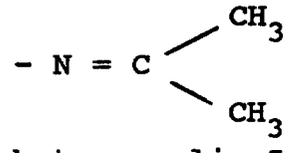
(I)

and the physiologically acceptable salts thereof, processes for preparing them and their use.
In this formula:

R_1 and R_2, which may be the same or different, each represent a hydrogen atom; C_{3-7} cycloalkyl group; C_{2-5} alkenyl group; phenyl group; phenyl group optionally mono- or disubstituted by halogen atoms or methoxy groups; a propargyl group, a straight or branched chain, saturated or unsaturated C_{1-5} alkyl group which may be substituted by a hydroxy group, C_{1-4} alkoxy group, halogen atom, NH_2 group, NH-C_{1-2} alkyl group, N,N-di-C_{1-2} alkyl group, NH-C_{2-4} acyl group, C_{3-7} cycloalkyl group, phenyl group, phenyl group substituted by a halogen atom, C_{1-2} alkyl group, C_{1-2} alkoxy group, NH-C_{1-2} alkyl group, N,N-di-C_{1-2} alkyl group, NH_2 group, NH-C_{2-3} acyl group, or an alkylsulphonylamino group, a furyl group,

a thienyl group, or a nitrogen-containing heterocyclic 5- or 6-membered ring which may optionally contain an oxygen or sulphur atom as a further heteroatom and wherein the ring may optionally be substituted by a C_{1-4} alkyl group, or R_1 and R_2 together with the nitrogen atom to which they are attached represent a 3- to 7-membered ring which may optionally contain an oxygen or nitrogen atom as a further heteroatom, [the ring optionally being substituted by phenyl (C_{1-4}) alkyl (this phenyl ring in turn being optionally mono- or disubstituted by halogen atoms or methoxy groups)],

or R_2, when R_1 represents a hydrogen atom, represents an $-NH_2$ group, a di(C_{1-2})alkylamino group, an acetonylamino group, a $-NH(C_{2-3})$acyl group, an alkylsulphonyl or alkoxycarbonyl group each having 1 to 3 carbon atoms in the alkyl chain, an isopropylideneimino,



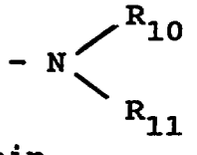
group,

or a heterocyclic 5- or 6-membered ring containing a nitrogen atom and optionally an oxygen, nitrogen or sulphur atom as a further heteroatom,

R_3, R_4 and R_5, which may be the same or different, represent hydrogen atoms or C_{1-4} alkyl groups,

R_7 and R_8 which may be the same or different, represent hydroxy, C_{1-4} alkoxy or C_{1-4} alkylthio groups, and

R_6 and R_9, which may be the same or different, represent hydrogen atoms, hydroxy, C_{1-4} alkoxy or C_{1-4} alkylthio groups or a group



,

wherein

R_{10} represents a hydrogen atom or C_{1-4} alkyl group

and R_{11} represents a hydrogen atom or C_{1-4} alkyl group, any such alkyl group being optionally substituted by a hydroxy, methoxy or furfuryl group.

The invention also includes the physiologically acceptable acid addition salts of the compounds of general formula (I).

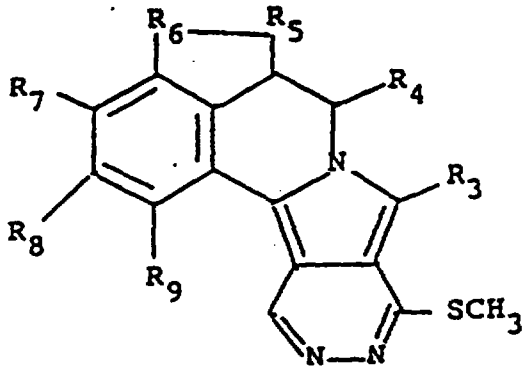
Preferred compounds are compounds of general formula I or acid addition salts thereof in which R_1 and R_2, which may be the same or different, represent hydrogen atoms or a straight- or branched-chain C_{1-5} alkyl group or

R_1 represents a hydrogen atom and R_2 represents an amino, methylamino, dimethylamino, isopropylideneimino, dimethylamino-C_{1-4}-alkyl, methoxy-C_{1-4}-alkyl, cyclopropyl, cyclopentyl, cyclohexyl, cyclohexylmethyl, pyrazolyl, phenyl, p-halophenyl or phenylethyl group, any such phenyl ring being optionally mono- or disubstituted by a methoxy group,

or R_1 and R_2 together with the nitrogen atom to which they are attached represent a morpholino ring or a piperazino ring and

R_7 and R_8 represent methoxy.

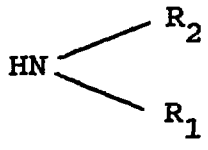
The new compounds may be obtained by reacting a 3,4-dihydro-12-methylmercapto-pyridazino[4',5':3,4]-pyrrolo[2,1-a]-isoquinoline of general formula II



(II)

wherein the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as

hereinbefore defined, is reacted with a compound of general formula III



(III)

wherein R_1 and R_2 are as hereinbefore defined.

In this reaction, a starting material of general formula (II) may be dissolved in a high-boiling inert solvent such as dimethylformamide, dimethylacetamide, chlorobenzene or hexamethyl-phosphorotriamide and refluxed with the amine compound of general formula (III) until the reaction is complete. The reaction time ranges from about 1 to 15 hours and will depend on the starting components used.

In the case of reactive amines, alcohols or tetrahydrofuran may also be used as solvent; under certain circumstances it may be advantageous to carry out the reaction in an autoclave.

If the amines used are liquid and sufficiently high-boiling, the reaction may also be carried out in an excess of the amine itself without any additional solvent, possibly under a nitrogen atmosphere. This may well be the situation when using aniline, morpholine, phenylethylamine.

In some cases it may also be possible and desirable to use a reaction partner which both serves as a solvent in the reaction and also yields the required amine by cleaving during the reaction, e.g. dimethylformamide.

The 12-amino-pyridazino-pyrazolo-isoquinolines according to the invention are bases and may be converted into physiologically acceptable acid addition salts with inorganic or organic acids in conventional manner.

Acids suitable for salt formation include

mineral acids, such as for example, hydrochloric, hydrobromic, hydriodic, hydrofluoric, sulphuric, phosphoric, and nitric acids or organic acids such as acetic, propionic, butyric, caproic, valeric, oxalic, malonic, succinic, maleic, fumaric, lactic, tartaric, citric, malic, benzoic, p-hydroxybenzoic, p-aminobenzoic, phthalic, cinnamic, salicylic, ascorbic and methanesulphonic acids.

Using the processes described hereinbefore, the following end products are readily obtained:

3,4-Dihydro-6,7-dimethoxy-12-N,N-dimethylaminoethylamino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-hydrazino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline;

3,4-Dihydro-6,7-dimethoxy-12-dimethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-morpholino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-pyridazino[4',5':3,4]-pyrrolo[2,1-a]isoquinoline-12-acetonylhydrazone;

3,4-Dihydro-6,7-dimethoxy-12-anilino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-methylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-ethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-diethylamino-pyridazino-

[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-cyclopropylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-isopropylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-butylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-N,N-dimethylhydrazino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(2-methoxyethyl)-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(3,4-dimethoxyphenyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(3-aminopyrazolyl)-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-cyclopentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-cyclohexylmethylamino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-propargylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-{2-[2-(1-methyl)-pyrrolidinyl]-ethyl} -amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-piperidinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-pyrrolidinyl-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-n-propylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

12-Allylamino-3,4-dihydro-6,7-dimethoxy-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[4-(2-methoxyphenyl)-piperazinyl]-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(3-dimethylaminopropyl)-amino-pyridazino[4',5':3,4]pyrrolol[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-morpholinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-n-pentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-cyclohexylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[4-(2-phenylethyl)-

piperazinyl]-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-furfurylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(3-methoxypropylamino)-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-isopentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-pyrrolidinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]iso-quinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(2-hydroxyethyl)-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-(4-fluoroanilino)-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(4-pyridinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(2-pyridinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

12-(4-Amino-1-benzyl-piperidinyl)-3,4-dihydro-6,7-dimethoxy-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-(3-thieno)-ethyl]-

amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[2-[2-(1-methyl)-pyrrolyl]-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline hydrochloride;

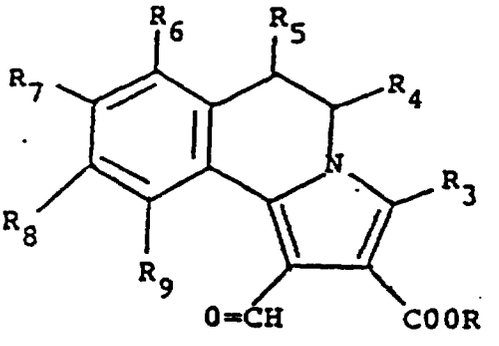
3,4-Dihydro-6,7-dimethoxy-12-amino-pyridazino[4',5':3,4]-pyrrolo[2,1-a]isoquinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-[4-(2-phenylethyl)-piperazinyl]-pyridazino[4',5':3,4]pyrrolo[2,1-a]iso-quinoline hydrochloride;

3,4-Dihydro-6,7-dimethoxy-12-isobutylamino-pyridazino-[4',5':3,4]pyrrolo-[2,1-a]isoquinoline hydrochloride; and

3,4-Dihydro-6,7-dimethoxy-12-benzylamino-pyridazino-[4',5':3,4]pyrrolo-[2,1-a]isoquinoline hydrochloride.

The starting materials of general formula II may be prepared starting from a compound of general formula IV

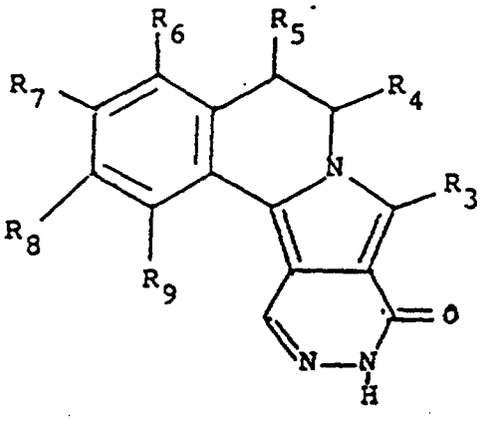


(IV)

wherein

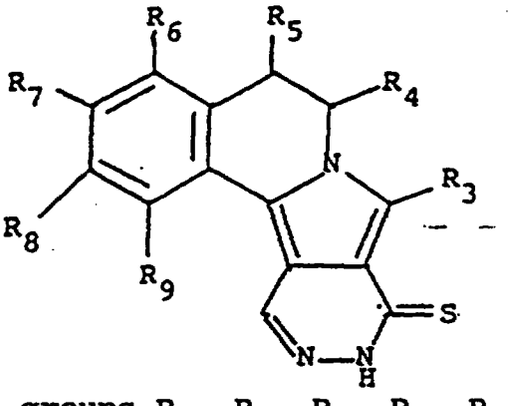
R represents a C_{1-4} alkyl group and the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined, by reaction with hydrazine hydrate, and

conversion of the resulting 3,4,11,12-tetrahydro-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinolin-12-one of general formula (V)



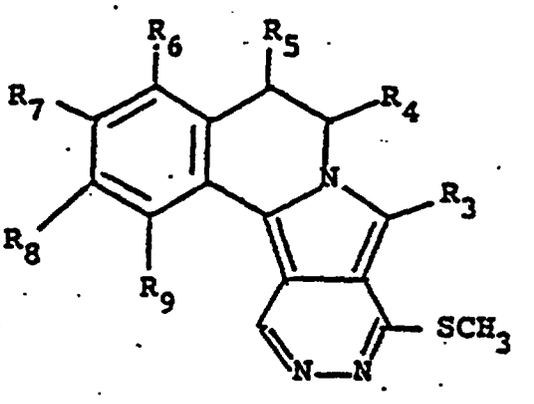
(V)

wherein the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined,
into the corresponding thione of general formula (VI)



(VI)

wherein the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined, using phosphorus pentasulphide followed by convertion of the thione compound formed into the corresponding methylmercapto compound of general formula (II)



(II)

wherein the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined, using dimethylacetamide/methyl iodide.

The starting materials of general formula IV may be obtained using the method described in German Patent Application P 34 01 018.1 by base-catalysed rearrangement of the 1-(3-furyl)-3,4-dihydroisoquinolines which are known from the literature.

The new 12-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinolines of general formula (I) have valuable therapeutic properties both as bases and in the form of their salts when tested on animals. They show strong bonding to the muscarinic receptor; this is demonstrated by tests in which homogenised material from various parts of a rat's brain is incubated with tritium-N-methylscopolamine and the radioligands are displaced by adding the substance which is to be tested. The displacement constitutes a measure of the affinity of the substance for the muscarinic-cholinergic receptor. (Cf. M. Watson et al, Live Science, Volume 32, page 3001-3011 (1983) and R. Hammer et al, Nature, Volume 283, page 90-92 (1980)). Compounds of general formula (I) have also proved highly effective in tests for cardiotonic activity on isolated guinea pig auricles. In this test, spontaneously beating isolated auricles were used; the quantitatively measured positively inotropic activity is a measurement of the effect on contractility. The EC_{50} is the quantity of active substance in mg/kg which brings about a 50% increase in contractility. (See R. Reichl, W. Traunecker, A. Engelhardt: Proceedings of the 12th meeting of the European Society for the study of Drug Toxicity. Uppsala June 1970

Excerpta Medica Int. Congr. Series Nr. 220 - Isolierter Herzvorhof).

In view of these findings, the compounds of general formula (I) and acid addition salts thereof have potential use as active substances for the treatment of cardiac insufficiency and cerebral metabolic disorders.

The compounds may be administered by both enteral and parenteral routes. The proposed dosage for oral use is 5 to 500, preferably 20 to 250 mg of active substance per dose, whilst the recommended dose for intravenous application is from 0.5 to 150, preferably from 5 to 50 mg per dose.

Suitable forms for administration include tablets, capsules, suppositories, solutions, syrups, emulsions, aerosols and dispersible powders. Suitable tablets may be prepared, for example, by mixing the active substance or substances with known adjuvants, for example inert diluents such as calcium carbonate, calcium phosphate or lactose, disintegrants such as corn starch or alginic acid, binders such as starch or gelatine, lubricants such as magnesium stearate or talc and/or agents for obtaining delayed release such as carboxypolymethylene, carboxymethyl-cellulose, cellulose acetate phthalate or polyvinyl acetate. The tablets may also consist of several layers.

Coated tablets may be prepared in the same way by coating cores produced analogously to the tablets with substances conventionally used for tablet coating, e.g. collidone or shellack, gum arabic, talc, titanium dioxide or sugar. In order to obtain delayed release or prevent intolerance, the core may also consist of several layers. Similarly, the tablet coating may consist of several layers in order to achieve delayed release, using the excipients given above for the tablets.

Syrups containing the active substances or combinations of active substances according to the invention may additionally contain a sweetener such as saccharin, cyclamate, glycerine or sugar and a flavour-enhancing agent, e.g. a flavouring such as vanillin or orange extract. They may also contain suspension adjuvants or thickeners such as sodium carboxymethylcellulose, wetting agents, e.g. condensation products of fatty alcohols with ethylene oxide, or preservatives such as p-hydroxybenzoates.

Solutions for injection may be prepared in conventional manner, e.g. with the addition of preservatives such as p-hydroxybenzoates or stabilisers such as alkali metal salts of ethylenediamine tetraacetic acid and may then be transferred into injection vials or ampoules.

Capsules containing the active substances or combinations of active substances may be prepared, for example, by mixing the active substances with inert vehicles such as lactose or sorbitol and encapsulating them in gelatine capsules.

Suitable suppositories may be prepared, for example, by mixing with carrier substances provided for this purpose, such as neutral fats or polyethylene glycol or derivatives thereof.

The following Examples serve to illustrate the invention more fully:

Example 1

3,4-Dihydro-6,7-dimethoxy-12-N,N-dimethylaminoethyl-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline-hydrochloride

3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline (8 g) and 15 ml of N,N-dimethylaminoethyl-amine are boiled for 2 hours in 100 ml of dimethylacetamide. After cooling to ambient temperature, the orange-yellow solution is concentrated by evaporation in vacuo, the oily residue is taken up in methylene chloride, extracted with water and dried over sodium sulphate. After the solvent has been eliminated, the residue is purified over an Al_2O_3 column (neutral Al_2O_3, Messrs. Woelm, Activity Stage III, Eluent: methylene chloride/methanol (100:8)). The reaction product is dissolved in ethanol and precipitated in the form of the hydrochloride by the addition of ethanolic hydrochloric acid.

Yield: 6.6 g (73% of theory); m.p. > 250°C.

Example 2

3,4-Dihydro-6,7-dimethoxy-12-hydrazino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline

3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline (5 g) are heated to boiling for 2 hours in 200 ml of ethanol with 10 ml of hydrazine hydrate. After the reaction has ended, the reaction mixture is evaporated in vacuo, the residue is stirred with water, suction filtered and the filter residue is recrystallised from ethanol/ether. The title compound is obtained in a yield of 3.4 g (71% of theory);

M.p. 254 - 257°C.

Example 3

3,4-Dihydro-6,7-dimethoxy-12-dimethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride

5g of 3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline are heated to boiling in 100 ml of dimethylformamide for 15 hours. After the reaction has ended the reaction mixture is concentrated by evaporation, the residue is suspended in methylene chloride and suction filtered. After the filter residue has been dissolved in hot methanol the base is converted into the hydrochloride and precipitated by the addition of ethanolic hydrochloric acid. Yield of title compound: 3.6 g (72% of theory); M.p. 264°C.

The following were obtained in a manner analogous to that of Example 3:

Starting from 3,4-dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline, and by reaction with formamide: 3,4-dihydro-6,7-dimethoxy-12-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline hydrochloride, m.p. 271°C.

Starting from 3,4-dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline, and by reaction with methylformamide: 3,4-dihydro-6,7-dimethoxy-12-methylamino-pyridazino[4',5':3,4]pyrrolo-[2,1-a]isoquinoline hydrochloride, m.p. 260-265°C.

Example 4

3,4-Dihydro-6,7-dimethoxy-12-dimethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline-hydrochloride

3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline (5 g) are heated to 120°C in 50 ml of dimethylacetamide

with 20 ml of dimethylamine for 10 hours in an autoclave. After the reaction has ended, the solvent is eliminated in vacuo, the residue is purified on silica gel (eluant: methylene chloride/methanol (100:10)), the hydrochloride is formed and crystallised from methanol. Yield: 3.1 g (63% of theory); m.p. 264°C.

The following compounds were also prepared using the above procedure:

3,4-Dihydro-6,7-dimethoxy-12-methylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. Yield: 3.2 g (67% of theory); m.p. > 250°C.

3,4-Dihydro-6,7-dimethoxy-12-ethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. Yield: 3.1 g (63% of theory); m.p. 273°C.

3,4-Dihydro-6,7-dimethoxy-12-diethylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. Yield: 3.4 g (67% of theory); m.p. 276°C.

3,4-Dihydro-6,7-dimethoxy-12-cyclopropylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. Yield: 2.4 g (46% of theory); m.p. > 260°C.

Example 5

3,4-Dihydro-6,7-dimethoxy-12-morpholino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride

5 g of 3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline (5 g) and 20 ml of morpholine are heated to boiling in 100 ml of dimethylacetamide for 1.5 hours. After the reaction has ended the reaction mixture is concentrated by evaporation in vacuo, the residue is triturated with methylene chloride and suction filtered. The reaction product is dissolved in

a mixture of methylene chloride and methanol, converted into the hydrochloride by the addition of ethanolic hydrochloric acid and crystallised. The yield of title compound is 3.5 g (63% of theory); m.p. 267°C.

The following were prepared by a manner analogous to the method described above:

3,4-Dihydro-6,7-dimethoxy-12-isopropylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.0 g (57% of theory); m.p 238°C.

3,4-Dihydro-6,7-dimethoxy-12-butylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.2 g (78% of theory); m.p 257°C.

3,4-Dihydro-6,7-dimethoxy-12-N,N-dimethylhydrazino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.5 g (87% of theory); m.p > 265°C.

3,4-Dihydro-6,7-dimethoxy-12-(2-methoxyethyl)-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.6 g (67% of theory); m.p 252°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(3,4-dimethoxyphenyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 5.5 g (78% of theory); m.p 257°C.

3,4-Dihydro-6,7-dimethoxy-12-(3-aminopyrazolyl)-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.1 g (68% of theory); m.p > 260°C.

3,4-Dihydro-6,7-dimethoxy-12-cyclopentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.1 g (56% of theory); m.p 265°C.

3,4-Dihydro-6,7-dimethoxy-12-cyclohexylmethylamino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 5.2 g (87% of theory); m.p 262°C.

3,4-Dihydro-6,7-dimethoxy-12-propargylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.7 g (73% of theory); m.p 247°C.

3,4-Dihydro-6,7-dimethoxy-12-{2-[2-(1-methyl)-pyrrolidinyl]-ethyl}-amino-pyridazino[4',5':3,4]pyrrolo-[2,1-a]isoquinoline hydrochloride.
Yield: 4.3 g (69% of theory); m.p 256-258°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-piperidinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.3 g (53% of theory); m.p 248-251°C.

3,4-Dihydro-6,7-dimethoxy-12-pyrrolidinyl-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.1 g (59% of theory); m.p 277-278°C.

3,4-Dihydro-6,7-dimethoxy-12-n-propylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.7 g (72% of theory); m.p 258°C.

12-Allylamino-3,4-dihydro-6,7-dimethoxy-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 2.7 g (53% of theory); m.p 260-263°C.

3,4-Dihydro-6,7-dimethoxy-12-[4-(2-methoxyphenyl)-piperazinyl]-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline

hydrochloride.
Yield: 4.8 g (66% of theory); m.p 250-252°C.

3,4-Dihydro-6,7-dimethoxy-12-(3-dimethylaminopropyl)-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 2.4 g (43% of theory); m.p > 250°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-morpholinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.4 g (54% of theory); m.p > 260°C.

3,4-Dihydro-6,7-dimethoxy-12-n-pentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.9 g (87% of theory); m.p 259-261°C.

3,4-Dihydro-6,7-dimethoxy-12-cyclohexylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.8 g (66% of theory); m.p 253°C.

3,4-Dihydro-6,7-dimethoxy-12-[4-(2-phenylethyl)-piperazinyl]-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.8 g (53% of theory); m.p 264°C.

3,4-Dihydro-6,7-dimethoxy-12-furfurylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.2 g (56% of theory); m.p 243-246°C.

3,4-Dihydro-6,7-dimethoxy-12-(3-methoxypropylamino)-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.6 g (65% of theory); m.p > 250°C.

3,4-Dihydro-6,7-dimethoxy-12-isopentylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.

Yield: 3.2 g (58% of theory); m.p 259°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-pyrrolidinyl)-ethyl]-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.3 g (55% of theory); m.p > 260°C.

3,4-Dihydro-6,7-dimethoxy-12-(2-hydroxyethyl)-amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.2 g (80% of theory); m.p 259°C.

Example 6

3,4-Dihydro-6,7-dimethoxy-pyridazino[4',5':3,4]pyrrolo-[2,1-a]isoquinoline-acetonylhydrazone

3,4-Dihydro-6,7-dimethoxy-12-hydrazino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline (1 g) are dissolved in 50 ml of acetone and heated to boiling for half an hour. The mixture is evaporated in vacuo and the crystals which are precipitated in the cold are suction filtered.
Yield: 5.1 g (95% of theory); m.p. 173-175°C.

Example 7

3,4-Dihydro-6,7-dimethoxy-12-anilino-pyridazino-[4',5':3,4]- pyrrolo[2,1-a]isoquinoline-hydrochloride

3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline (5 g) are heated to boiling in 50 ml of aniline under a protective nitrogen atmosphere for 6 hours. Excess aniline is eliminated in vacuo, the residue is triturated with methylene chloride, suction filtered and recrystallised from methanol/methylene chloride.
Yield: 3.0 g (53% of theory); m.p. > 250°C.

The following were prepared in an analogous manner:

3,4-Dihydro-6,7-dimethoxy-12-(4-fluoroanilino)-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.0 g (67% of theory); m.p. > 270°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(4-pyridinyl)-ethyl]-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.1 g (70% of theory); m.p. > 260°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(2-pyridinyl)-ethyl]-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.7 g (62% of theory); m.p. > 260°C.

12-(4-Amino-1-benzyl-piperidinyl)-3,4-dihydro-6,7-dimethoxy-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.9 g (56% of theory); m.p. > 250°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(3-thieno)-ethyl]-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 4.0 g (65% of theory); m.p. > 280°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-[3-(1-methyl)-pyrrolyl]-ethyl]-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.6 g (61% of theory); m.p. 256-258°C.

3,4-Dihydro-6,7-dimethoxy-12-[2-(1-piperidinyl)-ethyl]-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride.
Yield: 3.6 g (58% of theory); m.p. 250°C.

3,4-Dihydro-6,7-dimethoxy-12-isobutylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. M.p.

250°C.

3,4-Dihydro-6,7-dimethoxy-12-benzylamino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline hydrochloride. M.p. 257°C.

The preparation of some starting compounds will now be described, taking as an example 3,4-dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline.

a) 3,4,11,12-Tetrahydro-6,7-dimethoxy-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinolin-12-one

Ethyl 1-formyl-5,6-dihydro-8,9-dimethoxy-pyrrolo[2,1-a]isoquinolin-2-carboxylate (8.25 g) and 7 ml of hydrazine hydrate are stirred in 40 ml of boiling pyridine for 3 hours. After cooling, the crystalline precipitate is suction filtered and any pyridine adhering is removed by washing with methanol. The product obtained is analytically pure and is used for the next stage without further purification.

Yield: 7.1 g (95.4% of theory); m.p. > 285°C.

b) 3,4,11,12-Tetrahydro-6,7-dimethoxy-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinolin-12-thione

Phosphorous pentasulfide (302 g) are quickly added in batches to a suspension of 404 g of 3,4,11,12-tetrahydro-6,7-dimethoxy-pyridazino[4',5':3,4]-pyrrolo[2,1-a]isoquinolin-12-one in 2.8 l of pyridine, with stirring at ambient temperature. As the temperature rises slightly to a maximum of 60°C, a yellow solution is formed from which orange-yellow crystals are soon precipitated. The reaction mixture is refluxed for about 4 hours, allowed to cool to ambient temperature and then the crystals are suction filtered. They are digested in a mixture of 1 l of water and 200 ml of ethanol and, after suction filtering, dried in vacuo at 60°C. The product is processed further without any more purification. For analysis a sample is crystallised from ethanol/methylene chloride.

Yield: 392 g (92% of theory); m.p. 294°C.

c) 3,4-Dihydro-6,7-dimethoxy-12-methylmercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline A

suspension of 100 g of 3,4,11,12-tetrahydro-6,7-dimethoxy-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinolin-12-thione in 600 ml of dimethylacetamide is mixed with 20 ml of methyliodide at ambient temperature with stirring. After the mixture has been stirred for about 20 minutes at ambient temperature, an orangy-yellow solution is formed, out of which orange crystals are precipitated after a further 50 minutes. The mixture is stirred for another hour, the crystals are suction filtered and washed with methylene chloride. A second fraction is obtained from the mother liquor after evaporation and trituration with methylene chloride. The product obtained is pure according to NMR spectroscopy and is worked up without any further purification. A sample was recrystallised from dimethylacetamide for analysis.

Yield: 99.8 g (96% of theory); m.p. 254°C.

Pharmacy Examples

a) Coated tablets

1 tablet core contains:

Active substance according to the invention	150.0 mg
Lactose	50.0 mg
Corn starch	22.0 mg
Gelatine	2.0 mg
Magnesium stearate	1.0 mg
	225.0 mg

Preparation:

A mixture of the active substance with lactose and corn starch is granulated with a 10% aqueous gelatine solution through a screen having a mesh size of 1 mm, then dried at 40°C and rubbed through another screen. The granulate obtained is mixed with magnesium sterate and compressed. The resulting cores are coated in the usual way with a coating produced by an aqueous suspension of sugar, titanium dioxide, talc and gum arabic. The finished coated tables are polished with bees wax.

Finished weight of coated tablet: 200 mg.

b) Tablets

Active substance according to the invention	100.0 mg
Lactose	40.0 mg
Corn starch	44.0 mg
Soluble starch	5.0 mg
Magnesium stearate	1.0 mg
	190.0 mg

Preparation:

The active substance and magnesium stearate

are granulated with an aqueous solution of the soluble starch, the granulate is dried and intimately mixed with lactose and corn starch. The mixture is then compressed to form tablets weighing 100 mg each containing 10 mg of active substance.

c) Suppositories

1 suppository contains:

Active substance according to the invention	120.0 mg
Suppository mass	1680.0 mg

Preparation:

The finely powdered substance is stirred into the molten suppository mass which has been cooled to 40°C with an immersion homogeniser. The mass is poured into slightly chilled moulds at 35°C.

d) Ampoules

Composition:

Active substance according to the invention	50.0 parts by weight
Sodium pyrosulfite	1.0 parts by weight
Disodium salt of ethylene-diaminetetraacetic acid	0.5 parts by weight
Sodium chloride	8.5 parts by weight
doubly distilled water ad	1000.0 parts by weight

Preparation:

The substance and excipients are dissolved in a sufficient quantity of water and made up to the desired concentration with the required quantity of water. The solution is filtered and transferred into 1 ml ampoules under aseptic conditions. Finally the ampoules are sterilised and sealed.

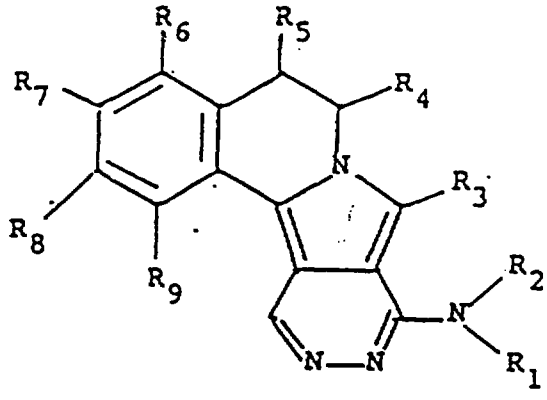
Each ampoule contains 50.0 mg of active substance.

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Patent Claims

for the contracting states
BE CH DE FR GB IT LI LU NL SE

1. 12-Amino-pyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinolines of general formula I



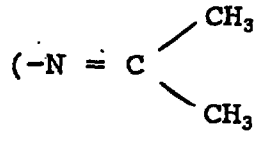
(I)

wherein
R_1 and R_2, which may be identical or different, each represent hydrogen, C_{3-7} cycloalkyl, C_{2-5} alkenyl, phenyl (optionally mono- or disubstituted by halogen atoms or methoxy groups), propargyl, a straight-chained or branched, saturated or unsaturated alkyl group with 1 to 5 carbon atoms which may be substituted by hydroxy, alkoxy with 1 to 4 carbon atoms, halogen, NH_2, NH-alkyl with 1 to 2 carbon atoms, N,N-dialkyl with 1 to 2 carbon atoms, NH-acyl with 2 to 4 carbon atoms, cycloalkyl with 3 to 7 carbon atoms, phenyl (optionally substituted by halogen, alkyl with 1 to 2 carbon atoms, alkoxy with 1 to 2 carbon atoms, NH-alkyl with 1 to 2 carbon atoms, N,N-dialkyl with 1 to 2 carbon atoms, NH_2, N-acyl with 2 to 3 carbon atoms), furyl, thienyl, a nitrogen-containing heterocyclic 5- or 6-membered ring which may optionally contain as a further heteroatom an oxygen or sulphur atom (and the ring may optionally be substituted by alkyl with 1 to 4 carbon atoms), or R_1 and R_2 together with the nitrogen atom represent a 3- to 7-membered ring

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which may optionally contain as a further heteroatom an oxygen or nitrogen atom [the ring may be optionally substituted by phenyl (C_{1-4}) alkyl (this phenyl ring in turn being mono- or disubstituted by halogen atoms or methoxy groups)],

or R_2, if R_1 represents hydrogen, represents $-NH_2$, di(C_{1-2}) alkylamino, acetonylamino, $-NH(C_{2-3})$ acyl, alkylsulphonyl or alkyloxycarbonyl group with 1 to 3 carbon atoms in the alkyl chain, a isopropylideneimino group



or a heterocyclic 5- or 6-membered ring containing a nitrogen atom and optionally containing as a further heteroatom an oxygen, nitrogen or sulphur atom,

R_3, R_4 and R_5, which may be identical or different, represent hydrogen or alkyl groups with 1 to 4 carbon atoms,

R_7 and R_8, which may be identical or different, represent hydroxy, alkoxy with 1 to 4 carbon atoms or alkylthio groups with 1 to 4 carbon atoms, and

R_6 and R_9, which may be identical or different, represent hydrogen, hydroxy, alkoxy with 1 to 4 carbon atoms or alkylthio groups with 1 to 4 carbon atoms or a group



wherein

R_{10} represents hydrogen or alkyl with 1 to 4 carbon atoms and

R_{11} represents alkyl with 1 to 4 carbon atoms, any such alkyl group being optionally substituted by a hydroxy, methoxy or furfuryl group

and physiologically acceptable acid addition salts thereof.

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2. Compounds of general formula I as claimed in claim 1, wherein

R_1 and R_2 which may be identical or different represent hydrogen or a straight-chained or branched alkyl group with 1 to 5 carbon atoms or

R_1 represents hydrogen and R_2 represents amino, methylamino, dimethylamino, isopropylideneimino, dimethylaminoalkyl with 1 to 4 carbon atoms, methoxyalkyl with 1 to 4 carbon atoms, cyclopropyl, cyclopentyl, cyclohexyl, cyclohexylmethyl, phenyl, p-halophenyl, phenylethyl, any such phenyl ring being optionally mono- or disubstituted by methoxy, or pyrazolyl,

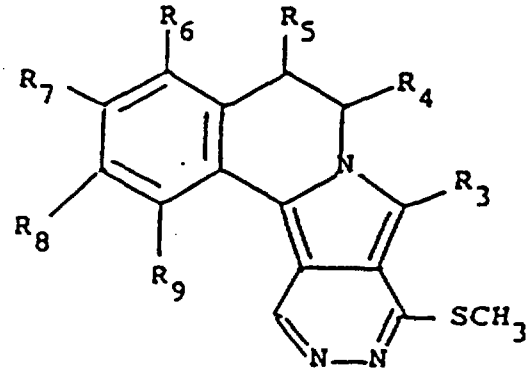
or R_1 and R_2 together with the nitrogen atom to which they are attached represent a morpholino or piperazino ring and

R_7 and R_8 represent methoxy,

and physiologically acceptable acid addition salts thereof.

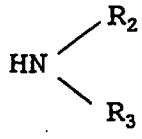
3. The compounds 3,4-dihydro-6,7-dimethoxy-12-dimethylaminopyridazino[4',5':3,4]pyrrolo[2,1-a]-isoquinoline and 3,4-dihydro-6,7-dimethoxy-12-isopropylamino-pyridazino[4',5':3,4]pyrrolo-[2,1-a]isoquinoline or acid addition salts thereof.

4. Process for preparing compounds of general formula I as claimed in claim 1 or the acid addition salts thereof, characterised in that a 3,4-dihydro-12-methyl-mercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline of general formula II



(II)

wherein
the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined,
is reacted with a compound of general formula III



(III)

wherein
R_1 and R_2 are as hereinbefore defined, and in that a compound thus obtained is optionally converted, in a manner known per se, into a physiologically acceptable acid addition salt.

5. Pharmaceutical preparations containing as active substance one or more compounds of general formula I in conjunction with conventional excipients or carriers.

6. Process for preparing pharmaceutical preparations according to claim 5, characterised in that compounds of general formula I are mixed with conventional galenic excipients and/or carriers to form conventional pharmaceutical preparations.

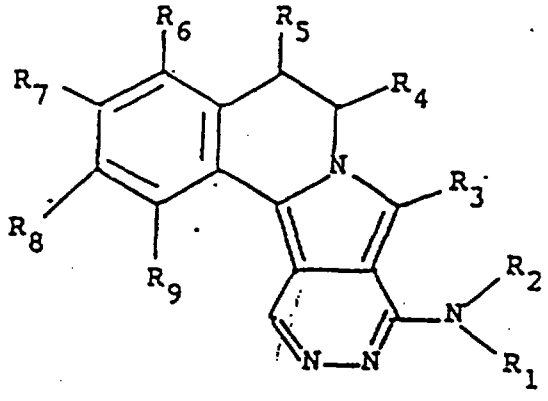
7. Use of a compound according to any one of claims 1 to 3 for producing the preparation for treating cardiac insufficiency and/or cerebral metabolic disorders.

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Claims for the designated state AT

1. Process for preparing a 12-amino-pyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline of general formula I



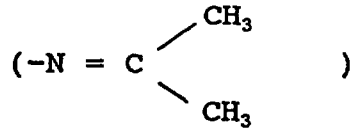
(I)

wherein

R_1 and R_2, which may be identical or different, each represent hydrogen, C_{3-7} cycloalkyl, C_{2-5} alkenyl, phenyl (optionally mono- or disubstituted by halogen atoms or methoxy groups), propargyl, a straight-chained or branched, saturated or unsaturated alkyl group with 1 to 5 carbon atoms which may be substituted by hydroxy, alkoxy with 1 to 4 carbon atoms, halogen, NH_2, NH-alkyl with 1 to 2 carbon atoms, N,N-dialkyl with 1 to 2 carbon atoms, NH-acyl with 2 to 4 carbon atoms, cycloalkyl with 3 to 7 carbon atoms, phenyl (optionally substituted by halogen, alkyl with 1 to 2 carbon atoms, alkoxy with 1 to 2 carbon atoms, NH-alkyl with 1 to 2 carbon atoms, N,N-dialkyl with 1 to 2 carbon atoms, NH_2, N-acyl with 2 to 3 carbon atoms), furyl, thienyl, a nitrogen-containing heterocyclic 5- or 6-membered ring which may optionally contain as a further heteroatom an oxygen or sulphur atom (and the ring may optionally be substituted by alkyl with 1 to 4 carbon atoms), or R_1 and R_2 together with the nitrogen atom represent a 3- to 7-membered ring which may optionally contain as a further heteroatom an oxygen or nitrogen atom [the ring may optionally be

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substituted by phenyl (C_{1-4}) alkyl (this phenyl ring in turn being mono- or disubstituted by halogen atoms or methoxy groups)],
or R_2, if R_1 represents hydrogen, represents $-NH_2$, di(C_{1-2}) alkylamino, acetonylamino, $-NH(C_{2-3})$ acyl, alkylsulphonyl or alkyloxycarbonyl group with 1 to 3 carbon atoms in the alkyl chain, a isopropylideneimino group

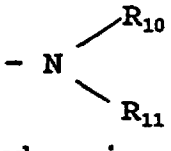


or a heterocyclic 5- or 6-membered ring containing a nitrogen atom and optionally containing as a further heteroatom an oxygen, nitrogen or sulphur atom,

R_3, R_4 and R_5, which may be identical or different, represent hydrogen or alkyl groups with 1 to 4 carbon atoms,

R_7 and R_8, which may be identical or different, represent hydroxy, alkoxy with 1 to 4 carbon atoms or alkylthio groups with 1 to 4 carbon atoms, and

R_6 and R_9, which may be identical or different, represent hydrogen, hydroxy, alkoxy with 1 to 4 carbon atoms or alkylthio groups with 1 to 4 carbon atoms or a group

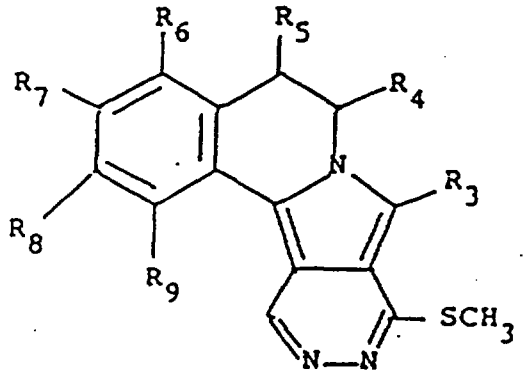


wherein

R_{10} represents hydrogen or alkyl with 1 to 4 carbon atoms and

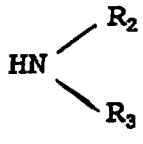
R_{11} represents alkyl with 1 to 4 carbon atoms, any such alkyl group being optionally substituted by a hydroxy, methoxy or furfuryl group
or a physiologically acceptable acid addition salt thereof, characterised in that a 3,4-dihydro-12-methyl-mercapto-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline of general formula II

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(II)

wherein
the groups R_3, R_4, R_5, R_6, R_7, R_8 and R_9 are as hereinbefore defined,
is reacted with a compound of general formula III



(III)

wherein
R_1 and R_2 are as hereinbefore defined, and in that a compound thus obtained is optionally converted, in a manner known per se, into a physiologically acceptable acid addition salt.

2. Process according to claim 1, characterised in that a compound of general formula I is prepared wherein R_1 and R_2, which may be identical or different, represent hydrogen or a straight-chained or branched alkyl group with 1 to 5 carbon atoms or

R_1 represents hydrogen and R_2 represents amino, methylamino, dimethylamino, isopropylideneimino, dimethylaminoalkyl with 1 to 4 carbon atoms, methoxyalkyl with 1 to 4 carbon atoms, cyclopropyl, cyclopentyl, cyclohexyl, cyclohexylmethyl, phenyl, p-halophenyl, phenylethyl, any such phenyl ring being optionally mono- or disubstituted by methoxy, or pyrazolyl,

* C L M S *

or R_1 and R_2 together with the nitrogen atom to which they are attached represent a morpholino or piperazino ring and

R_7 and R_8 represent methoxy,

or a physiologically acceptable acid addition salt thereof.

3. Process according to claim 1, characterised in that 3,4-dihydro-6,7-dimethoxy-12-dimethylamino-pyridazino[4',5':3,4]pyrrolo[2,1-a]isoquinoline or 3,4-dihydro-6,7-dimethoxy-12-isopropylaminopyridazino-[4',5':3,4]pyrrolo[2,1-a]isoquinoline
or acid addition salts thereof are prepared.

4. Use of a compound of general formula I or a physiologically acceptable acid addition salt thereof, as defined in any one of claims 1 to 3, for producing a preparation for treating cardiac insufficiency and/or cerebral metabolic disorders.

* C L M S *