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REPLACED SHEETS		SG
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☒	Claim(s) : paged	to paged
☐	Drawing(s) : paged	to paged
☐	Abstract : paged	to paged
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Title: NOVEL 7-(SUBSTITUTED)-8-(SUBSTITUTED)-
9-(SUBSTITUTED AMINO)-6-DEMETHYL-6-
DEOXYTETRACYCLINES

BACKGROUND OF THE INVENTION

1. Field of the Invention

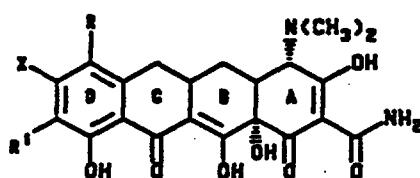
The invention relates to novel [4S-(4alpha, 12aalpha)]-4-(dimethylamino)-7-(substituted)-8-(substituted)-9-(substituted)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamides herein after called 7-(substituted)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracyclines, which are useful as antibiotic agents and exhibit antibacterial activity against a wide spectrum of organisms including organisms which are resistant to tetracyclines.

The invention also relates to novel 7-(substituted)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline intermediates useful for making the novel compounds of the present invention and to novel methods for producing the novel compounds and intermediate compounds.

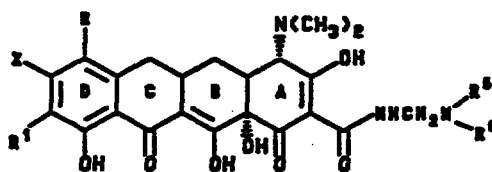
SUMMARY OF THE INVENTION

This invention is concerned with novel 7-(substituted)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracyclines, represented by formulas I and II, which have antibacterial activity; with method of treating infectious diseases in warm blooded animals employing these new compound; with methods of treating or controlling veterinary diseases; with pharmaceutical preparations containing these compounds; with novel

intermediate compounds and processes for the production of these compounds. More particularly, this invention is concerned with compounds of formulas I and II which have enhanced in vitro and in vivo antibiotic activity against tetracycline resistant strains as well as a high level of activity against strains which are normally susceptible to tetracyclines.



I



II

In formula I and II, X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine; R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen,

R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;

and when R² = methyl or ethyl,

R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R² = n-propyl,

R³ = n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R² = 1-methylethyl,

R³ = n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 = n\text{-butyl}$,

$R^3 = n\text{-butyl}$, 1-methylpropyl or 2-methylpropyl;

and when $R^2 = 1\text{-methylpropyl}$,

5 $R^3 = 2\text{-methylpropyl}$;

and when R or $R^1 = -NR^2R^3$ and $R^2 = \text{hydrogen}$,

R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

10 straight or branched mono(C_1-C_6)alkylamino group se-

lected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-

ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-

15 pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-

pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3-C_8)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-

20 cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-di-

methylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclo-

butyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethyl-

cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl,

cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]-

25 oct-2-ylamino and where appropriate their diastereomers

and enantiomers; straight or branched chain

di(C_1-C_6)alkylamino group selected from dimethylamino,

diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)-

amino or a combination of methyl, ethyl, n-propyl,

30 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl,

1,1-dimethylethyl, n-pentyl, 2-methylbutyl,

1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl,

n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl,

2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl,

35 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and

where appropriate their diastereomers and enantiomers;

(C_1-C_6)alkoxyamino group selected from methoxy, ethoxy,

propoxy, butoxy,

5 pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy,
10 cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethyl-
cyclopropoxy, cis-2,3-dimethylcyclopropoxy,
cyclobutoxy, trans-2,3-dimethylcyclobutoxy,
cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-
15 yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
20 (C₂-C₈)azacycloalkyl group selected from aziridinyl,
15 azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
25 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl,
4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
30 tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
25 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and
where appropriate their diastereomers and enantiomers;
azaheterocyclic group selected from 1-imidazolyl,
35 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
1-tetrazolyl, or 2-tetrazolyl; carboxy(C₂-C₄)alkyl-
amino group selected from aminoacetic acid,
α-aminopropionic acid, or α-aminobutyric acid and
their optical isomers; (heterocyclo)amino group
40 selected from 2- or 3-furyl, 2- or 3-thienyl, 2-, 3- or
4-pyridyl, 2- or 5-pyridazinyl, 2-pyrazinyl, or
2-(imidazolyl)amino and their substituted analogues
(substitution selected from straight or branched

(C₁-C₆)alkyl); (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; substituted (C₆-C₁₀)arylamino group selected from
5 4-(acetamido)phenyl, 2-,3- or 4-halophenyl, 2-,3-, or 4-(C₁-C₄)alkylphenyl, or 2-,3- or 4-carboxyphenylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or
10 branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted
15 (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano,
20 (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; α-hydroxy(C₁-C₃)alkyl group selected from
25 hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; α-mercapto(C₁-C₃)alkyl group selected from mercaptomethyl, α-mercaptoethyl, α-mercapto-1-methyl-ethyl or α-mercaptopropyl; halo(C₁-C₃)alkyl group such as bromomethyl,
30 fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated
35 ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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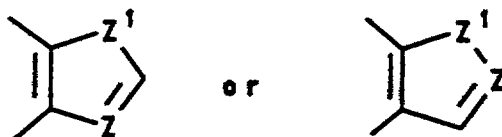


Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:

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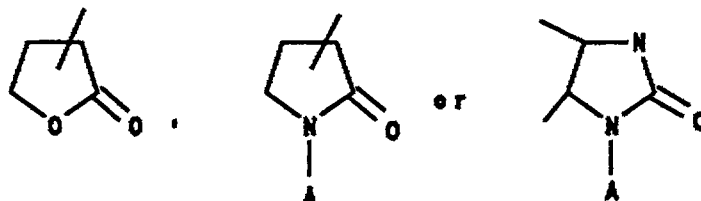
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Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazol-
yl, benzoxazolyl, indazolyl, thiazolyl, benzothiazol-
yl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimida-
zolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:

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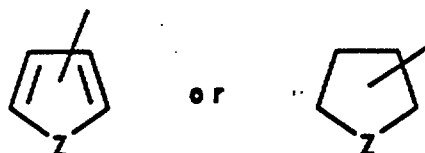
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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,
(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group

selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5 such as γ -butyrolactam, γ -butyrolactone,
imidazolidinone or N-aminoimidazolidinone, or a six
membered aromatic ring with one to three N heteroatoms
such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
10 unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-
pyridazinyl, or a six membered saturated ring with one
or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom such as 2,3-dioxo-1-piperazinyl,
4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-
1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,
15 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl; acyl or
haloacyl group selected from acetyl, propionyl,
chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcar-
bonyl such as cyclopropylcarbonyl, cyclobutylcarbonyl,
cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethyl-
20 cyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)car-
bonyl, (2-ethylcyclopropyl)carbonyl, (2-methyl-
cyclopentyl)carbonyl or (3-ethylcyclobutyl)carbonyl,
(C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo
substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl,
25 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or
4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the
heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom
30 optionally having a benzo or pyrido ring fused thereto:

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Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:

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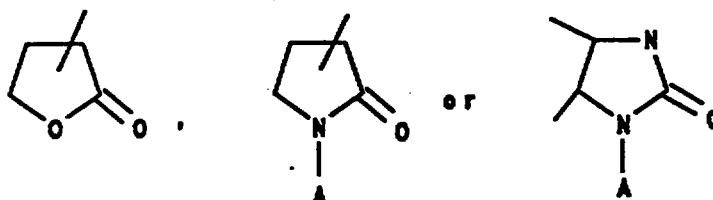
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Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl,
oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzo-
thiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or
pyridylimidazolyl, or a five membered saturated ring
with one or two N, O, S or Se heteroatoms and an
adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl
(substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano,

(C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);
(C₇-C₉)aralkyl group selected from benzyl,
1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone,
imidazolidinone or N-aminoimidazolidinone, or a six
membered aromatic ring with one to three N heteroatoms
such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
10 unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkyl-
thiopyridazinyl, or a six membered saturated ring with
one or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom such as 2,3-dioxo-1-piperazinyl,
4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-
15 piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,
2-dioxomorpholinyl or 2-dioxothiophorolinyl;

(C₁-C₄)alkoxycarbonyl group selected from
methoxycarbonyl, ethoxycarbonyl, straight or branched
propoxycarbonyl, straight or branched butoxycarbonyl
20 or allyloxycarbonyl; α -aminomethoxycarbonyl;
halomethoxycarbonyl; vinyl or substituted vinyl group
[substitution selected from (C₁-C₃)alkyl group,
halogen, (C₆-C₁₀)aryl group selected from phenyl,
 α -naphthyl, β -naphthyl, substituted (C₆-C₁₀)aryl group
25 (substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano,
(C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy),
halo(C₁-C₃)alkyl group such as bromomethyl, fluoro-
methyl, difluoromethyl, trifluoromethyl, chloromethyl,
30 dichloromethyl, trichloromethyl, 2-fluoroethyl,
2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl
or 2-iodoethyl, a heterocycle group selected from a
five membered aromatic or saturated ring with one N, O,
S or Se heteroatom optionally having a benzo or pyrido
35 ring fused thereto:



Z - N, O, S or Se

10 such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl]; (C₁-C₄)alkoxy group such
as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or
tert-butoxy; C₆-aryloxy group selected from phenoxy or
15 substituted phenoxy (substitution selected from halo,
(C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy,
di(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group such as
benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;
vinyloxy or substituted vinyloxy group (substitution
20 selected from (C₁-C₄)alkyl, cyano, carboxy, or
(C₆-C₁₀)aryl selected from phenyl, α-naphthyl or
β-naphthyl); R^aR^bamino(C₁-C₄)alkoxy group, wherein
R^aR^b is a straight or branched (C₁-C₄)alkyl selected
from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or
25 R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is
selected from -N(C₁-C₃)alkyl [straight or branched],
-NH, -NOB [B is selected from hydrogen or
(C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein
R^aR^b is a straight or branched (C₁-C₄)alkyl selected
30 from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n,
n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from
-N(C₁-C₃)- alkyl [straight or branched], -NH, -NOB [B
is selected from hydrogen or (C₁-C₃)alkyl], O or S; and
35 when R³ = R⁴(CH₂)_nCO- and n=1-4;
R⁴ is selected from hydrogen; straight or branched
(C₁-C₄)alkyl group selected from methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,

2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted

(C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)- aryl group

(substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);

(C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkyl- carbonyl,

(C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or

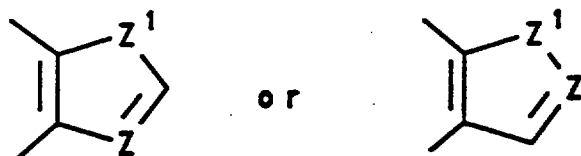
4-(1-methylethyl)benzoyl, (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



30 Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
diny, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:

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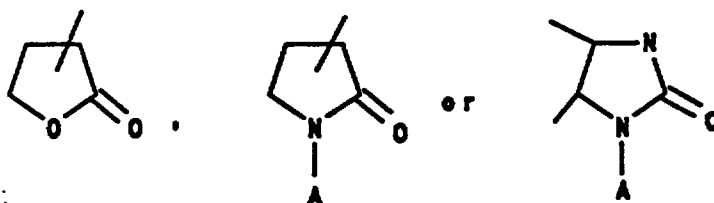


Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-

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1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,
2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

(C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy,
n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group
selected from phenoxy or substituted phenoxy

(substitution selected from halo, (C₁-C₄)alkyl, nitro,
cyano, thiol, amino, carboxy, di(C₁-C₃)alkylamino);

(C₇-C₁₀)aralkyloxy group such as benzyloxy,

1-phenylethyloxy or 2-phenylethyloxy; (C₁-C₃)alkylthio
group selected from methylthio, ethylthio, propylthio

or allylthio; C₆-arylthio group selected from
phenylthio or substituted phenylthio (substitution
selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol,
amino, carboxy, di(C₁-C₃)alkylamino); C₆-arylsulfonyl

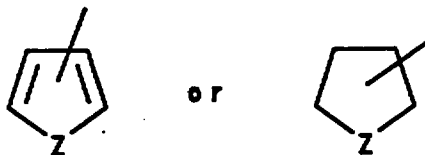
group selected from phenylsulfonyl or substituted
phenylsulfonyl (substitution selected from halo,

(C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino,
cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or

carboxy); (C₇-C₈)aralkylthio group such as benzylthio,
1-phenylethylthio or 2-phenylethylthio; a heterocycle

group selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom

optionally having a benzo or pyrido ring fused thereto:

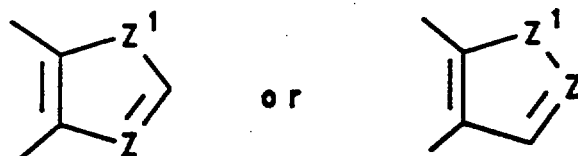


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,

benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:

5

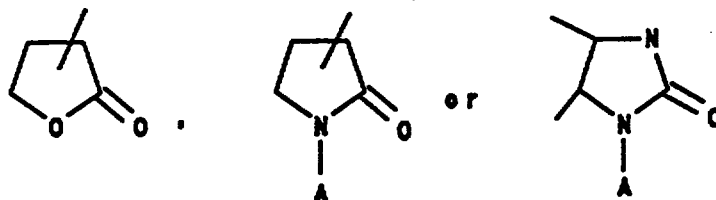


Z or Z' = N, O, S or Se

10

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15



20

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

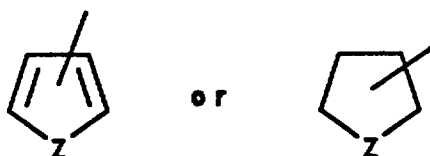
25

30

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-

35

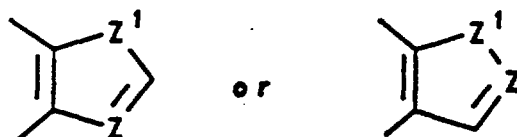
1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,
2-dioxomorpholinyl or 2-dioxothiomorpholinyl; hydroxy
group; mercapto group; α -hydroxy(C_1 - C_3)alkyl group
5 selected from hydroxy- methyl, α -hydroxyethyl or
 α -hydroxy-1-methylethyl or α -hydroxypropyl;
halo(C_1 - C_3)alkyl group such as bromomethyl,
fluoromethyl, difluoromethyl, trifluoromethyl,
10 chloromethyl, dichloromethyl, trichloromethyl,
2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl,
2-bromoethyl or 2-iodoethyl; acyl or haloacyl group
selected from acetyl, propionyl, chloroacetyl,
trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl,
15 (C_6 - C_{10})aroyl selected from benzoyl or naphthoyl, halo
substituted (C_6 - C_{10})aroyl such as pentafluorobenzoyl,
4-chlorobenzoyl, 3-bromobenzoyl, 3,4-difluorobenzoyl,
(C_1 - C_4)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or
4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the
20 heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

30 such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
35 optionally having a benzo or pyrido ring fused thereto:

5

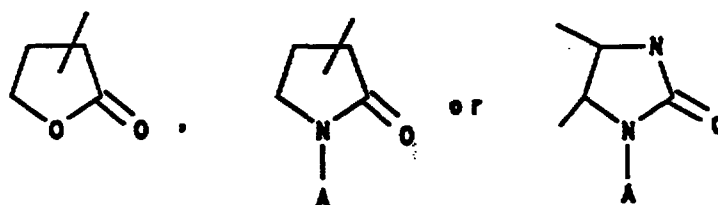


Z or Z' = N, O, S or Se

10

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15



20

25

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

30

35

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,

2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

(C₁-C₄)alkoxycarbonyl group selected from

methoxycarbonyl, ethoxycarbonyl, straight or branched
propoxycarbonyl, allyloxycarbonyl or straight or

branched butoxycarbonyl; R^aR^bamino(C₁-C₄)alkoxy group,
wherein R^aR^b is a straight or branched (C₁-C₄)alkyl

selected from methyl, ethyl, n-propyl, 1-methylethyl,
n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is

(CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected
from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB

[B is selected from hydrogen or (C₁-C₃)alkyl], O or S;
or R^aR^baminoxy group, wherein R^aR^b is a straight or

branched (C₁-C₄)alkyl selected from methyl, ethyl,

n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or

2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-

(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl
[straight or branched], -NH, -NOB [B is selected from

hydrogen or (C₁-C₃)alkyl], O or S;

and when R³ = R⁴(CH₂)_nCO- and n = 2-4,

R⁴ is selected from amino; hydroxyamino; straight or
branched mono(C₁-C₆)alkylamino group selected from

methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,

1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,

n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,

1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,

3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C₃-C₈)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl,

trans-2,3-dimethylcyclopropyl, cis-2,3-di-

methylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclo-

butyl, cis-2,3-dimethylcyclobutyl, cyclopentyl,

cyclohexyl, cycloheptyl, cyclooctyl,

bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]-

oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from

5 dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

10 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino

15 group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy,

20 cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers;

25 (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,

30 trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl

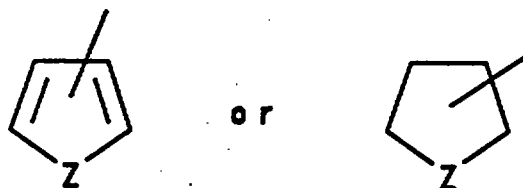
35 group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl,

4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
 tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
 2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and
 where appropriate their diastereomers and enantiomers;
 azaheterocyclic group selected from 1-imidazolyl,
 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
 1-tetrazolyl, or 2-tetrazolyl; carboxy(C₂-C₄)alkylamino
 group selected from aminoacetic acid, α-aminopropionic
 acid, or α-aminobutyric acid and their optical
 isomers; (heterocyclo)amino group selected from 2- or
 3-furyl, 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2- or
 5-pyridazinyl, 2-pyrazinyl, or 2-(imidazolyl)amino and
 their substituted analogues (substitution selected from
 straight or branched (C₁-C₆)alkyl); (C₆-C₁₀)arylamino
 group selected from phenylamino or naphthylamino;
 substituted (C₆-C₁₀)arylamino group selected from
 4-(acetamido)phenyl, 2-,3- or 4-halophenyl, 2-,3-, or
 4-(C₁-C₄)alkylphenyl, or 2-,3- or 4-carboxyphenylamino;
 (C₇-C₁₀)arylalkylamino group selected from benzyl,
 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
 (1-naphthyl)methyl or phenylpropylamino;
 (C₁-C₄)alkoxycarbonylamino group selected from
 tert-butoxycarbonylamino, allyloxycarbonylamino,
 methoxycarbonylamino, ethoxycarbonylamino or
 propoxycarbonylamino;
 and when R³ = R^{4'} (CH₂)_n SO₂- and n = 0,
 R^{4'} is selected from amino; hydroxyamino; straight or
 branched mono(C₁-C₆)alkylamino group selected from
 methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
 n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
 pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
 1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C₃-C₈)cycloalkylamino
roup selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl,
5 trans-2,3-dimethylcyclopropyl, cis-2,3-dimethyl-
cyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl,
cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
10 diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl,
15 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
20 1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C₁-C₆)alkoxyamino
group selected from methoxy, ethoxy, propoxy, butoxy,
pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
selected from cyclopropoxy, trans-1,2-dimethylcyclopro-
25 poxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethyl-
cyclopropoxy, cis-2,3-dimethylcyclopropoxy,
cyclobutoxy, trans-2,3-dimethylcyclobutoxy,
cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-
30 yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
35 (C₂-C₈)azacycloalkyl group selected from aziridinyl,
azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-

hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
5 diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl,
4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
10 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and
where appropriate their diastereomers and enantiomers;
azaheterocyclic group selected from 1-imidazolyl,
1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
15 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group
selected from phenylamino or naphthylamino;
(C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
(1-naphthyl)methyl or phenylpropylamino; straight or
20 branched (C₁-C₄)alkyl group selected from methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
(C₃-C₆)cycloalkyl group selected from cyclopropyl,
cyclobutyl, cyclopentyl or cyclohexyl; substituted
25 (C₃-C₆)cycloalkyl group (substitution selected from
(C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl);
(C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or
β-naphthyl; substituted (C₆-C₁₀)aryl group
(substitution selected from halo, (C₁-C₄)alkoxy,
30 trihalo(C₁-C₃)alkyl, nitro, amino, cyano,
(C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);
(C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl; halo(C₁-C₃)alkyl group
such as bromomethyl, fluoromethyl, difluoromethyl,
35 trifluoromethyl, chloromethyl, dichloromethyl,
trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl,
2,2,2-trifluoroethyl, 2-chloroethyl, 2,2-dichloroethyl,
2,2,2-trichloroethyl, 2-bromoethyl or 2-iodoethyl; a

heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

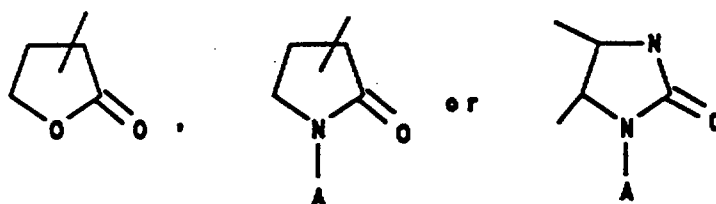
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

5



10

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; R^aR^b amino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^b aminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-

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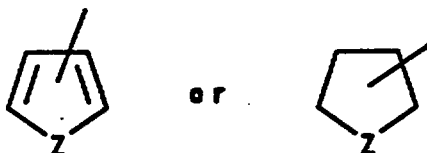
(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S;
5 and when R³ = R^{4'}(CH₂)_nSO₂- and n= 1-4, R^{4'} is selected from hydrogen; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
10 (C₁-C₄)carboxyalkyl group; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from
15 phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl,
20 1-phenylethyl, 2-phenylethyl or phenylpropyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₃)alkyl, nitro, cyano, thiol,
25 amino, carboxy, di(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl,
30 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy
35 group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or

$-(CH_2)_2W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S;

(C_1-C_3) alkylthio group selected from methylthio, ethylthio or n-propylthio; C_6 -arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C_1-C_3) alkyl, nitro, cyano, thiol, amino, carboxy, $di(C_1-C_3)$ alkylamino);

(C_7-C_8) aralkylthio group such as benzylthio, 1-phenylethylthio or 2-phenylethylthio;

a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

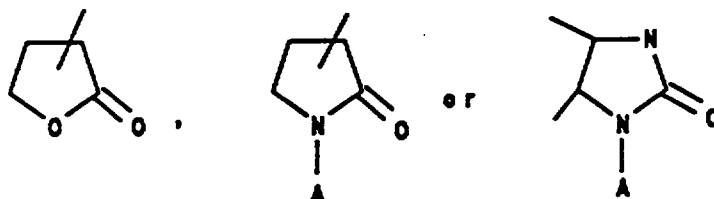
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-

azolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; hydroxy group; mercapto group; amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,

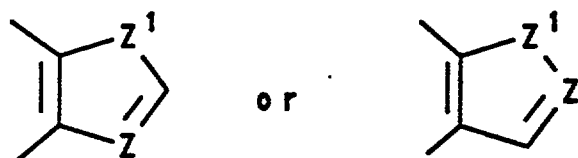
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C₃-C₈)cycloalkylamino
group selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-
2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-
2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C₁-C₆)alkoxyamino
group selected from methoxy, ethoxy, propoxy, butoxy,
pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
selected from cyclopropoxy, trans-1,2-dimethylcyclopro-
poxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethyl-
cyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclo-
butoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-
dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-
yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
(C₂-C₈)azacycloalkyl group selected from aziridiny,

azetidiny1, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
5 hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocyclo-
alkyl group selected from morpholinyl, piperazinyl,
10 4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and
15 where appropriate their diastereomers and enantiomers;
azaheterocyclic group selected from 1-imidazolyl,
1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group
selected from phenylamino or naphthylamino;
20 (C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
(1-naphthyl)methyl or phenylpropylamino;
halo(C₁-C₃)alkyl group such as bromomethyl,
fluoromethyl, difluoromethyl, trifluoromethyl,
25 chloromethyl, dichloromethyl, trichloromethyl,
2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl,
2-chloroethyl, 2,2-dichloroethyl, 2,2,2-trichloroethyl,
2-bromoethyl or 2-iodoethyl; acyl or haloacyl group
selected from acetyl, propionyl, chloroacetyl,
30 trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl,
(C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo
substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl,
4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or
35 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the
heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:



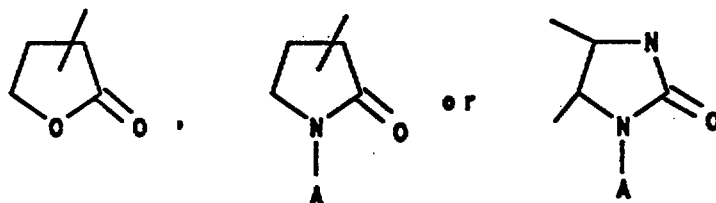
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);

(C₇-C₉)aralkyl group selected from benzyl,
1-phenylethyl, 2-phenylethyl or phenylpropyl)

- 5 such as γ -butyrolactam, γ -butyrolactone,
imidazolidinone or N-aminoimidazolidinone, or a six
membered aromatic ring with one to three N heteroatoms
such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
10 unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-
pyridazinyl, or a six membered saturated ring with one
or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom such as 2,3-dioxo-1-piperazinyl,
4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-
1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,
15 2-dioxomorpholinyl or 2-dioxothiомorpholinyl;
(C₁-C₄)alkoxycarbonyl group selected from
methoxycarbonyl, ethoxycarbonyl, straight or branched
propoxycarbonyl, allyloxycarbonyl or straight or
branched butoxycarbonyl; R⁵ is selected from hydrogen;
20 straight or branched (C₁-C₃)alkyl group selected from
methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl
group selected from phenyl, α -naphthyl or β -naphthyl;
(C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl; a heterocycle group
25 selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

- 35 such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered

aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

5

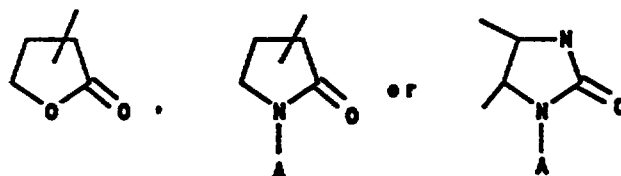


Z or Z¹ = N, O, S or Se

10

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15



20

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

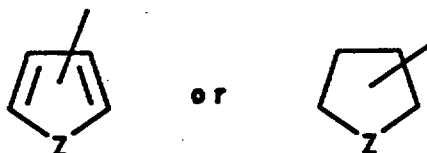
25

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃) alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl,

30

35

2-dioxomorpholinyl, 2-dioxothiomorpholinyl; or
 $-(CH_2)_n COOR^7$ where $n=0-4$ and R^7 is selected from
hydrogen; straight or branched (C_1-C_3) alkyl group
5 selected from methyl, ethyl, n-propyl or 1-methylethyl;
or (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl,
 β -naphthyl; R^6 is selected from hydrogen; straight or
branched (C_1-C_3) alkyl group selected from methyl,
ethyl, n-propyl or 1-methylethyl; (C_6-C_{10}) aryl group
10 selected from phenyl, α -naphthyl or β -naphthyl;
 (C_7-C_9) aralkyl group such as benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl; a heterocycle group
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
15 having a benzo or pyrido ring fused thereto:



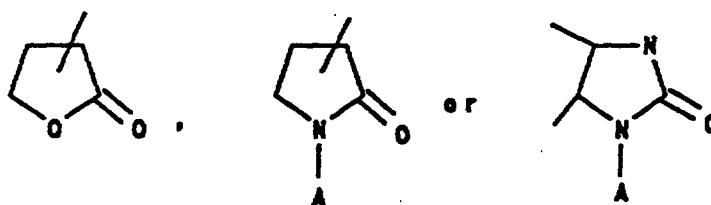
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
25 furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered
aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl, 2-dioxo-thiomorpholinyl; or -(CH₂)_nCOOR^{7'} where n=0-4 and R^{7'} is selected from hydrogen; straight or branched (C₁-C₃)alkyl selected from methyl, ethyl, n-propyl or

1-methylethyl; or (C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl; with the proviso that R⁵ and R⁶ cannot both be hydrogen;

or R⁵ and R⁶ taken together are -(CH₂)₂W(CH₂)₂-, wherein W is selected from (CH₂)_n and n=0-1, -NH, -N(C₁-C₃)alkyl [straight or branched], -N(C₁-C₄)alkoxy, oxygen, sulfur or substituted congeners selected from (L or D)proline, ethyl(L or D)prolinate, morpholine, pyrrolidine or piperidine; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Preferred compounds are compounds according to the above formula I and II in which X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine; R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ is selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-; and when R³ = R⁴(CH₂)_nCO- and n=0,

R⁴ is selected from hydrogen; amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3 - C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1 - C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1 - C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3 - C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C_7 - C_{10})aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C_2 - C_8)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-

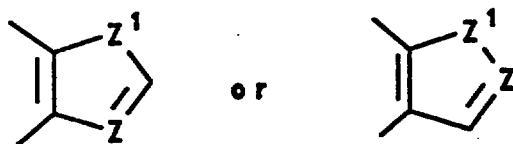
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
5 diastereomers and enantiomers; azaheterocyclo-
alkyl group selected from morpholinyl, piperazinyl,
4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
10 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl
and where appropriate their diastereomers and
enantiomers; azaheterocyclic group selected from
1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl),
15 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl;
carboxy(C₂-C₄)alkylamino group selected from
aminoacetic acid, α-aminopropionic acid, or
α-aminobutyric acid and their optical isomers;
(heterocyclo)amino group selected from 2- or 3-furyl,
20 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2- or
5-pyridazinyl, 2-pyrazinyl, or 2-(imidazolyl)amino and
their substituted analogues (substitution selected from
straight or branched (C₁-C₆)alkyl); (C₆-C₁₀)arylamino
group selected from phenylamino or naphthylamino;
25 substituted (C₆-C₁₀)arylamino group selected from
4-(acetamido)phenyl, 2-, 3- or 4-halophenyl, 2-, 3-, or
4-(C₁-C₄)alkylphenyl, or 2-, 3- or 4-carboxyphenylamino;
(C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
30 (1-naphthyl)methyl or phenylpropylamino; straight or
branched (C₁-C₃)alkyl group selected from methyl,
ethyl, n-propyl or 1-methylethyl; (C₃-C₆)cycloalkyl
group selected from cyclopropyl, cyclobutyl,
cyclopentyl or cyclohexyl; substituted (C₃-C₆)cyclo-
35 alkyl group (substitution selected from (C₁-C₃)alkyl,
cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group
selected from phenyl, α-naphthyl or β-naphthyl;
substituted (C₆-C₁₀)aryl group (substitution selected

from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z - N, O, S or Se

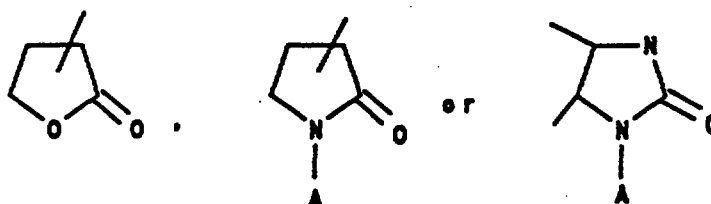
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
diny, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:



Z or Z' - N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-

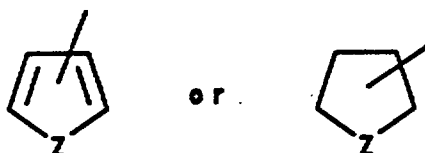
lyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

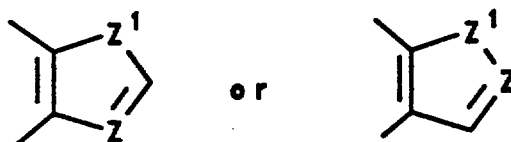
such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophorolinyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl such as cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl, (2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)carbonyl or (3-ethylcyclobutyl)carbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl,

4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-methyltoluoyl
or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl,
the heterocycle selected from a five membered aromatic
or saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:



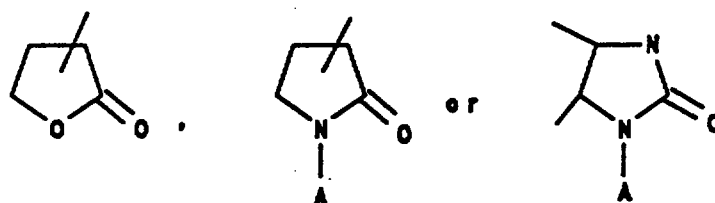
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; α -aminomethoxycarbonyl; halo-methoxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group,

halogen, (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl, β-naphthyl, substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy), halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di(C₁-C₃)alkyl-amino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; vinyloxy or substituted vinyloxy group (substitution selected from (C₁-C₄)alkyl, cyano, carboxy, or (C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl); R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-

propyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
- $(CH_2)_2 W(CH_2)_2$ - wherein W is selected from
- $N(C_1-C_3)$ alkyl [straight or branched], -NH, -NOB [B is
5 selected from hydrogen or (C_1-C_3) alkyl], O or S; or
 $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or
branched (C_1-C_4) alkyl selected from methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or - $(CH_2)_2 W$ -
10 $(CH_2)_2$ - wherein W is selected from - $N(C_1-C_3)$ alkyl
[straight or branched], -NH, -NOB [B is selected from
hydrogen or (C_1-C_3) alkyl], O or S;
and when $R^3 = R^4 (CH_2)_n CO-$ and $n=1-4$,
 R^4 is selected from hydrogen; (C_1-C_3) alkyl group
15 selected from methyl, ethyl, n-propyl or 1-methylethyl;
 (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or
 β -naphthyl; substituted (C_6-C_{10}) aryl group (substitu-
tion selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) -
alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl,
20 (C_1-C_3) alkylamino or carboxy); acyloxy or haloacyloxy
group, selected from acetyl, propionyl, chloroacetyl,
trichloroacetyl, (C_3-C_6) cycloalkylcarbonyl,
 (C_6-C_{10}) aroylel selected from benzoyl or naphthoyl, halo
substituted (C_6-C_{10}) aroylel such as pentafluorobenzoyl,
25 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
 (C_1-C_4) alkylbenzoyl such as 4-toluoyl, 2-toluoyl,
4-(1-methylethyl)benzoyl or (heterocycle)carbonyl, the
heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom
30 optionally having a benzo or pyrido ring fused thereto:

5



Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15



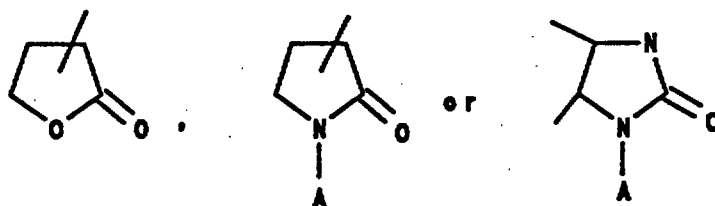
20

Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25

30



35

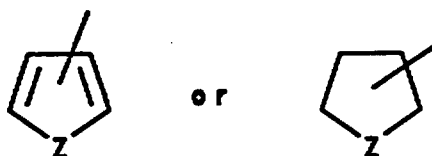
(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl
(substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-

alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-
aralkyl group selected from benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl)

5

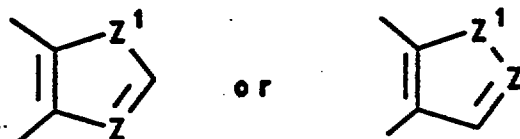
such as γ -butyrolactam, γ -butyrolactone,
imidazolidinone or N-aminoimidazolidinone, or a six
membered aromatic ring with one to three N heteroatoms
such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
10 unsym-triazinyl, pyrimidinyl, or a six membered
saturated ring with one or two N, O, S or Se
heteroatoms and an adjacent appended O heteroatom such
as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-pipera-
zinyll, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-
15 2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-
thiomorpholinyl; (C₁-C₄)alkoxy group such as allyloxy,
methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy;
R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a
straight or branched (C₁-C₄)alkyl selected from methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
20 propyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or
-(CH₂)₂W(CH₂)₂- wherein W is selected from
-N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is
selected from hydrogen or (C₁-C₃)alkyl], O or S; or
25 R^aR^baminoxy group, wherein R^aR^b is a straight or
branched (C₁-C₄)alkyl selected from methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-
(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl
30 [straight or branched], -NH, -NOB [B is selected from
hydrogen or (C₁-C₃)alkyl], O or S; C₆-aryloxy group
selected from phenoxy or substituted phenoxy
(substitution selected from halo, (C₁-C₄)alkyl, nitro,
cyano, thiol, amino, carboxy, di(C₁-C₃)alkylamino);
35 (C₁-C₃)alkylthio group selected from methylthio,
ethylthio, propylthio or allylthio; C₆-arylthio group
selected from phenylthio or substituted phenylthio
(substitution selected from halo, (C₁-C₄)alkyl, nitro,

cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino);
 C₆-arylsulfonyl group selected from phenylsulfonyl or
 substituted phenylsulfonyl (substitution selected from
 halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino,
 cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or
 carboxy); a heterocycle group selected from a five
 membered aromatic or saturated ring with one N, O, S or
 Se heteroatom optionally having a benzo or pyrido ring
 fused thereto:



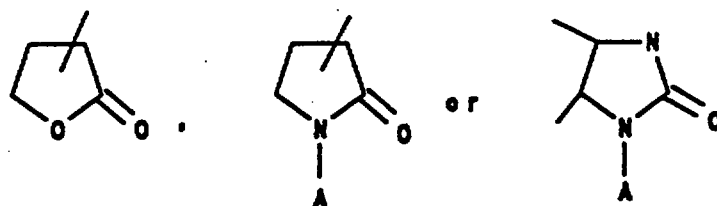
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 danyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
 furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
 benzothienyl, or a five membered aromatic ring with two
 N, O, S or Se heteroatoms optionally having a benzo or
 pyrido ring fused thereto:



Z or Z' = N, O, S or Se

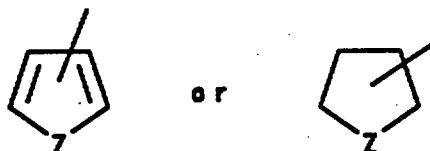
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
 ly, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
 ly, or a five membered saturated ring with one or two
 N, O, S or Se heteroatoms and an adjacent appended O
 heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl; hydroxy group; α -hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo-(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromo-

benzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl
such as 4-toluoyl, 2-toluoyl, or 4-(1-methylethyl)-
benzoyl, or (heterocycle)carbonyl, the heterocycle
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
having a benzo or pyrido ring fused thereto:



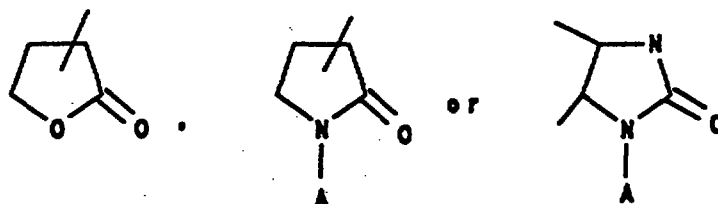
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl;

and when R³ = R⁴(CH₂)_nCO- and n = 2-4,

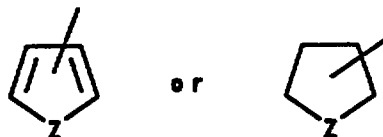
R⁴ is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl,
trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclo-
propyl, cyclobutyl, trans-2,3-dimethylcyclobutyl,
cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-
dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-
1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C₁-C₆)alkoxyamino
group selected from methoxy, ethoxy, propoxy, butoxy,
pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-
dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy,
cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-
dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yl-oxy, or bicyclo[2.2.1]oct-2-
yloxyamino and where appropriate their diastereomers
and enantiomers; (C₇-C₁₀)aralkoxyamino group selected
from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-
naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpro-
poxyamino; (C₂-C₈)azacycloalkyl group selected from
aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl,
piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethyl-
pyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-
azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-
5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo-

[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; carboxy(C₂-C₄)alkylamino group selected from aminoacetic acid, α-aminopropionic acid, or α-aminobutyric acid and their optical isomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,

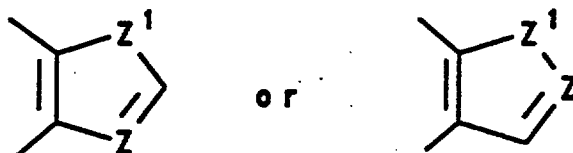
cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
5 bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl,
10 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
15 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
20 selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
25 cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)aza-
30 cycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo-
35 [2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl

group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



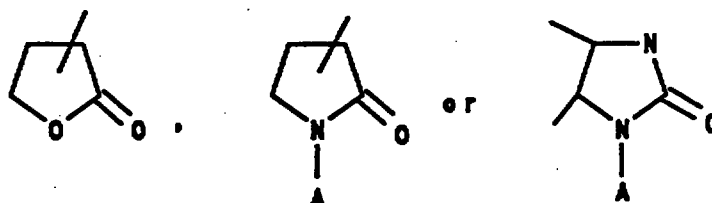
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:



(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl
(substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-
aralkyl group selected from benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl)

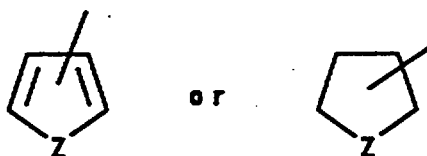
such as γ-butyrolactam, γ-butyrolactone,
imidazolidinone or N-aminoimidazolidinone, or a six

membered aromatic ring with one to three N heteroatoms
 such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
 unsym-triazinyl, pyrimidinyl or a six membered
 saturated ring with one or two N, O, S or Se
 heteroatoms and an adjacent appended O heteroatom such
 as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-pipera-
 zinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-
 2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-
 thiomorpholinyl;
 and when $R^3 = R^{4'}(CH_2)_nSO_2-$ and $n = 1-4$,
 $R^{4'}$ is selected from hydrogen; amino; hydroxyamino;
 straight or branched mono(C_1-C_6)alkylamino group
 selected from methyl, ethyl, n-propyl, 1-methylethyl,
 n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
 ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
 pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-
 pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
 1-methyl-1-ethylpropylamino and where appropriate their
 diastereomers and enantiomers; (C_3-C_8)cycloalkylamino
 group selected from cyclopropyl, trans-1,2-dimethyl-
 cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-
 dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
 cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-
 dimethylcyclobutyl, cyclopentyl, cyclohexyl, cyclo-
 heptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
 bicyclo[2.2.2]oct-2-ylamino and where appropriate their
 diastereomers and enantiomers; straight or branched
 chain di-(C_1-C_6)alkylamino group selected from
 dimethylamino, diethylamino, methyl(ethyl)amino,
 ethyl(1-methylethyl)amino or a combination of methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
 butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-
 methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethyl-

propylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or
5 hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy,
10 cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)-aralkoxyamino group selected from benzyloxy,
15 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
20 hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl
25 group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or
30 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group
35 selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or

branched (C_1-C_3)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl;
 5 substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy); (C_1-C_4)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy, iso-butoxy or
 10 tert-butoxy; C_6 -aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C_1-C_4)alkyl, nitro cyano, thiol, amino, carboxy, di(C_1-C_3)alkylamino; (C_7-C_{10})aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;
 15 (C_1-C_4)carboxyalkyl group;

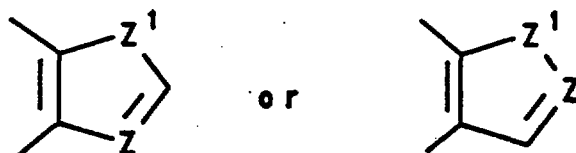
R^5 is selected from hydrogen; straight or branched (C_1-C_3)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl; (C_7-C_9)aralkyl
 20 group such as benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



30 $Z = N, O, S \text{ or } Se$

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 35 danyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

5

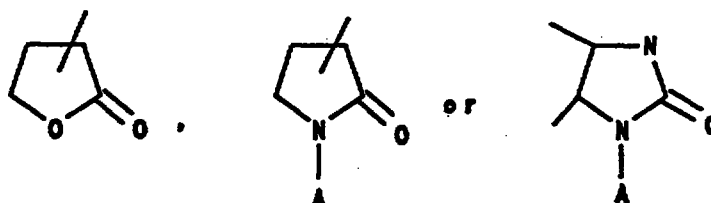


Z or Z' - N, O, S or Se

10

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15



20

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

25

30

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl or pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se

35

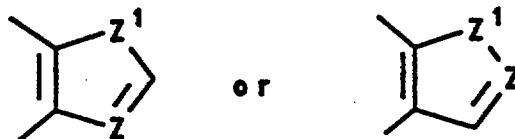
heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl, 2-dioxothio-

morpholinyl; or $-(CH_2)_n COOR^7$ where $n=0-4$ and R^7 is selected from hydrogen; straight or branched (C_1-C_3) alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; or (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; R^6 is selected from hydrogen; straight or branched (C_1-C_3) alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; (C_7-C_9) aralkyl group such as benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



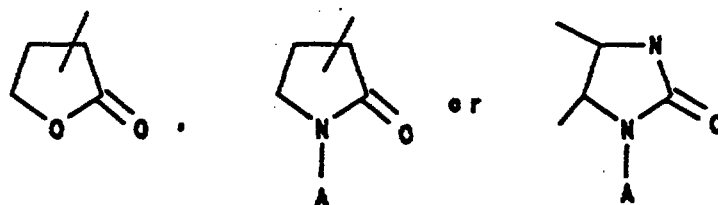
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl, 2-dioxothiomorpholinyl; or (CH₂)_nCOOR^{7'} where n=0-4 and R^{7'} is selected from hydrogen; straight or branched (C₁-C₃)-alkyl selected from methyl, ethyl, n-propyl or 1-methylethyl; or (C₆-C₁₀)aryl selected from phenyl, α -naphthyl or β -naphthyl; with the proviso that R⁵ and R⁶ cannot both be hydrogen; or R⁵ and R⁶ taken together are -(CH₂)₂W(CH₂)₂-, wherein W is selected from (CH₂)_n and n=0-1, -NH, -N(C₁-C₃)alkyl [straight or branched], -N(C₁-C₄)alkoxy, oxygen, sulfur or substituted congeners selected from (L or D)proline, ethyl(L or D)prolinate, morpholine, pyrrolidine or piperidine; and the pharmacologically

acceptable organic and inorganic salts or metal complexes.

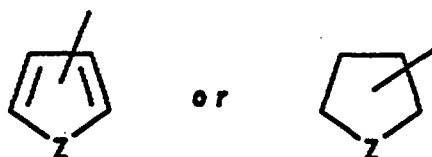
Particularly preferred compounds are compounds according to the above formula I and II in which X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine; R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or -NR²R³; and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl; and when R or R¹ = -NR²R³ and R² = hydrogen, R³ is selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-; and when R³ = R⁴(CH₂)_nCO- and n=0, R⁴ is selected from hydrogen; amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers

and enantiomers; straight or branched chain di-(C₁-C₆)-alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo-

[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo-
[2.2.1]hept-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocyclic group
selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-
triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or
2-tetrazolyl; (heterocyclo)amino group selected from
2- or 3-furyl, 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2-
or 5-pyridazinyl, 2-pyrazinyl, or 2-(imidazolyl)amino
and their substituted analogues (substitution selected
from straight or branched (C₁-C₆)alkyl); (C₆-C₁₀)aryl-
amino group selected from phenylamino or naphthylamino;
substituted (C₆-C₁₀)arylamino group selected from
4-(acetamido)phenyl, 2-,3- or 4-halophenyl, 2-,3-, or
4-(C₁-C₄)alkylphenyl, or 2-,3- or 4-carboxyphenyl-
amino; (C₇-C₁₀)arylalkylamino group selected from
benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)-
methyl, (1-naphthyl)methyl or phenylpropylamino;
straight or branched (C₁-C₃)alkyl group selected from
methyl, ethyl, n-propyl or 1-methylethyl; (C₃-C₆)cyclo-
alkyl group selected from cyclopropyl, cyclobutyl,
cyclopentyl or cyclohexyl; substituted (C₃-C₆)cyclo-
alkyl group (substitution selected from (C₁-C₃)alkyl,
cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group
selected from phenyl, α-naphthyl or β-naphthyl;
substituted (C₆-C₁₀)aryl group (substitution selected
from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro,
amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino
or carboxy); α-hydroxy(C₁-C₃)alkyl group selected from
hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl
or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as
bromomethyl, fluoromethyl, difluoromethyl, trifluoro-
methyl, chloromethyl, dichloromethyl, trichloromethyl,
2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl,
2-bromoethyl or 2-iodoethyl; a heterocycle group
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally

having a benzo or pyrido ring fused thereto:

5

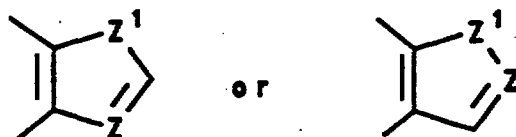


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15

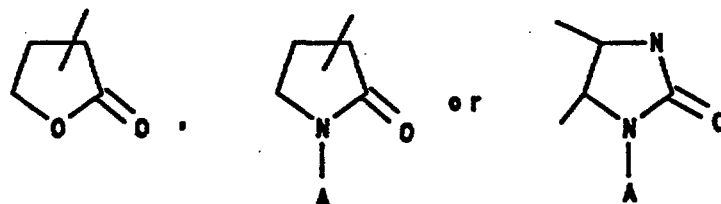


20

Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25



30

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,
(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group
selected from benzyl, 1-phenylethyl, 2-phenylethyl or

35

phenylpropyl)

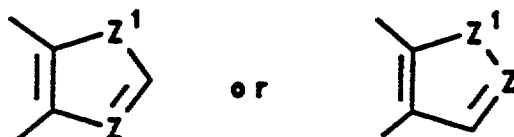
such as γ -butyrolactam, γ -butyrolactone,
 imidazolidinone or N-aminoimidazolidinone, or a six
 membered aromatic ring with one to three N heteroatoms
 such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
 unsym-triazinyl, pyrimidinyl, or a six membered
 saturated ring with one or two N, O, S or Se
 heteroatoms and an adjacent appended O heteroatom such
 as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-
 piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl,
 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomor-
 pholinyl or 2-dioxothiopholinyl; acyl or haloacyl
 group selected from acetyl, propionyl, chloroacetyl,
 trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl such as
 cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentyl-
 carbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclo-
 propyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl,
 (2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)-
 carbonyl or (3-ethylcyclobutyl)carbonyl, (C_6 - C_{10})aroyl
 selected from benzoyl or naphthoyl, halo substituted
 (C_6 - C_{10})aroyl such as pentafluorobenzoyl, 4-chloro-
 benzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
 (C_1 - C_4)alkylbenzoyl such as 4-toluoyl, 2-methylbenzoyl
 or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl,
 the heterocycle selected from a five membered aromatic
 or saturated ring with one N, O, S or Se heteroatom
 optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

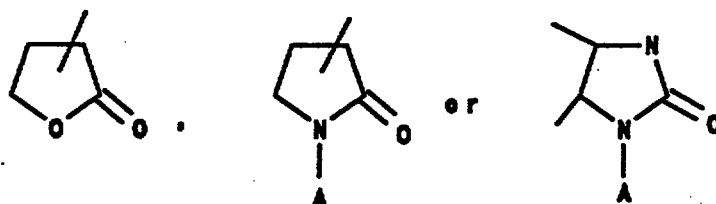
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 dinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofura-
 nyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl,

or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

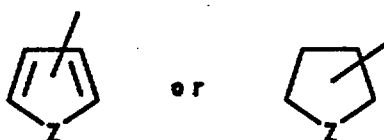
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-alkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-

2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-
thiomorpholinyl; (C₁-C₄)alkoxycarbonyl group selected
from methoxycarbonyl, ethoxycarbonyl, straight or
branched propoxycarbonyl, straight or branched
butoxycarbonyl or allyloxycarbonyl; α-aminomethoxy-
carbonyl; halomethoxycarbonyl; vinyl or substituted
vinyl group [substitution selected from (C₁-C₃)alkyl
group, halogen, (C₆-C₁₀)aryl group selected from
phenyl, α-naphthyl, β-naphthyl, substituted
(C₆-C₁₀)aryl group (substitution selected from halo,
(C₁-C₄)alkoxy, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino
or carboxy), halo(C₁-C₃)alkyl group such as bromo-
methyl, fluoromethyl, difluoromethyl, trifluoromethyl,
chloromethyl, dichloromethyl, trichloromethyl,
2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl,
2-bromoethyl or 2-iodoethyl, a heterocycle group
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

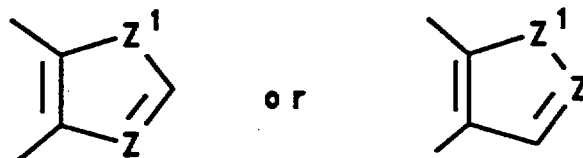
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy,
methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy;
C₆-aryloxy group selected from phenoxy or substituted
phenoxy (substitution selected from halo, (C₁-C₄)-
alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy,
1-phenylethyloxy or 2-phenylethyloxy;
and when R³ = R⁴(CH₂)_nCO- and n=1-4,
R⁴ is selected from hydrogen; (C₁-C₃)alkyl group
selected from methyl, ethyl, n-propyl or 1-methylethyl;

(C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or (heterocycle)-carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

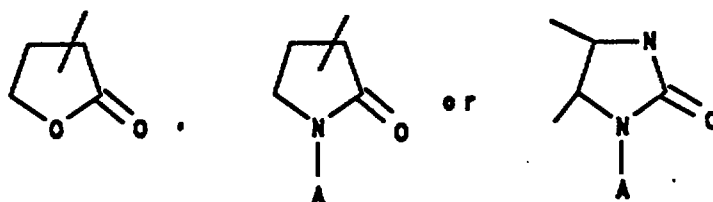
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl

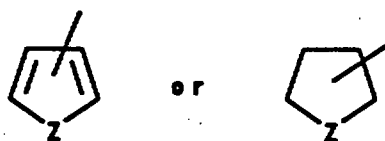
lyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)alkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

20 such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothi-morpholinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkyl-amino); (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkyl-

amino); C_6 -arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

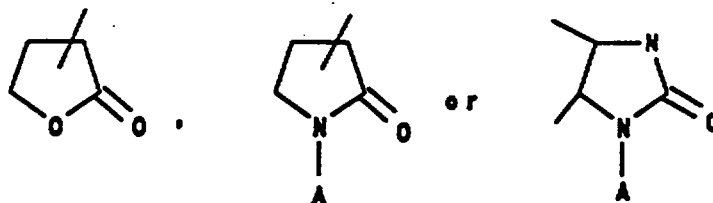
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; hydroxy group; α -hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoroethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoromethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromophenylcarbonyl or 3,4-difluoro-

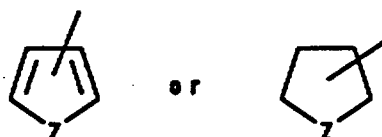
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benzoyl, (C₁-C₄)alkylbenzoyl such as from 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (hetero-
 5 cycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



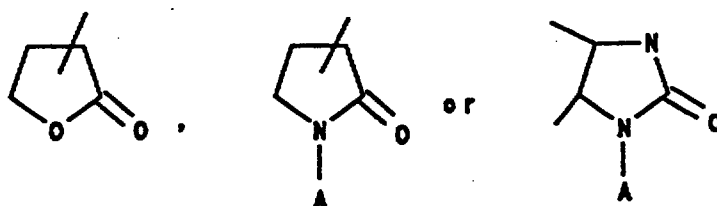
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 15 danyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or
 20 pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
 30 ly, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched

(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-

2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-morpholinyl or 2-dioxothiomorpholinyl;

and when R³ = R⁴(CH₂)_nCO- and n = 2-4,

R⁴ is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl,

cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)-alkylamino group selected from dimethylamino, diethyl-

amino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or
a combination of methyl, ethyl, n-propyl,
1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl,
5 1,1-dimethylethyl, n-pentyl, 2-methylbutyl,
1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl,
n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl,
2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl,
1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and
10 where appropriate their diastereomers and enantiomers;
(C₁-C₆)alkoxyamino group selected from methoxy, ethoxy,
propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cyclo-
alkoxyamino group selected from cyclopropoxy, trans-
1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopro-
15 poxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethyl-
cyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclo-
butoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy,
cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo-
[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino
20 and where appropriate their diastereomers and
enantiomers; (C₇-C₁₀)aralkoxyamino group selected from
benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-
naphthyl)methoxy, (1-naphthyl)methoxy, or phenyl-
propoxyamino; (C₂-C₈)azacycloalkyl group selected from
25 aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl,
piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethyl-
pyrrolidinyl, trans-3,4-dimethylpyrrolidinyl,
2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-
5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo-
30 [2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and
where appropriate their diastereomers and enantiomers;
azaheterocycloalkyl group selected from morpholinyl,
piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
35 tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl
and where appropriate their diastereomers and

enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropyl-amino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-

butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and

5 enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, 10 cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate 15 their diastereomers and enantiomers;

(C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino;

20 (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their 25 diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-

30 oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers;

35 azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino;

(C₇-C₁₀)arylalkylamino group selected from benzyl,

2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl,
 (1-naphthyl)methyl or phenylpropylamino; straight or
 branched (C_1 - C_3)alkyl group selected from methyl,
 ethyl, n-propyl or 1-methylethyl; (C_6 - C_{10})aryl group
 selected from phenyl, α -naphthyl or β -naphthyl;
 substituted (C_6 - C_{10})aryl group (substitution selected
 from halo, (C_1 - C_4)alkoxy, trihalo(C_1 - C_3)alkyl, nitro,
 amino, cyano, (C_1 - C_4)alkoxycarbonyl, (C_1 - C_3)alkylamino
 or carboxy); a heterocycle group selected from a five
 membered aromatic or saturated ring with one N, O, S or
 Se heteroatom optionally having a benzo or pyrido ring
 fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 danyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
 furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
 benzothienyl;

and when $R^3 = R^{4'}(CH_2)_nSO_2-$ and $n = 1-4$,

$R^{4'}$ is selected from hydrogen; amino; hydroxyamino;
 straight or branched mono(C_1 - C_6)alkylamino group
 selected from methyl, ethyl, n-propyl, 1-methylethyl,
 n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
 ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
 1-methyl-1-ethylpropylamino and where appropriate their
 diastereomers and enantiomers; (C_3 - C_8)cycloalkylamino
 group selected from cyclopropyl, trans-1,2-dimethyl-
 cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-
 dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
 cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-

dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino
and where appropriate their diastereomers and
enantiomers; (C₁-C₆)alkoxyamino group selected from
methoxy, ethoxy, propoxy, butoxy, pentoxy or
hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected
from cyclopropoxy, trans-1,2-dimethylcyclopropoxy,
cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethyl-
cyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclo-
butoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-
dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-
2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
(C₂-C₈)azacycloalkyl group selected from aziridinyl,
azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl,

4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-
 alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-
 oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methyl-
 5 pyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or
 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where
 appropriate their diastereomers and enantiomers;
 azaheterocyclic group selected from 1-imidazolyl,
 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
 10 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group
 selected from phenylamino or naphthylamino;
 (C₇-C₁₀)arylalkylamino group selected from benzyl,
 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
 (1-naphthyl)methyl or phenylpropylamino; straight or
 15 branched (C₁-C₃)alkyl group selected from methyl,
 ethyl, n-propyl or 1-methylethyl;
 R⁵ is selected from hydrogen; straight or branched
 (C₁-C₃)alkyl group selected from methyl, ethyl,
 n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected
 20 from phenyl, α-naphthyl or β-naphthyl; (C₇-C₉)aralkyl
 group such as benzyl, 1-phenylethyl, 2-phenylethyl or
 phenylpropyl; or -(CH₂)_nCOOR⁷ where n=0-4 and R⁷ is
 selected from hydrogen; straight or branched
 (C₁-C₃)alkyl group selected from methyl, ethyl,
 25 n-propyl or 1-methylethyl; or (C₆-C₁₀)aryl group
 selected from phenyl, α-naphthyl or β-naphthyl;
 R⁶ is selected from hydrogen; straight or branched
 (C₁-C₃)alkyl group selected from methyl, ethyl,
 n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected
 30 from phenyl, α-naphthyl or β-naphthyl; (C₇-C₉)aralkyl
 group such as benzyl, 1-phenylethyl, 2-phenylethyl or
 phenylpropyl; or (CH₂)_nCOOR^{7'} where n=0-4 and R^{7'} is
 selected from hydrogen; straight or branched
 (C₁-C₃)alkyl selected from methyl, ethyl, n-propyl or
 35 1-methylethyl; or (C₆-C₁₀)aryl selected from phenyl,
 α-naphthyl or β-naphthyl; with the proviso that R⁵ and
 R⁶ cannot both be hydrogen;

or R^5 and R^6 taken together are $-(CH_2)_2W(CH_2)_2-$,
wherein W is selected from $(CH_2)_n$ and $n=0-1$, $-NH$,
5 $-N(C_1-C_3)alkyl$ [straight or branched], $-N(C_1-C_4)alkoxy$,
oxygen, sulfur or substituted congeners selected from
(L or D)proline, ethyl(L or D)prolinate, morpholine,
pyrrolidine or piperidine; and the pharmacologically
acceptable organic and inorganic salts or metal
complexes.

10 Most particularly preferred compounds are
compounds according to the above formula I and II in
which X is selected from halogen or trifluoromethane-
sulfonyloxy; the halogen is selected from bromine,
chlorine, fluorine or iodine;

15 R and R^1 are the same or different and are selected
from hydrogen; nitro; amino; halogen (selected from
chlorine, bromine, fluorine or iodine); cyano; hydroxy;
or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 = hydrogen$,

20 $R^3 = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,$
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
and when $R^2 = methyl$ or ethyl,

$R^3 = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,$
1-methylpropyl or 2-methylpropyl;

25 and when R or $R^1 = -NR^2R^3$ and $R^2 = hydrogen$,
 R^3 selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

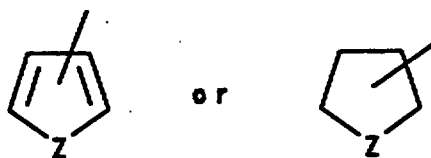
straight or branched mono(C_1-C_6)alkylamino group

30 selected from methyl, ethyl, n-propyl, 1-methylethyl,
n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-
35 pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C_3-C_8)cycloalkylamino
group selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-

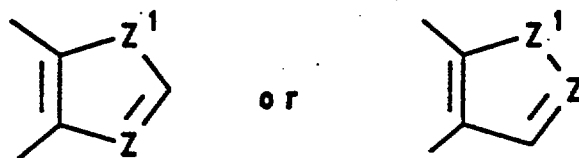
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl,
4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl,
tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,
2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-
2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl
and where appropriate their diastereomers and
enantiomers; (C₇-C₁₀)arylalkylamino group selected from
benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)-
methyl, (1-naphthyl)methyl or phenylpropylamino;
straight or branched (C₁-C₂)alkyl group selected from
methyl or ethyl; (C₆-C₁₀)aryl group selected from
phenyl, α-naphthyl or β-naphthyl; substituted
(C₆-C₁₀)aryl group (substitution selected from halo,
(C₁-C₄)alkoxy, nitro, amino); α-hydroxy(C₁-C₃)alkyl
group selected from hydroxymethyl; halo(C₁-C₃)alkyl
group such as bromomethyl, fluoromethyl, difluoro-
methyl, trifluoromethyl, chloromethyl, dichloromethyl,
trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl,
2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a
heterocycle group selected from a five membered
aromatic or saturated ring with one N, O, S or Se
heteroatom optionally having a benzo or pyrido ring
fused thereto:



Z = N, O, S or Se

such as indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl,
2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl,

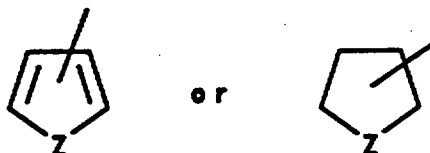
tetrahydrothienyl or thienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, indazolyl, thiazolyl or benzothiazolyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; α-aminomethoxycarbonyl; halomethoxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl, β-naphthyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; and when R³ = R⁴(CH₂)_nCO- and n=1-4, R⁴ is selected from hydrogen; (C₁-C₂)alkyl group selected from methyl or ethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted(C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl); acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C₃-C₆)-cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl

or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as pyrazolyl, benzimidazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a six membered aromatic ring with one or two N heteroatoms such as pyridyl or pyridazinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methyl-ethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; and when R³ = R⁴(CH₂)_nCO- and n = 2-4,

R^4 is selected from amino; hydroxyamino; straight or
 branched mono(C_1-C_6)alkylamino group selected from
 methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
 n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
 1-methyl-1-ethylpropylamino and where appropriate their
 diastereomers and enantiomers; (C_3-C_8)cycloalkylamino
 group selected from cyclopropyl, trans-1,2-dimethyl-
 cyclopropyl, cis-1,2-dimethylcyclopropyl,
 trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclo-
 propyl, cyclobutyl, trans-2,3-dimethylcyclobutyl,
 cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl,
 cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
 bicyclo[2.2.2]oct-2-ylamino and where appropriate their
 diastereomers and enantiomers; straight or branched
 chain di-(C_1-C_6)alkylamino group selected from
 dimethylamino, diethylamino, methyl(ethyl)amino,
 ethyl(1-methylethyl)amino or a combination of methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
 butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
 butyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino
 and where appropriate their diastereomers and
 enantiomers; (C_1-C_6)alkoxyamino group selected from
 methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxy-
 amino; (C_3-C_8)cycloalkoxyamino group selected from
 cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-
 dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy,
 cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-
 dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
 cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
 bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-

yl oxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀) aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈) azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₇-C₁₀) arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈) cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-di-
methylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclo-
butyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethyl-
cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl,
cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]-
oct-2-ylamino and where appropriate their diastereomers
and enantiomers; straight or branched chain
di-(C₁-C₆)alkylamino group selected from dimethyl-
amino, diethylamino, methyl(ethyl)amino, ethyl(1-
methylethyl)amino or a combination of methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methyl-
butyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino
and where appropriate their diastereomers and
enantiomers; (C₁-C₆)alkoxyamino group selected from
methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxy-
amino; (C₃-C₈)cycloalkoxyamino group selected from
cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-
dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy,
cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-
dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-
yloxyamino and where appropriate their diastereomers
and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)-
azacycloalkyl group selected from aziridinyl,
azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-

hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
5 diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl, 4-
methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-
alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-
oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methyl-
10 pyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or
2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
15 (1-naphthyl)methyl or phenylpropylamino; straight or
branched (C₁-C₂)alkyl group selected from methyl or
ethyl; (C₆-C₁₀)aryl group selected from phenyl,
α-naphthyl or β-naphthyl;
and when R³ = R^{4'} (CH₂)_nSO₂- and n= 1-4,
20 R^{4'} is selected from hydrogen; straight or branched
(C₁-C₂)alkyl group selected from methyl or ethyl;
R⁵ is selected from hydrogen; straight or branched
(C₁-C₃)alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected
25 from phenyl, α-naphthyl or β-naphthyl; (C₇-C₉)aralkyl
group such as benzyl; or -(CH₂)_nCOOR⁷ where n=0-4 and
R⁷ is selected from hydrogen; straight or branched
(C₁-C₃)alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl; or (C₆-C₁₀)aryl group
30 selected from phenyl, α-naphthyl, β-naphthyl;
R⁶ is selected from hydrogen; straight or branched
(C₁-C₃)alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected
from phenyl, α-naphthyl or β-naphthyl; (C₇-C₉)aralkyl
35 group such as benzyl; or -(CH₂)_nCOOR⁷ where n=0-4 and
R⁷ is selected from hydrogen; straight or branched
(C₁-C₃)alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl; or (C₆-C₁₀)aryl group

selected from phenyl, α -naphthyl, β -naphthyl; with the proviso that R^5 and R^6 cannot both be hydrogen; or R^5 and R^6 taken together are $-(CH_2)_2W(CH_2)_2-$, wherein W is selected from $(CH_2)_n$ and $n=0-1$, $-NH$, $-N(C_1-C_3)$ alkyl [straight or branched], $-N(C_1-C_4)$ alkoxy, oxygen, sulfur or substituted congeners selected from (L or D)proline, ethyl(L or D)prolinate, morpholine, pyrrolidine or piperidine; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Compounds of special interest are compounds according to the above formula I and II in which X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, or fluorine;

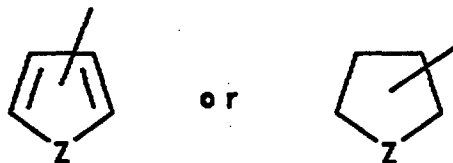
R and R^1 are the same or different and are selected from hydrogen; amino; halogen (selected from chlorine, bromine, fluorine or iodine); or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl; $R^3 =$ methyl or ethyl,

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen, R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

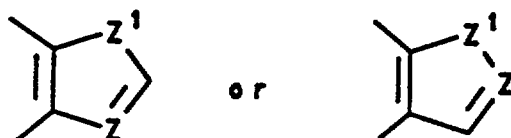
and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, or S heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O or S

such as furanyl or thienyl, or a five membered aromatic ring with two N, O or S heteroatoms optionally having a benzo or pyrido ring fused thereto:



10 $Z \text{ or } Z' = N, O, \text{ or } S$

such as pyrazolyl, benzimidazolyl or thiazolyl;
 (C_1-C_4) alkoxy group such as allyloxy, methoxy, ethoxy,
n-propoxy, n-butoxy or tert-butoxy; C_6 -aryloxy group
15 selected from phenoxy or substituted phenoxy
(substitution selected from halo, (C_1-C_4) alkyl);
 (C_7-C_{10}) aralkyloxy group such as benzyloxy, 1-phenyl-
ethyloxy or 2-phenylethyloxy; α -aminomethoxycarbonyl;
or halomethoxycarbonyl;

20 and when $R^3 = R^4(CH_2)_nCO-$ and $n=1-4$,

R^4 is selected from hydrogen; (C_1-C_2) alkyl group
selected from methyl or ethyl; (C_6-C_{10}) aryl group
selected from phenyl, α -naphthyl or β -naphthyl;

and when $R^3 = R^{4'}(CH_2)_nSO_2-$ and $n = 0$,

25 $R^{4'}$ is selected from straight or branched (C_1-C_2) alkyl
group selected from methyl or ethyl; (C_6-C_{10}) aryl
group selected from phenyl, α -naphthyl or β -naphthyl;
 R^5 is selected from hydrogen; straight or branched
 (C_1-C_3) alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl;

30 R^6 is selected from hydrogen; straight or branched
 (C_1-C_3) alkyl group selected from methyl, ethyl,
n-propyl or 1-methylethyl; with the proviso that R^5 and
 R^6 cannot both be hydrogen;

35 or R^5 and R^6 taken together are $-(CH_2)_2W(CH_2)_2-$,
wherein W is selected from $(CH_2)_n$ and $n=0-1$, $-NH$,
 $-N(C_1-C_3)$ alkyl [straight or branched], $-N(C_1-C_4)$ alkoxy,
oxygen, sulfur or substituted congeners selected from
(L or D)proline, ethyl(L or D)prolinate, morpholine,

pyrrolidine or piperidine;and the pharmacologically acceptable organic and inorganic salts or metal complexes.

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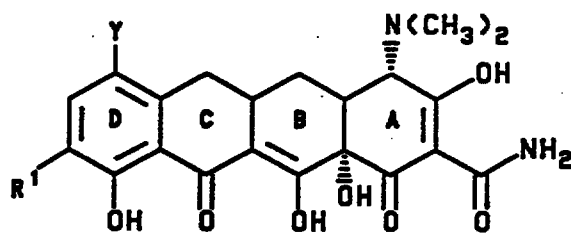
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Also included in the present invention are
compounds useful as intermediates for producing the
above compounds of formula I and II. Such intermediate
compounds include those having the formula III and IV:

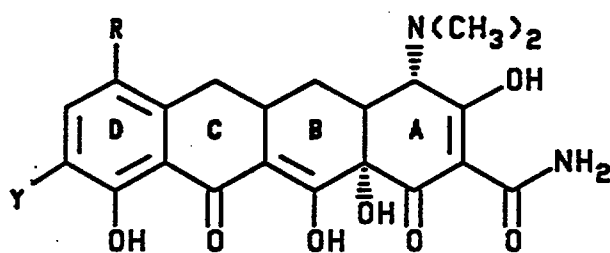
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III

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25

IV

30

35

wherein:

Y is selected from $-N_2^+Cl^-$ or $-N_3$;

R or R^1 is selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;

and when $R^2 =$ methyl or ethyl,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ n-propyl,

$R^3 =$ n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ 1-methylethyl,

$R^3 =$ n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ n-butyl,

$R^3 =$ n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ 1-methylpropyl,

$R^3 =$ 2-methylpropyl;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-

dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethyl-

propyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,

1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,

3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-

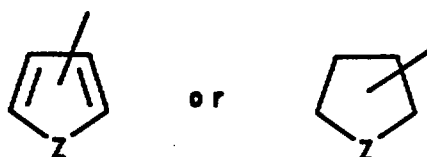
dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,

cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-

dimethylcyclobutyl, cyclopentyl, cyclohexyl, cyclo-
heptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C₁-C₆)alkoxyamino
group selected from methoxy, ethoxy, propoxy, butoxy,
pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
selected from cyclopropoxy, trans-1,2-dimethyl-
cyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-
dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy,
cyclobutoxy, trans-2,3-dimethylcyclobutoxy,
cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-
yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
(C₂-C₈)azacycloalkyl group selected from aziridinyl,
azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or
2-azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocyclo-

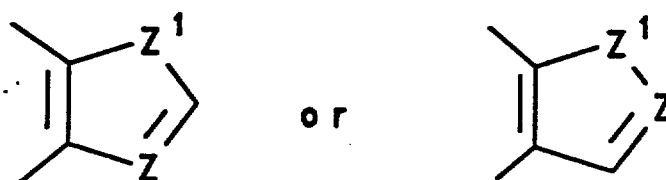
alkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo-(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; α-mercapto(C₁-C₃)alkyl group selected from mercaptomethyl, α-mercaptoethyl, α-mercapto-1-methylethyl or α-mercaptopropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group

selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



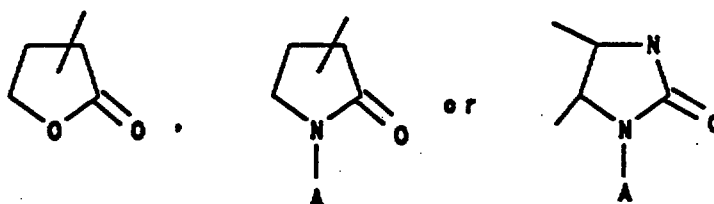
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent

20

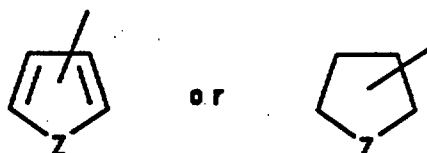
appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl such as cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl, (2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)carbonyl or (3-ethylcyclobutyl)carbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or

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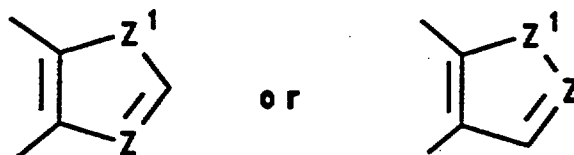
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3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as
4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or
(heterocycle)carbonyl, the heterocycle selected from a
five membered aromatic or saturated ring with one N, O,
S or Se heteroatom optionally having a benzo or pyrido
ring fused thereto:



Z = N, O, S or Se

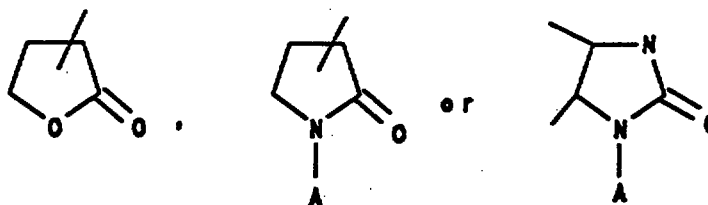
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxa-
zolyl, benzoxazolyl, indazolyl, thiazolyl, benzothia-
zolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridyl-
imidazolyl, or a five membered saturated ring with one
or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

20

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

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(C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched

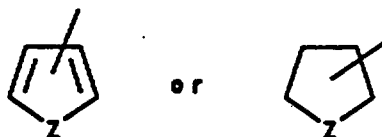
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propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl, β -naphthyl, substituted (C₆-C₁₀)aryl group

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(substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy), halo-(C₁-C₃)alkyl group such as bromomethyl, fluoro-

methyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

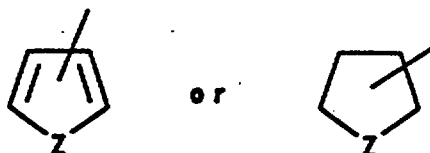


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; vinyloxy or substituted vinyloxy group (substitution selected from (C₁-C₄)alkyl, cyano, carboxy, or (C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl); R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n,

n=2-6, or $-(CH_2)_2W(CH_2)_2-$ wherein W is selected from
-N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is
selected from hydrogen or (C₁-C₃)alkyl], O or S;
5 and when R³ = R⁴(CH₂)_nCO- and n=1-4,
R⁴ is selected from hydrogen; straight or branched
(C₁-C₄)alkyl group selected from methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl
10 group selected from cyclopropyl, cyclobutyl, cyclo-
pentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl
group (substitution selected from (C₁-C₃)alkyl, cyano,
amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from
phenyl, α-naphthyl or β-naphthyl; substituted(C₆-C₁₀)-
15 aryl group (substitution selected from halo,
(C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino,
cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or
carboxy); (C₇-C₉)aralkyl group such as benzyl,
1-phenylethyl, 2-phenylethyl or phenylpropyl; acyloxy
20 or haloacyloxy group, selected from acetyl, propionyl,
chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkylcar-
bonyl, (C₆-C₁₀)aroyl selected from benzoyl or
naphthoyl, halo substituted (C₆-C₁₀)aroyl such as
pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or
25 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as
4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl,
(heterocycle)carbonyl, the heterocycle selected from a
five membered aromatic or saturated ring with one N, O,
S or Se heteroatom optionally having a benzo or pyrido
30 ring fused thereto:

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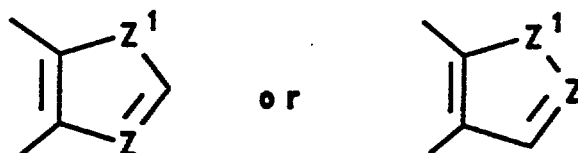


Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms optional-
ly having a benzo or pyrido ring fused thereto:

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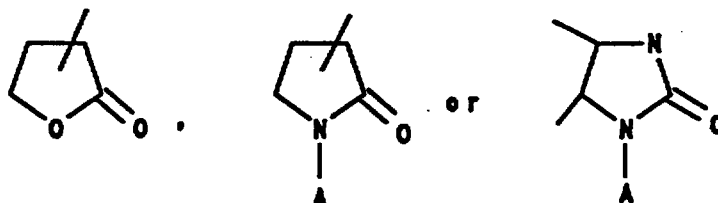
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Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazo-
lyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-
azolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:

30



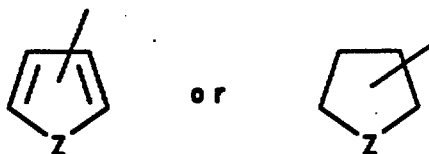
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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo-

(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxy-carbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₇-C₁₀)-aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₈)aralkylthio group such as benzylthio, 1-phenylethylthio or 2-phenylethylthio; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

5

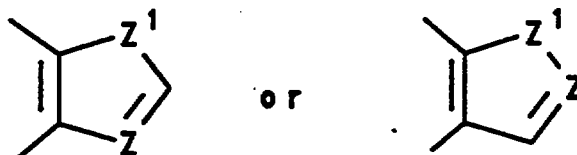


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms optionally
having a benzo or pyrido ring fused thereto:

15



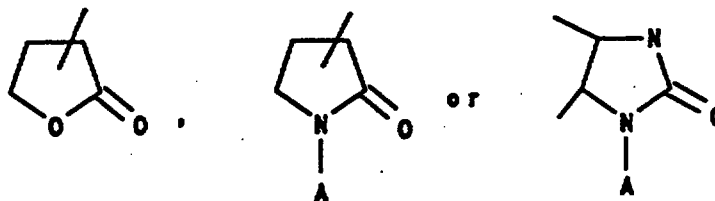
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Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolo-
lyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-
azolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:

25

30



35

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,

(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiомorpholinyl; hydroxy group; mercapto group; α -hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α -hydroxyethyl or α -hydroxy-1-methylethyl or α -hydroxypropyl; halo-(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl, 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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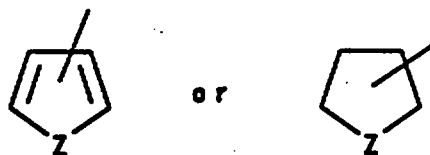
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5



Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms optional-
ly having a benzo or pyrido ring fused thereto:

15



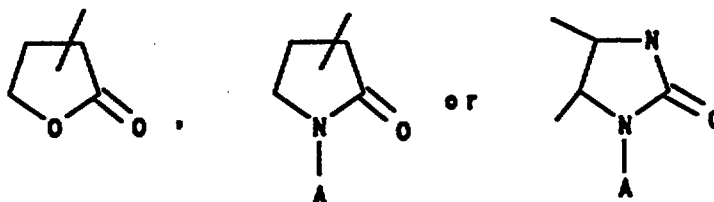
20

Z or Z' = N, O, S or Se

25

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazo-
lyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-
azolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:

30



35

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,
(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group

selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5 such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-
10 pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

15 (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight or branched butoxycarbonyl; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl
20 selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB
25 [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-
30 (CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S;

and when R³ = R⁴(CH₂)_nCO- and n = 2-4, R⁴ is selected from amino; hydroxyamino; straight or
35 branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-di-

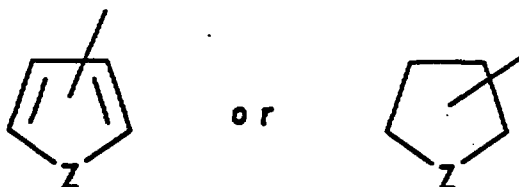
methylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl

group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_n SO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-
2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclo-
propyl, cyclobutyl, trans-2,3-dimethylcyclobutyl,
5 cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C₁-C₆)alkylamino group selected from
10 dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
15 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-
methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethyl-
propylamino and where appropriate their diastereomers
and enantiomers; (C₁-C₆)alkoxyamino group selected from
20 methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxy-
amino; (C₃-C₈)cycloalkoxyamino group selected from
cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-
dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy,
cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-
25 2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-
yloxyamino and where appropriate their diastereomers
and enantiomers; (C₇-C₁₀)aralkoxyamino group selected
30 from benzyloxy, 2-phenylethoxy, α-phenylethoxy,
(2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenyl-
propoxyamino; (C₂-C₈)azacycloalkyl group selected from
aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl,
piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethyl-
35 pyrrolidinyl, trans-3,4-dimethylpyrrolidinyl,
2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-
5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo-
[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and

where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)-aryl group (substitution selected from halo, (C₁-C₄)-alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloroethyl, 2,2-dichloroethyl, 2,2,2-trichloroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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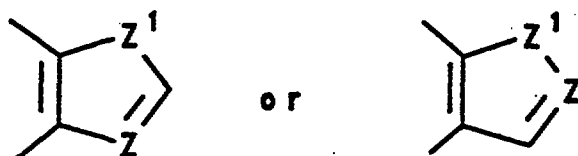


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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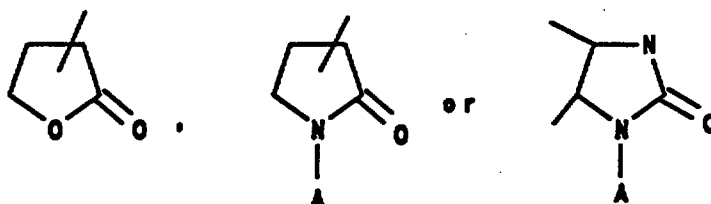
Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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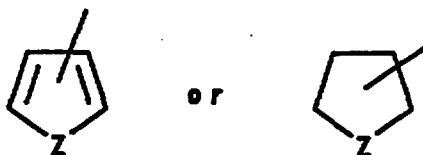


(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-morpholinyl or 2-dioxothiophoroliny; R^aR^bamino-(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or

2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W-$
 $(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)alkyl$
 [straight or branched], $-NH$, $-NOB$ [B is selected from
 5 hydrogen or $(C_1-C_3)alkyl$], O or S;
 and when $R^3 = R^{4'} (CH_2)_n SO_2-$ and $n=1-4$,
 $R^{4'}$ is selected from hydrogen; amino; straight or
 branched $(C_1-C_4)alkyl$ group selected from methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 10 propyl, 2-methylpropyl or 1,1-dimethylethyl; $(C_1-C_4)-$
 carboxyalkyl group; $(C_3-C_6)cycloalkyl$ group selected
 from cyclopropyl, cyclobutyl, cyclopentyl or cyclo-
 hexyl; substituted $(C_3-C_6)cycloalkyl$ group (sub-
 stitution selected from $(C_1-C_3)alkyl$, cyano, amino or
 15 $(C_1-C_3)acyl$); $(C_6-C_{10})aryl$ group selected from phenyl,
 α -naphthyl or β -naphthyl; substituted $(C_6-C_{10})aryl$
 group (substitution selected from halo, $(C_1-C_4)alkoxy$,
 trihalo $(C_1-C_3)alkyl$, nitro, amino, cyano, $(C_1-C_4)-$
 alkoxycarbonyl, $(C_1-C_3)alkylamino$ or carboxy);
 20 $(C_7-C_9)aralkyl$ group selected from benzyl, 1-phenyl-
 ethyl, 2-phenylethyl or phenylpropyl; $(C_1-C_4)alkoxy$
 group such as allyloxy, methoxy, ethoxy, n-propoxy or
 tert-butoxy; C_6 -aryloxy group selected from phenoxy or
 substituted phenoxy (substitution selected from halo,
 25 $(C_1-C_3)alkyl$, nitro, cyano, thiol, amino, carboxy,
 di- $(C_1-C_3)alkylamino$); $(C_7-C_{10})aralkyloxy$ group such
 as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;
 $R^a R^b amino(C_1-C_4)alkoxy$ group, wherein $R^a R^b$ is a
 straight or branched $(C_1-C_4)alkyl$ selected from methyl,
 30 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from
 $-N(C_1-C_3)alkyl$ [straight or branched], $-NH$, $-NOB$ [B is
 selected from hydrogen or $(C_1-C_3)alkyl$], O or S; or
 35 $R^a R^b aminoxy$ group, wherein $R^a R^b$ is a straight or
 branched $(C_1-C_4)alkyl$ selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or

$-(CH_2)_2W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; (C_1-C_3) alkylthio group selected from methylthio, ethylthio or n-propylthio; C_6 -arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C_1-C_3) alkyl, nitro, cyano, thiol, amino, carboxy, di- (C_1-C_3) alkylamino); (C_7-C_8) aralkylthio group such as benzylthio, 1-phenylethylthio or 2-phenylethylthio; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



$Z = N, O, S \text{ or } Se$

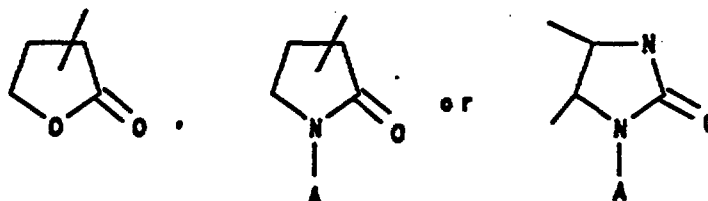
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



$Z \text{ or } Z^1 = N, O, S \text{ or } Se$

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-

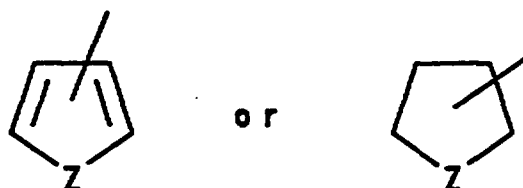
azolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophorolinyl; hydroxy group; mercapto group; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloroethyl, 2,2-dichloroethyl, 2,2,2-trichloroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl,

chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



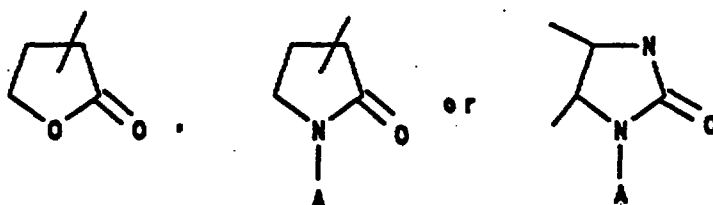
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



10 (A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group
15 selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

20 such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-
25 pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpho-
30 linyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight or branched butoxycarbonyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

35 Preferred compounds are compounds according to the above formula III and IV in which Y is selected from -N₂⁺Cl⁻ or -N₃;

R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl,

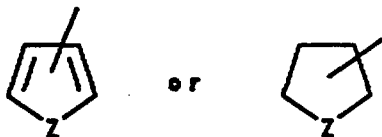
R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ is selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-; and when R³ = R⁴(CH₂)_nCO- and n=0,

R⁴ is selected from hydrogen; amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, thyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino

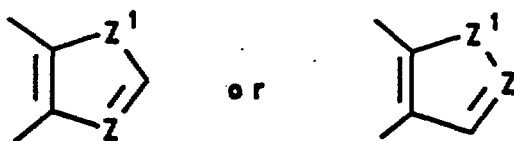
group selected from benzyl, 2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C_1 - C_3)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_3 - C_6)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C_3 - C_6)cycloalkyl group (substitution selected from (C_1 - C_3)alkyl, cyano, amino or (C_1 - C_3)acyl); (C_6 - C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6 - C_{10})aryl group (substitution selected from halo, (C_1 - C_4)alkoxy, trihalo(C_1 - C_3)-alkyl, nitro, amino, cyano, (C_1 - C_4)alkoxycarbonyl, (C_1 - C_3)alkylamino or carboxy); α -hydroxy(C_1 - C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo- (C_1 - C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z - N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

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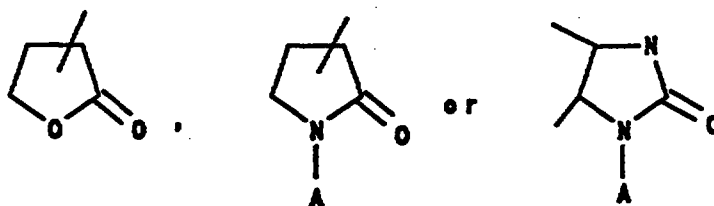


Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

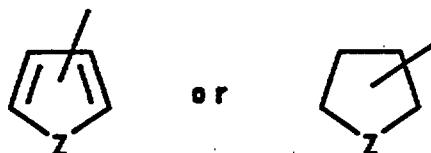
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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; acyl or

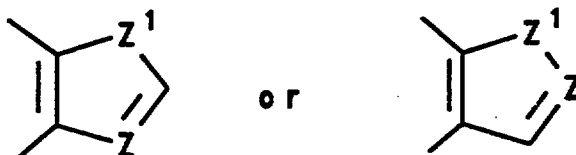
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haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl such as cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl, (2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)carbonyl or (3-ethylcyclobutyl)carbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-methyltoluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

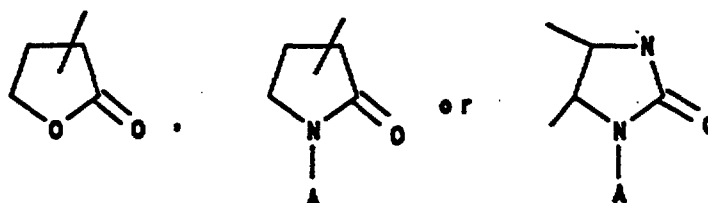
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl

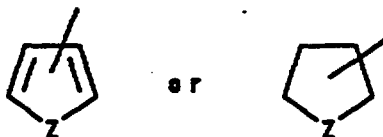
lyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl, β-naphthyl, substituted (C₆-C₁₀)aryl group (substitution selected from halo,

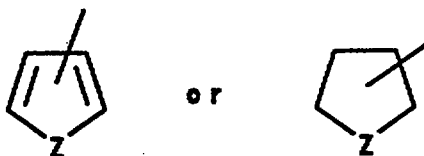
(C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy), halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z - N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di(C₁-C₃)alkyl-amino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; vinyloxy or substituted vinyloxy group (substitution selected from (C₁-C₄)alkyl, cyano, carboxy, or (C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl); R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or

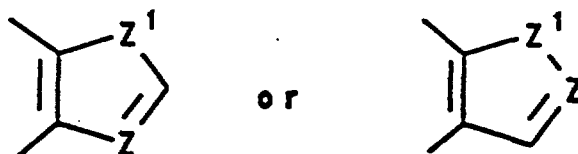
branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W-(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; and when $R^3 = R^4 (CH_2)_n CO-$ and $n=1-4$, R^4 is selected from hydrogen; (C_1-C_3) alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) aryl group (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) -alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy); acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C_3-C_6) cycloalkylcarbonyl, (C_6-C_{10}) -aroyl selected from benzoyl or naphthoyl, halo substituted (C_6-C_{10}) aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C_1-C_4) alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



$Z = N, O, S \text{ or } Se$

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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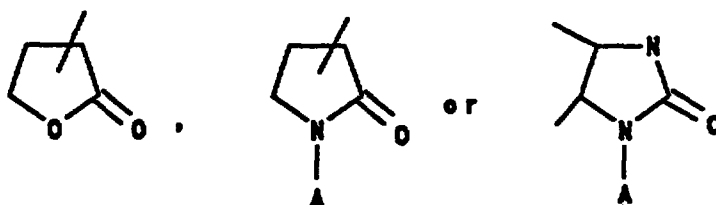


Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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25

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se

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heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-

2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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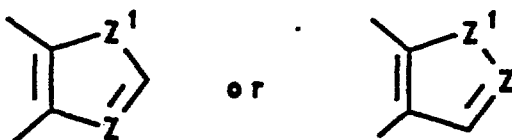


Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

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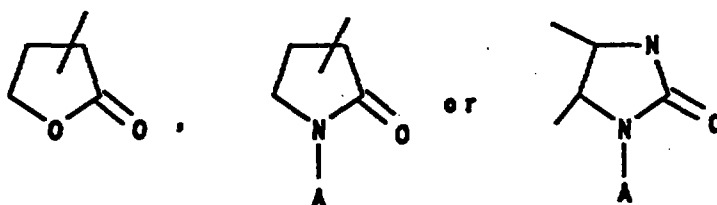


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Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

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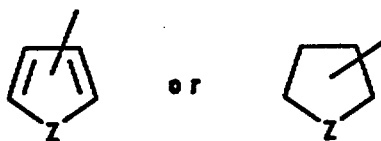
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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (sub-
stitution selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycar-
bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl

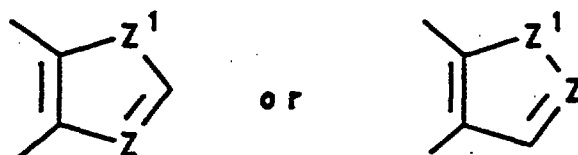
group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; hydroxy group; α -hydroxy(C_1 - C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo(C_1 - C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl, (C_6 - C_{10})aroyl selected from benzoyl or naphthoyl, halo substituted (C_6 - C_{10})aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C_1 - C_4)alkylbenzoyl such as 4-toluoyl, 2-toluoyl, or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



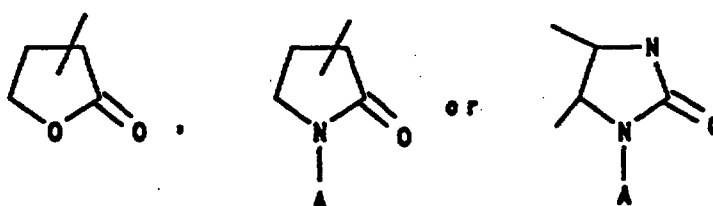
Z - N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrro-
lidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydro-
furanyl, furanyl, benzofuranyl, tetrahydrothienyl,
thienyl or benzothienyl, or a five membered aromatic
ring with two N, O, S or Se heteroatoms optionally
having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxa-
zolyl, benzoxazolyl, indazolyl, thiazolyl or benzo-
thiazolyl, or a five membered saturated ring with one
or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom:



(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (sub-
stitution selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycar-
bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl
group selected from benzyl, 1-phenylethyl, 2-phenyl-
ethyl or phenylpropyl)

such as γ-butyrolactam, γ-butyrolactone, imidazo-
lidinone or N-aminoimidazolidinone, or a six membered
aromatic ring with one to three N heteroatoms such as

pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl;

and when $R^3 = R^4 (CH_2)_n CO-$ and $n = 2-4$,

R^4 is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and

enantiomers; (C_1 - C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxy-amino; (C_3 - C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C_7 - C_{10})aralkoxy-amino group selected from benzyloxy, 2-phenylethoxy, α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C_2 - C_8)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]-oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C_1 - C_4)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C_6 - C_{10})arylamino group selected from phenylamino or naphthylamino; (C_7 - C_{10})arylalkylamino group selected from benzyl, 2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C_1 - C_4)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycar-

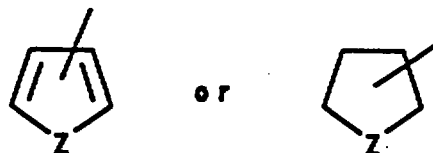
bonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino;

and when $R^3 = R^{4'} (CH_2)_n SO_2-$ and $n = 0$,

$R^{4'}$ is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1-C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3-C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-

dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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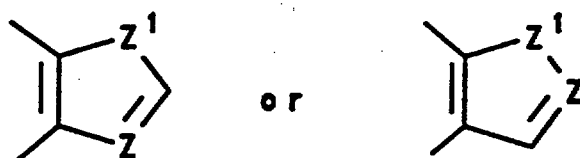


Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

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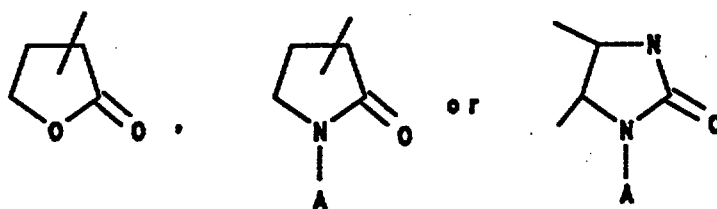


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Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxa-
zolyl, benzoxazolyl, indazolyl, thiazolyl or benzo-
thiazolyl, or a five membered saturated ring with one
or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom:

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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (sub-
stitution selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄) alkoxy-car-

bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

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and when R³ = R^{4'} (CH₂)_nSO₂- and n= 1-4, R^{4'} is selected from hydrogen; amino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy, iso-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino; (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; (C₁-C₄)carboxyalkyl group; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

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Particularly preferred compounds are compounds according to the above formula III and IV in which Y is selected from -N₂⁺Cl⁻ or -N₃;

R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl,

R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ is selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-;

and when R³ = R⁴(CH₂)_nCO- and n=0,

R⁴ is selected from hydrogen; amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,1-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1-C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3-C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C_7-C_{10})aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C_2-C_8)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C_1-C_4)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C_6-C_{10})arylamino group selected from phenylamino or naphthylamino; (C_7-C_{10})arylalkylamino

group selected from benzyl, 2-phenylethyl, α -phenyl-ethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C_1-C_3)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_3-C_6)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C_3-C_6)cycloalkyl group (substitution selected from (C_1-C_3)alkyl, cyano, amino or (C_1-C_3)-acyl); (C_6-C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)-alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy); α -hydroxy(C_1-C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo(C_1-C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

5

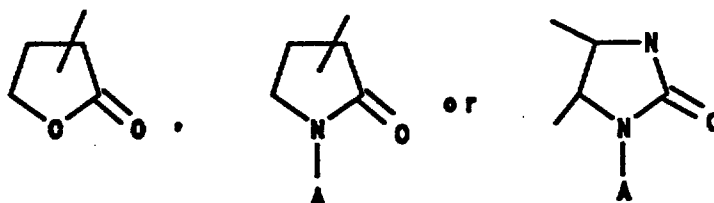


Z or Z' = N, O, S or Se

10

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxy-carbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

30

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2, 3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl,

35

4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl
or 2-dioxothiopholinyl; acyl or haloacyl group
selected from acetyl, propionyl, chloroacetyl,
trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl such as
cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentyl-
carbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclo-
propyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl,
(2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)-
carbonyl or (3-ethylcyclobutyl)carbonyl, (C₆-C₁₀)aroyl
selected from benzoyl or naphthoyl, halo substituted
(C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chloro-
benzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-methylbenzoyl
or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl,
the heterocycle selected from a five membered aromatic
or saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:



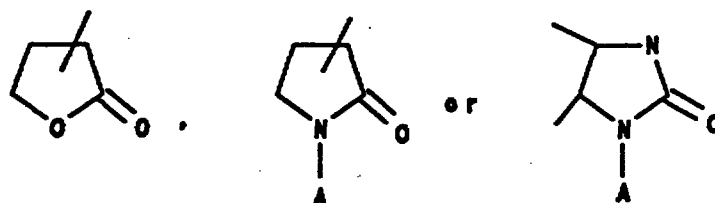
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuran-
yl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
or benzothienyl, or a five membered aromatic ring with
two N, O, S or Se heteroatoms optionally having a benzo
or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

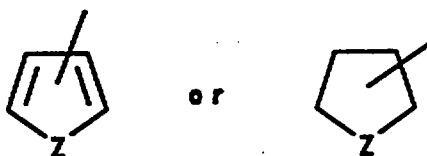
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl, β -naphthyl, substituted (C₆-C₁₀)aryl group

(substitution selected from halo, (C₁-C₄)alkoxy, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy), halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)-alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; and when R³ = R⁴(CH₂)_nCO- and n=1-4, R⁴ is selected from hydrogen; (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkylcarbo-

nyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or (heterocycle)-carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



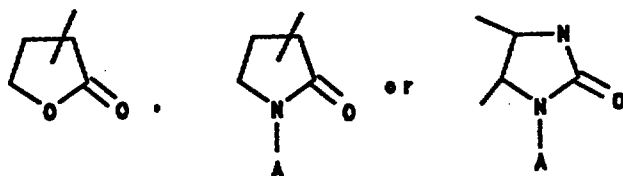
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

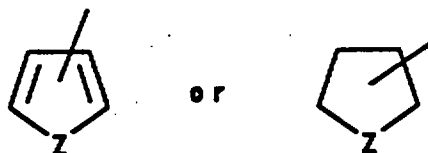
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

5

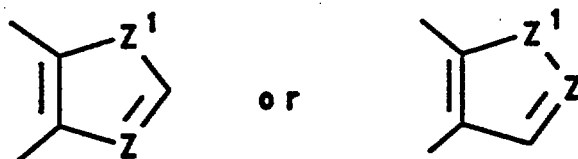


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15

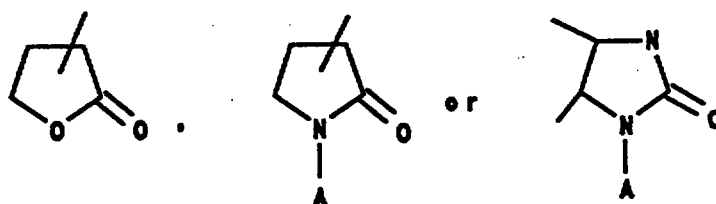


20

Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiaz-
olyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25



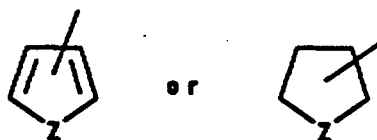
30

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (sub-
stitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-

aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5 such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se
10 heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl; hydroxy group; α -hydroxy(C_1 - C_3)alkyl
15 group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo- (C_1 - C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-
20 difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl, (C_6 - C_{10})aroyl selected from benzoyl or naphthoyl, halo substituted (C_6 - C_{10})aroyl
25 such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromophenylcarbonyl or 3,4-difluorobenzoyl, (C_1 - C_4)alkylbenzoyl such as from 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or
30 saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

5

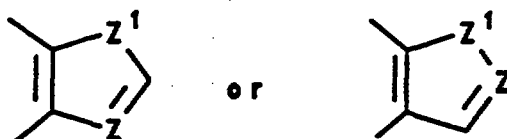


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15

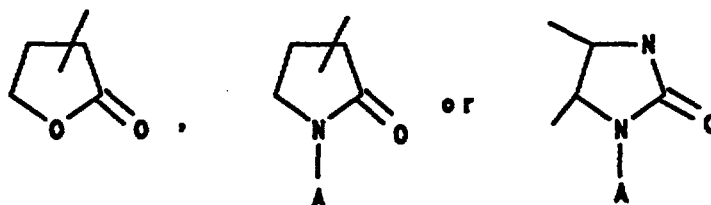


Z or Z' = N, O, S or Se

20

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25



30

35

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (sub-
stitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-
aralkyl group selected from benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

and when $R^3 = R^4(CH_2)_nCO-$ and $n = 2-4$,

R^4 is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-

methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or

phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino;

and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0,

R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

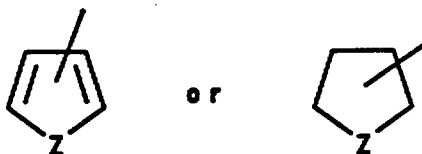
1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched

chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers

and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy,

cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxy-amino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-

alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl;

and when R³ = R^{4'}(CH₂)_nSO₂- and n = 1-4,

R^{4'} is selected from hydrogen; amino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Most particularly preferred compounds are compounds according to the above formula III and IV in which Y is selected from -N₂⁺Cl⁻ or -N₃; R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl,

R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R or R¹ = -NR²R³ and R² = hydrogen,

R³ selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C_1-C_6)alkylamino group

selected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-

ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-

pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-

pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3-C_8)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-

dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,

cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-

dimethylcyclobutyl, cyclopentyl, cyclohexyl,

cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or

bicyclo[2.2.2]-oct-2-ylamino and where appropriate

their diastereomers and enantiomers; straight or

branched chain di-(C_1-C_6)alkylamino group selected

from dimethylamino, diethylamino, methyl(ethyl)amino,

ethyl(1-methylethyl)amino or a combination of methyl,

ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-

propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,

2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-

butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-

methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethyl-

propylamino and where appropriate their diastereomers

and enantiomers; (C_1-C_6)alkoxyamino group selected

from methoxy, ethoxy, propoxy, butoxy, pentoxy or

hexoxyamino; (C_3-C_8)cycloalkoxyamino group selected

from cyclopropoxy, trans-1,2-dimethylcyclopropoxy,

cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclo-

propoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy,

trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclo-

butoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers;

(C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino;

(C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl

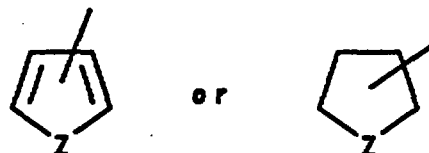
group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers;

(C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropyl-amino; straight or branched (C₁-C₂)alkyl group selected from methyl or ethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted

(C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, nitro, amino); α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered

aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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10

Z = N, O, S or Se

such as indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl or thienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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20

Z or Z¹ = N, O, S or Se

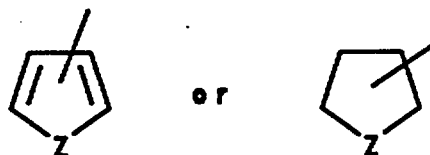
such as imidazolyl, pyrazolyl, benzimidazolyl, indazolyl, thiazolyl or benzothiazolyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl, β-naphthyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; and when R³ = R⁴(CH₂)_nCO- and n=1-4,

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R^4 is selected from hydrogen; (C_1-C_2) alkyl group selected from methyl or ethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) aryl group (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl); acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C_3-C_6) cycloalkyl-carbonyl, (C_6-C_{10}) aroyl selected from benzoyl or naphthoyl, halo substituted (C_6-C_{10}) aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C_1-C_4) alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



$Z = N, O, S \text{ or } Se$

such as tetrahydrofuranlyl, furanyl, benzofuranlyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



$Z \text{ or } Z' = N, O, S \text{ or } Se$

such as pyrazolyl, benzimidazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a six membered

aromatic ring with one or two N heteroatoms such as pyridyl or pyridazinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; and when R³ = R⁴(CH₂)_nCO- and n = 2-4, R⁴ is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-

methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)-alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino,

methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino;

and when $R^3 = R^{4'}(CH_2)_nSO_2^-$ and $n = 0$,

$R^{4'}$ is selected from amino; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl;

and when $R^3 = R^{4'}(CH_2)_nSO_2^-$ and $n = 1-4$,

$R^{4'}$ is selected from hydrogen; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Compounds of special interest are compounds according to the above formula III and IV in which Y is $-N_2^+Cl^-$ or $-N_3$;

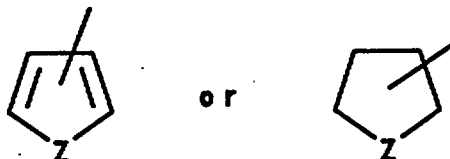
R or R^1 are selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl; $R^3 =$ methyl or ethyl,

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen, R^3 is selected from $R^4(CH_2)_nCO^-$ or $R^{4'}(CH_2)_nSO_2^-$;

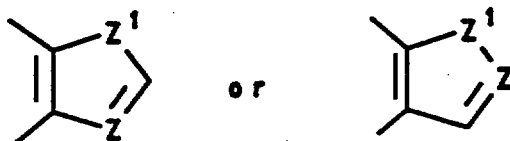
and when $R^3 = R^4(CH_2)_nCO^-$ and $n=0$,

R^4 is selected from hydrogen; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, or S heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O or S

such as furanyl or thienyl, or a five membered aromatic ring with two N, O or S heteroatoms optionally having a benzo or pyrido ring fused thereto:



10 $Z \text{ or } Z' = N, O, \text{ or } S$

such as pyrazolyl, benzimidazolyl or thiazolyl;

(C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;

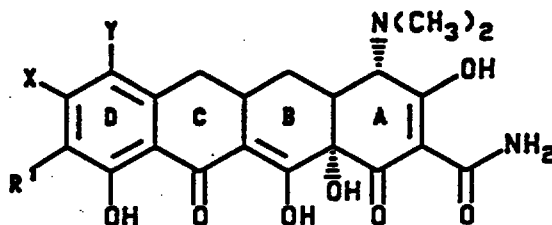
and when R³ = R⁴(CH₂)_nCO- and n=1-4,

R⁴ is selected from hydrogen; (C₁-C₂)alkyl group selected from methyl or ethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl;

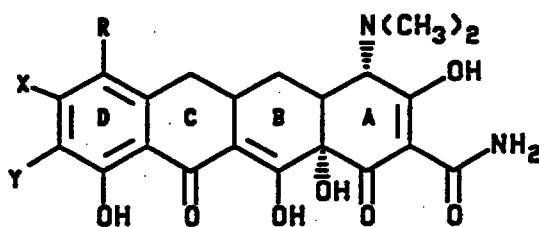
and when R³ = R^{4'}(CH₂)_nSO₂- and n = 0,

R^{4'} is selected from straight or branched (C₁-C₂)alkyl group selected from methyl or ethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Additional intermediate compounds include those having the formula V and VI:



V



VI

wherein:

Y is selected from $-N_2^+Cl^-$ or N_3 ;

X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine;

R or R^1 is selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;

and when $R^2 =$ methyl or ethyl,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ n-propyl,

$R^3 =$ n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ 1-methylethyl,

$R^3 =$ n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 = n\text{-butyl}$,

$R^3 = n\text{-butyl}$, 1-methylpropyl or 2-methylpropyl;

and when $R^2 = 1\text{-methylpropyl}$,

5 $R^3 = 2\text{-methylpropyl}$;

and when R or $R^1 = -NR^2R^3$ and $R^2 = \text{hydrogen}$,

R^3 is selected from $R^4(\text{CH}_2)_n\text{CO-}$ or $R^{4'}(\text{CH}_2)_n\text{SO}_2\text{-}$;

and when $R^3 = R^4(\text{CH}_2)_n\text{CO-}$ and $n=0$,

10 R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono($\text{C}_1\text{-C}_6$)alkylamino group

selected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-

ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

15 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-

pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,

3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or

1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; ($\text{C}_3\text{-C}_8$)cycloalkylamino

group selected from cyclopropyl, trans-1,2-dimethyl-

20 cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,

3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,

cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-

dimethylcyclobutyl, cyclopentyl, cyclohexyl,

cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or

25 bicyclo[2.2.2]oct-2-ylamino and where appropriate their

diastereomers and enantiomers; straight or branched

chain di-($\text{C}_1\text{-C}_6$)alkylamino group selected from

dimethylamino, diethylamino, methyl(ethyl)amino,

ethyl(1-methylethyl)amino or a combination of methyl,

30 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-

propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,

2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-

butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-

35 dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-

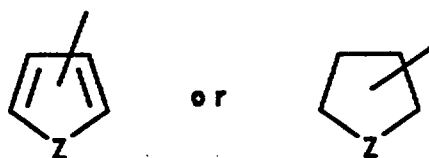
ethylpropylamino and where appropriate their

diastereomers and enantiomers; ($\text{C}_1\text{-C}_6$)alkoxyamino

group selected from methoxy, ethoxy, propoxy, butoxy,

5 pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group
selected from cyclopropoxy, trans-1,2-dimethylcyclo-
propoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-
10 dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy,
cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-
dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,
cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-
yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where
15 appropriate their diastereomers and enantiomers;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)-
20 azacycloalkyl group selected from aziridinyl, aze-
tidinyl, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
25 [2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-
azabicyclo[2.2.2]oct-2-yl and where appropriate their
diastereomers and enantiomers; azaheterocycloalkyl
group selected from morpholinyl, piperazinyl, 4-methyl-
piperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxy-
30 piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl,
isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-
methylbicyclo[2.2.1]hept-2-yl and where appropriate
their diastereomers and enantiomers; (C₆-C₁₀)arylamino
35 group selected from phenylamino or naphthylamino;
(C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl,
(1-naphthyl)methyl or phenylpropylamino; straight or
branched (C₁-C₄)alkyl group selected from methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
(C₃-C₆)cycloalkyl group selected from cyclopropyl,
cyclobutyl, cyclopentyl or cyclohexyl; substituted
(C₃-C₆)cycloalkyl group (substitution selected from

(C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl);
(C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or
β-naphthyl; substituted (C₆-C₁₀)aryl group
5 (substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);
(C₇-C₉)aralkyl group selected from benzyl, 1-phenyl-
ethyl, 2-phenylethyl or phenylpropyl; α-hydroxy-
10 (C₁-C₃)alkyl group selected from hydroxymethyl,
α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxy-
propyl; α-mercapto(C₁-C₃)alkyl group selected from
mercaptomethyl, α-mercaptoethyl, α-mercapto-1-methyl-
ethyl or α-mercaptopropyl; halo(C₁-C₃)alkyl group such
15 as bromomethyl, fluoromethyl, difluoromethyl,
trifluoromethyl, chloromethyl, dichloromethyl,
trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl,
2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a
heterocycle group selected from a five membered aro-
20 matic or saturated ring with one N, O, S or Se
heteroatom optionally having a benzo or pyrido ring
fused thereto:



Z = N, O, S or Se

30 such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
35 matic ring with two N, O, S or Se heteroatoms optional-
ly having a benzo or pyrido ring fused thereto:

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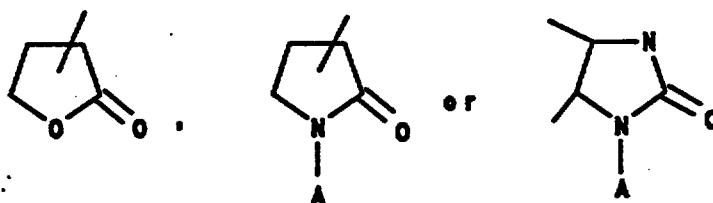


Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-

2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-morpholinyl or 2-dioxothiophomorpholinyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl such as cyclopropylcarbonyl, cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethylcyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)carbonyl, (2-ethylcyclopropyl)carbonyl, (2-methylcyclopentyl)carbonyl or (3-ethylcyclobutyl)carbonyl, (C₆-C₁₀)-aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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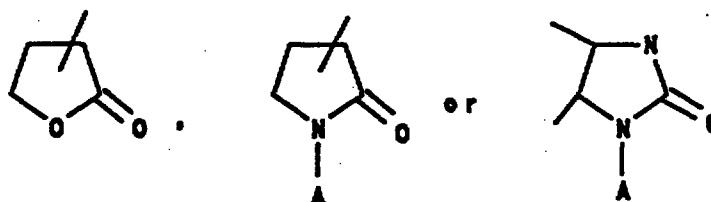


Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-pipera-

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zinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-
morpholinyl or 2-dioxothiopholinyl; (C₁-C₄)alkoxy-
carbonyl group selected from methoxycarbonyl, ethoxy-
carbonyl, straight or branched propoxycarbonyl,
straight or branched butoxycarbonyl or allyloxycar-
bonyl; vinyl or substituted vinyl group [substitution
selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl
group selected from phenyl, α-naphthyl, β-naphthyl,
substituted (C₆-C₁₀)aryl group (substitution selected
from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro,
amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino
or carboxy), halo(C₁-C₃)alkyl group such as
bromomethyl, fluoromethyl, difluoromethyl, trifluoro-
methyl, chloromethyl, dichloromethyl, trichloromethyl,
2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl,
2-bromoethyl or 2-iodoethyl, a heterocycle group
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
diny, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl]; (C₁-C₄)alkoxy group such
as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or
tert-butoxy; C₆-aryloxy group selected from phenoxy or
substituted phenoxy (substitution selected from halo,
(C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy,
di-(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group such
as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;
vinyloxy or substituted vinyloxy group (substitution
selected from (C₁-C₄)alkyl, cyano, carboxy, or

(C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl); R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; and when R³ = R⁴(CH₂)_nCO- and n=1-4, R⁴ is selected from hydrogen; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted(C₆-C₁₀)-aryl group (substitution selected from halo, (C₁-C₄)-alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; acyloxy or haloacyloxy group, selected from acetyl, propionyl, chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or

4-(1-methylethyl)benzoyl, (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

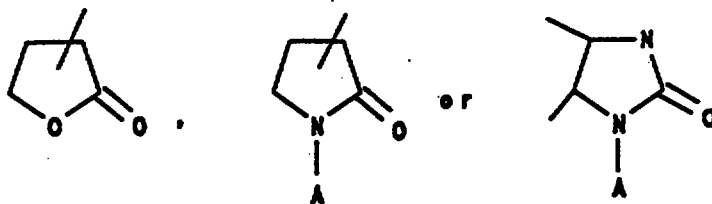
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms optional-
ly having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazo-
lyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-
azolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

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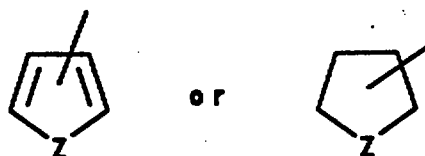
(C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; (C₁-C₃)alkylthio group

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selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino,

carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)-alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₈)aralkylthio group such as benzylthio, 1-phenylethylthio or 2-phenylethylthio; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

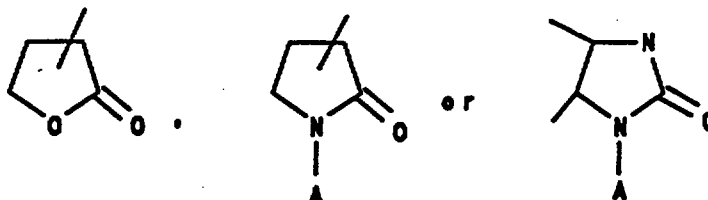
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-

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pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; hydroxy group; mercapto group;

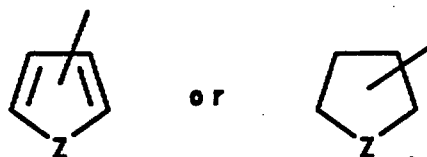
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α -hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α -hydroxyethyl or α -hydroxy-1-methylethyl or α -hydroxypropyl; halo(C₁-C₃)alkyl group such as

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bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted

(C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chloro-
benzoyl, 3-bromobenzoyl, 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or
4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the
heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:



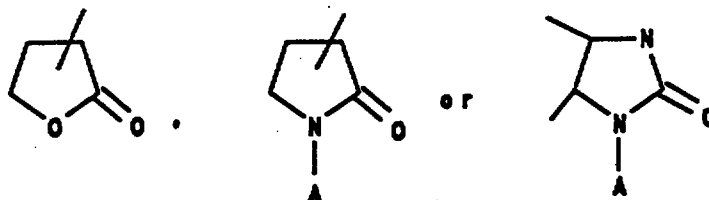
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
benzothienyl or selenazolyl, or a five membered aro-
matic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazo-
lyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimid-
azolyl, or a five membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom:



10 (A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenyl-
15 ethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as
20 pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-
25 piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothio-morpholinyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched
30 propoxycarbonyl, allyloxycarbonyl or straight or branched butoxycarbonyl; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is
35 (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or

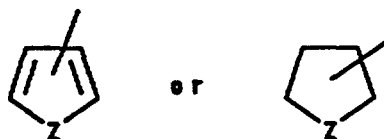
branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
5 $-(CH_2)_2 W-(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; and when $R^3 = R^4 (CH_2)_n CO-$ and $n = 2-4$, R^4 is selected from amino; hydroxyamino; straight or
10 branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,
15 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
20 bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl,
25 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino
30 and where appropriate their diastereomers and enantiomers; (C_1-C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or

hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)aryl amino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)-alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino;

and when R³ = R⁴' (CH₂)_n SO₂- and n = 0,

$R^{4'}$ is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1-C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3-C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-

yloxyamino and where appropriate their diastereomers
 and enantiomers; (C₇-C₁₀)aralkoxyamino group selected
 from benzyloxy, 2-phenylethoxy, α-phenylethoxy,
 (2-naphthyl)methoxy, (1-naphthyl)methoxy, or
 phenylpropoxyamino; straight or branched (C₁-C₄)alkyl
 group selected from methyl, ethyl, n-propyl, 1-methyl-
 ethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or
 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected
 from cyclopropyl, cyclobutyl, cyclopentyl or cyclo-
 hexyl; substituted (C₃-C₆)cycloalkyl group (substitu-
 tion selected from (C₁-C₃)alkyl, cyano, amino or
 (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl,
 α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl
 group (substitution selected from halo, (C₁-C₄)alkoxy,
 trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
 alkoxy carbonyl, (C₁-C₃)alkylamino or carboxy);
 (C₇-C₉)aralkyl group such as benzyl, 1-phenylethyl,
 2-phenylethyl or phenylpropyl; halo(C₁-C₃)alkyl group
 such as bromomethyl, fluoromethyl, difluoromethyl,
 trifluoromethyl, chloromethyl, dichloromethyl, tri-
 chloromethyl, 2-fluoroethyl, 2,2-difluoroethyl,
 2,2,2-trifluoroethyl, 2-chloroethyl, 2,2-dichloroethyl,
 2,2,2-trichloroethyl, 2-bromoethyl or 2-iodoethyl; a
 heterocycle group selected from a five membered
 aromatic or saturated ring with one N, O, S or Se
 heteroatom optionally having a benzo or pyrido ring
 fused thereto:

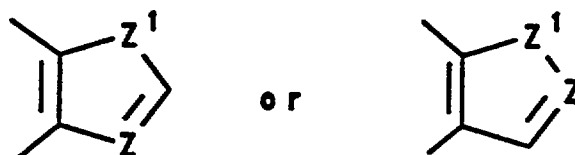


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 dinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
 furanyl, benzofuranyl, tetrahydrothienyl, thienyl,
 benzothienyl or selenazolyl, or a five membered

aromatic ring with two N, O, S or Se heteroatoms
optionally having a benzo or pyrido ring fused thereto:

5



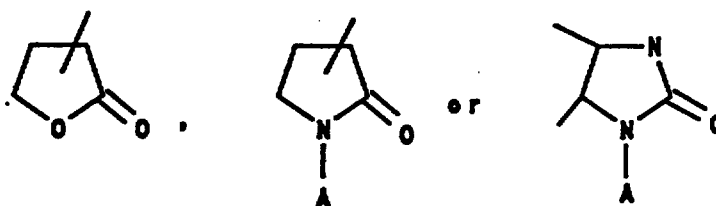
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Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15

20



25

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

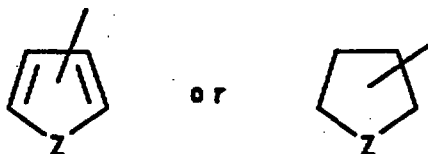
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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one

or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiopholinyl; $R^a R^b$ amino(C_1-C_4)alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3)alkyl], O or S; or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3)alkyl], O or S; and when $R^3 = R^{4'} (CH_2)_n SO_2-$ and $n=1-4$, $R^{4'}$ is selected from hydrogen; amino; straight or branched (C_1-C_4)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C_1-C_4)-carboxyalkyl group; (C_3-C_6)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C_3-C_6)cycloalkyl group (substitution selected from (C_1-C_3)alkyl, cyano, amino or (C_1-C_3)acyl); (C_6-C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)-alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy); (C_7-C_9)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; (C_1-C_4)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy or tert-butoxy; C_6 -aryloxy group selected from phenoxy or

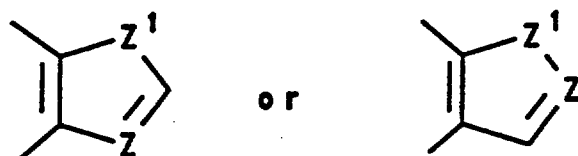
substituted phenoxy (substitution selected from halo,
 (C_1-C_3) alkyl, nitro, cyano, thiol, amino, carboxy,
 di- (C_1-C_3) alkylamino); (C_7-C_{10}) aralkyloxy group such
 as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy;
 $R^a R^b$ amino (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a
 straight or branched (C_1-C_4) alkyl selected from methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$
 alkyl [straight or branched], $-NH$, $-NOB$ [B is selected
 from hydrogen or (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy
 group, wherein $R^a R^b$ is a straight or branched
 (C_1-C_4) alkyl selected from methyl, ethyl, n-propyl,
 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methyl-
 propyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$
 wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or
 branched], $-NH$, $-NOB$ [B is selected from hydrogen or
 (C_1-C_3) alkyl], O or S; (C_1-C_3) alkylthio group selected
 from methylthio, ethylthio or n-propylthio; C_6 -aryl-
 thio group selected from phenylthio or substituted
 phenylthio (substitution selected from halo,
 (C_1-C_3) alkyl, nitro, cyano, thiol, amino, carboxy,
 di- (C_1-C_3) alkylamino); (C_7-C_8) aralkylthio group such as
 benzylthio, 1-phenylethylthio or 2-phenylethylthio;
 a heterocycle group selected from a five membered aro-
 matic or saturated ring with one N, O, S or Se hetero-
 atom optionally having a benzo or pyrido ring fused
 thereto:



Z = N, O, S or Se

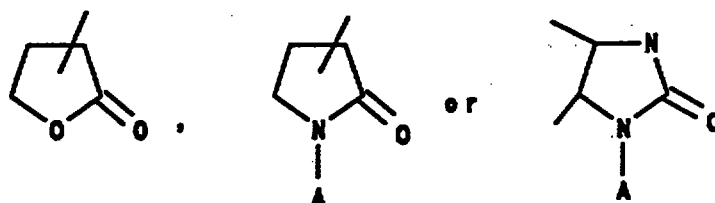
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-

dinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

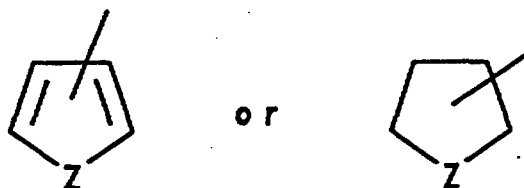
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as

pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; hydroxy group; mercapto group; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloroethyl, 2,2-dichloroethyl, 2,2,2-trichloroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

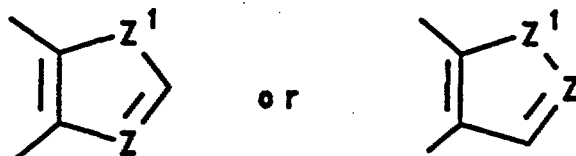


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, benzothienyl or selenazolyl, or a five membered

aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

5



or

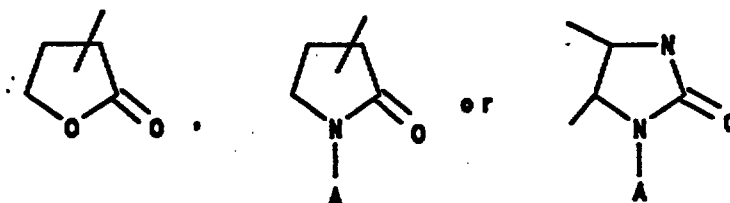
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Z or Z' - N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl, benzothiazolyl, 3-alkyl-3H-imidazo[4,5-b]pyridyl or pyridylimidazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthio-pyridazinyl, or a six membered saturated ring with one

or two N, O, S or Se heteroatoms and an adjacent
appended O heteroatom such as 2,3-dioxo-1-pipera-
ziny1, 4-ethyl-2,3-dioxo-1-piperaziny1, 4-methyl-2,3-
5 dioxo-1-piperaziny1, 4-cyclopropyl-2-dioxo-1-pipera-
ziny1, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;
(C₁-C₄)alkoxycarbonyl group selected from methoxycar-
bonyl, ethoxycarbonyl, straight or branched propoxy-
carbonyl, allyloxycarbonyl or straight or branched
10 butoxycarbonyl; and the pharmacologically acceptable
organic and inorganic salts or metal complexes.

Preferred compounds are compounds according
to the above formula V and VI in which X is selected
from halogen or trifluoromethanesulfonyloxy; the
15 halogen is selected from bromine, chlorine, fluorine or
iodine;

Y is selected from -N₂⁺Cl⁻ or N₃;

R or R¹ are selected from nitro; amino; halogen
(selected from chlorine, bromine, fluorine or iodine);
20 cyano; hydroxy or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen,
R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
and when R² = methyl or ethyl,

25 R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl or 2-methylpropyl;

and when R or R¹ = -NR²R³ and R² = hydrogen,

R³ is selected from R⁴(CH₂)_nCO- or R^{4'}(CH₂)_nSO₂-;

and when R³ = R⁴(CH₂)_nCO- and n=0,

30 R⁴ is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C₁-C₆)alkylamino group
selected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
ethyl, n-pentyl, 2-methyl-butyl, 1,1-dimethylpropyl,
35 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-
pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3 - C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1 - C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1 - C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3 - C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C_7 - C_{10})aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C_2 - C_8)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo-

[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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Z = N, O, S or Se

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

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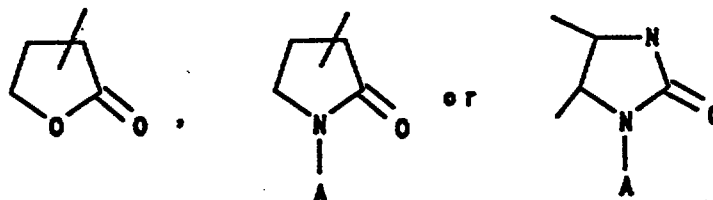


Z or Z¹ = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxy-
carbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-
aralkyl group selected from benzyl, 1-phenylethyl,
2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidi-
none or N-aminoimidazolidinone, or a six membered
aromatic ring with one to three N heteroatoms such as
pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl,
unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyri-
dazinyl, or a six membered saturated ring with one or
two N, O, S or Se heteroatoms and an adjacent appended
O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-
2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-pipera-
zinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-
morpholinyl or 2-dioxothiormorpholinyl; acyl or haloacyl
group selected from acetyl, propionyl, chloroacetyl,
trifluoroacetyl, (C₃-C₆)cycloalkylcar- bonyl such as
cyclopropylcarbonyl, cyclobutylcarbonyl,
cyclopentylcarbonyl, cyclohexylcarbonyl, (2,3-dimethyl-
cyclopropyl)carbonyl, (1,2-dimethylcyclopropyl)car-
bonyl, (2-ethylcyclopropyl)carbonyl, (2-methylcyclo-
pentyl)carbonyl or (3-ethylcyclobutyl)carbonyl,
(C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo
substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl,
4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
(C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-methyltoluoyl
or 4-(1-methylethyl)benzoyl, or (heterocycle)carbonyl,
the heterocycle selected from a five membered aromatic
or saturated ring with one N, O, S or Se heteroatom
optionally having a benzo or pyrido ring fused thereto:

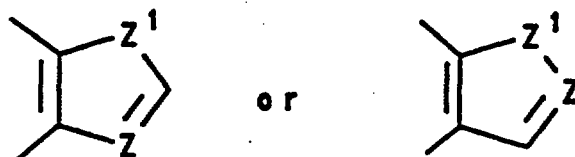


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two

N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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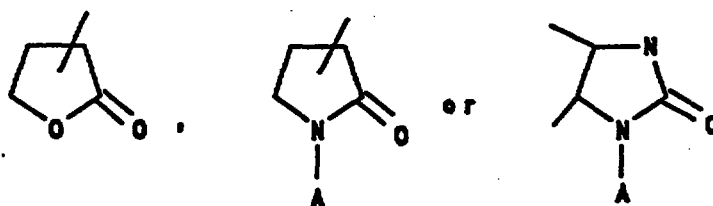


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Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxy-carbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or (C₁-C₃)alkylthiopyridazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-

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2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxo-morpholinyl or 2-dioxothiopholinyl; (C₁-C₄)alkoxy-carbonyl group selected from methoxycarbonyl, ethoxy-carbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl, β -naphthyl, substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkyl-amino or carboxy), halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

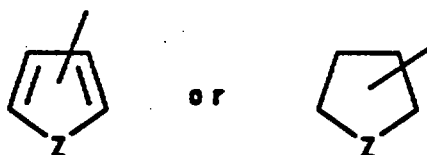


Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkyl-amino); (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; vinyloxy or

substituted vinyloxy group (substitution selected from
 (C_1-C_4) alkyl, cyano, carboxy, or (C_6-C_{10}) aryl selected
from phenyl, α -naphthyl or β -naphthyl); $R^a R^b$ amino-
 (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a straight or
branched (C_1-C_4) alkyl selected from methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$
alkyl [straight or branched], $-NH$, $-NOB$ [B is selected
from hydrogen or (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy
group, wherein $R^a R^b$ is a straight or branched $(C_1-C_4)-$
alkyl selected from methyl, ethyl, n-propyl, 1-methyl-
ethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or
 $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W-(CH_2)_2-$ wherein W is
selected from $-N(C_1-C_3)$ alkyl [straight or branched],
 $-NH$, $-NOB$ [B is selected from hydrogen or $(C_1-C_3)-$
alkyl], O or S;
and when $R^3 = R^4 (CH_2)_n CO-$ and $n=1-4$,
 R^4 is selected from hydrogen; (C_1-C_3) alkyl group
selected from methyl, ethyl, n-propyl or 1-methylethyl;
 (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or
 β -naphthyl; substituted (C_6-C_{10}) aryl group (substitu-
tion selected from halo, (C_1-C_4) alkoxy, trihalo $(C_1-C_3)-$
alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl,
 (C_1-C_3) alkylamino or carboxy); acyloxy or haloacyloxy
group, selected from acetyl, propionyl, chloroacetyl,
trichloroacetyl, (C_3-C_6) cycloalkylcarbonyl, $(C_6-C_{10})-$
aroyl selected from benzoyl or naphthoyl, halo
substituted (C_6-C_{10}) aroyl such as pentafluorobenzoyl,
4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluorobenzoyl,
 (C_1-C_4) alkylbenzoyl such as 4-toluoyl, 2-toluoyl,
4-(1-methylethyl)benzoyl or (heterocycle)carbonyl, the
heterocycle selected from a five membered aromatic or
saturated ring with one N, O, S or Se heteroatom op-
tionally having a benzo or pyrido ring fused thereto:

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$Z = N, O, S \text{ or } Se$

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such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

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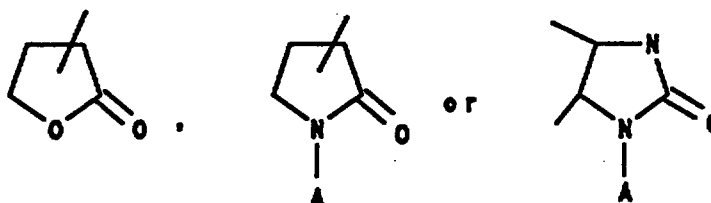


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$Z \text{ or } Z' = N, O, S \text{ or } Se$

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazol-
yl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

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(A is selected from hydrogen; straight or branched
(C_1-C_4)alkyl; C_6 -aryl; substituted C_6 -aryl (substitu-
tion selected from halo, (C_1-C_4)alkoxy, trihalo-
(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)alkoxycar-

bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophorlinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino,

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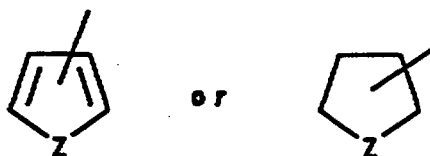
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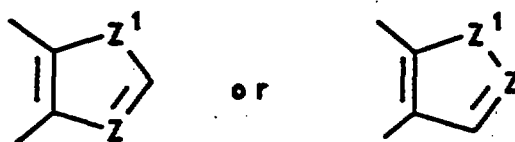
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carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

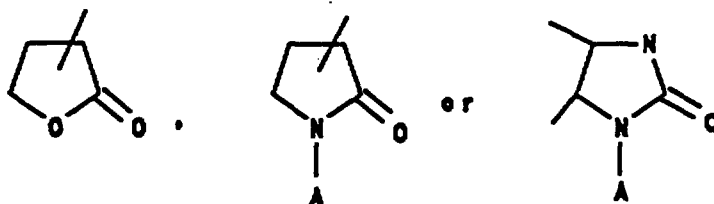
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
diny, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl; or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:



Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

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10

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; hydroxy group; α -hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo-(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl such as pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromo-

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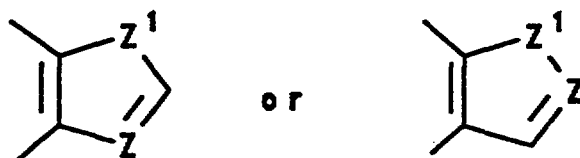
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benzoyl or 3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl
 such as 4-toluoyl, 2-toluoyl, or 4-(1-methylethyl)-
 benzoyl, or (heterocycle)carbonyl, the heterocycle
 selected from a five membered aromatic or saturated
 ring with one N, O, S or Se heteroatom optionally hav-
 ing a benzo or pyrido ring fused thereto:



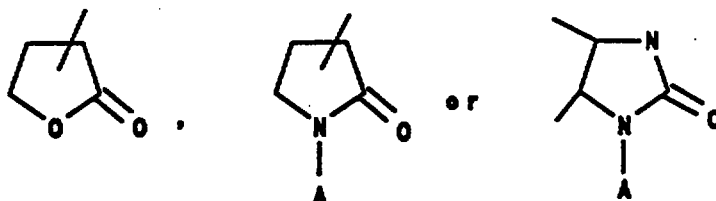
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
 dyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
 furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
 benzothienyl, or a five membered aromatic ring with two
 N, O, S or Se heteroatoms optionally having a benzo or
 pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
 yl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
 yl, or a five membered saturated ring with one or two
 N, O, S or Se heteroatoms and an adjacent appended O
 heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl;

and when R³ = R⁴(CH₂)_nCO- and n = 2-4,

R⁴ is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3 - C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1 - C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_1 - C_6)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C_3 - C_8)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C_7 - C_{10})aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C_2 - C_8)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo-

[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-aza-bicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-

(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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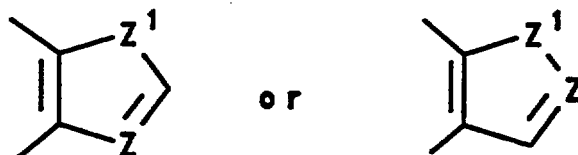


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15



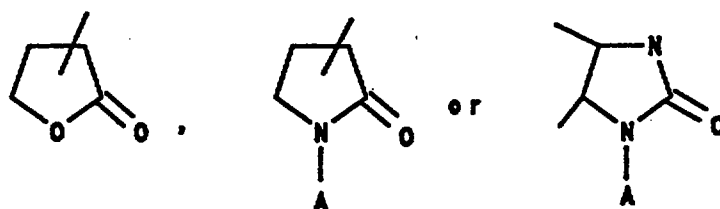
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Z or Z' = N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

30



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(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycar-

bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxo-thiomorpholinyl;

and when R³ = R^{4'} (CH₂)_nSO₂- and n= 1-4, R^{4'} is selected from hydrogen; amino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy, iso-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino; (C₇-C₁₀)aralkyloxy group such as benzyloxy, 1-phenylethyloxy or 2-phenylethyloxy; (C₁-C₄)carboxyalkyl group; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

Particularly preferred compounds are compounds according to the above formula V and VI in which X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine;

Y is selected from $-N_2^+Cl^-$ or N_3 ;

R or R^1 are selected from nitro; amino; halogen
(selected from chlorine, bromine, fluorine or iodine);
5 cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,
 $R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;
and when $R^2 =$ methyl or ethyl,

10 $R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl or 2-methylpropyl;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,
 R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;
and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

15 R^4 is selected from hydrogen; amino; hydroxyamino;
straight or branched mono(C_1-C_6)alkylamino group
selected from methyl, ethyl, n-propyl, 1-methylethyl,
n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
20 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-
pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or
1-methyl-1-ethylpropylamino and where appropriate their
diastereomers and enantiomers; (C_3-C_8)cycloalkylamino
25 group selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-
dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-
dimethylcyclobutyl, cyclopentyl, cyclohexyl, cyclo-
30 heptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their
diastereomers and enantiomers; straight or branched
chain di-(C_1-C_6)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,

35 ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diazamethylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or

1-methylethyl; (C_3-C_6)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C_3-C_6)cycloalkyl group (substitution selected from (C_1-C_3)alkyl, cyano, amino or (C_1-C_3)acyl); (C_6-C_{10})aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)-alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy); α -hydroxy(C_1-C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; halo(C_1-C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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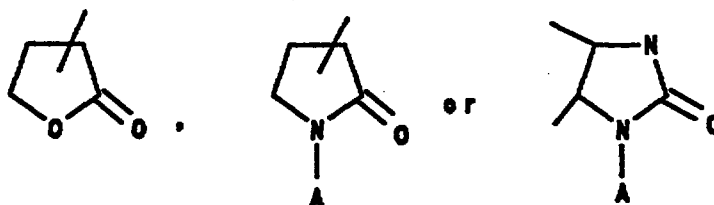


Z or Z' - N, O, S or Se

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such as imidazolyl, pyrazolyl, benzimidazolyl, oxazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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such as γ-butyrolactam, γ-butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-

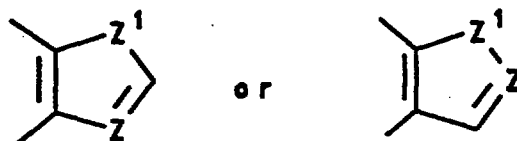
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dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothio-
morpholinyl; acyl or haloacyl group selected from
acetyl, propionyl, chloroacetyl, trifluoroacetyl,
(C₃-C₆)cycloalkylcarbonyl such as cyclopropylcarbonyl,
cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcar-
bonyl, (2,3-dimethylcyclopropyl)carbonyl, (1,2-di-
methylcyclopropyl)carbonyl, (2-ethylcyclopropyl)car-
bonyl, (2-methylcyclopentyl)carbonyl or (3-ethylcyclo-
butyl)carbonyl, (C₆-C₁₀)aroyl selected from benzoyl or
naphthoyl, halo substituted (C₆-C₁₀)aroyl such as
pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or
3,4-difluorobenzoyl, (C₁-C₄)alkylbenzoyl such as
4-toluoyl, 2-methylbenzoyl or 4-(1-methylethyl)benzoyl,
or (heterocycle)carbonyl, the heterocycle selected from
a five membered aromatic or saturated ring with one N,
O, S or Se heteroatom optionally having a benzo or
pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

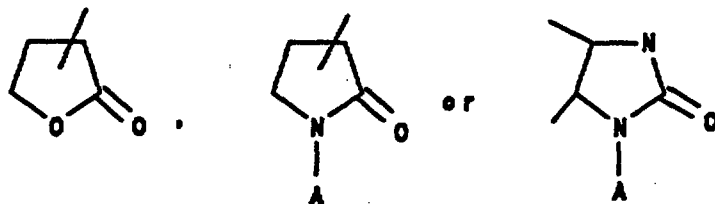


Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-

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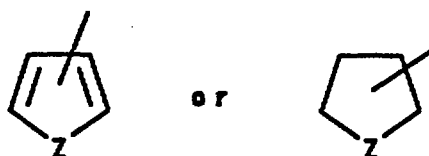
lyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl, pyrazinyl, sym-triazinyl, unsym-triazinyl, pyrimidinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α -naphthyl, β -naphthyl, substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy),

halo(C₁-C₃)alkyl group such as bromomethyl, fluoro-
methyl, difluoromethyl, trifluoromethyl, chloromethyl,
dichloromethyl, trichloromethyl, 2-fluoroethyl,
2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl
or 2-iodoethyl, a heterocycle group selected from a
five membered aromatic or saturated ring with one N, O,
S or Se heteroatom optionally having a benzo or pyrido
ring fused thereto:



Z = N, O, S or Se

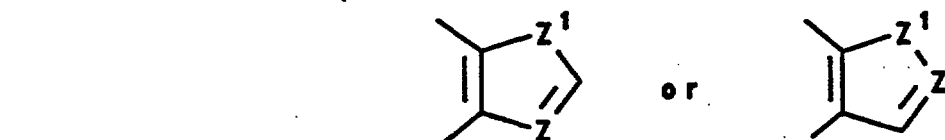
such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothienyl]; (C₁-C₄)alkoxy group such as allyloxy,
methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy;
C₆-aryloxy group selected from phenoxy or substituted
phenoxy (substitution selected from halo, (C₁-C₄)-
alkyl); (C₇-C₁₀)aralkyloxy group such as benzyloxy,
1-phenylethyloxy or 2-phenylethyloxy;
and when R³ = R⁴(CH₂)_nCO- and n=1-4,
R⁴ is selected from hydrogen; (C₁-C₃)alkyl group
selected from methyl, ethyl, n-propyl or 1-methylethyl;
(C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or
β-naphthyl; substituted (C₆-C₁₀)aryl group (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycar-
bonyl, (C₁-C₃)alkylamino or carboxy); acyloxy or
haloacyloxy group, selected from acetyl, propionyl,
chloroacetyl, trichloroacetyl, (C₃-C₆)cycloalkylcarbo-
nyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl,
halo substituted (C₆-C₁₀)aroyl such as pentafluoroben-
zoyl, 4-chlorobenzoyl, 3-bromobenzoyl or 3,4-difluoro-

benzoyl, (C₁-C₄)alkylbenzoyl such as 4-toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or (heterocycle)-carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



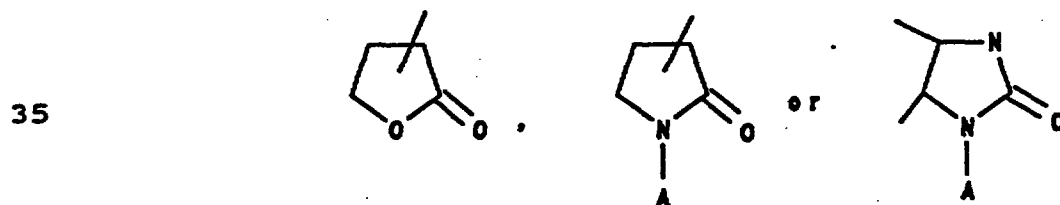
Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

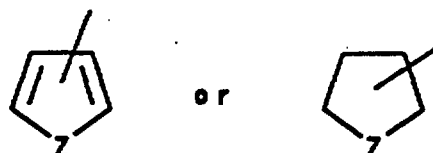
such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiophomorpholinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

5



Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl or
benzothienyl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15

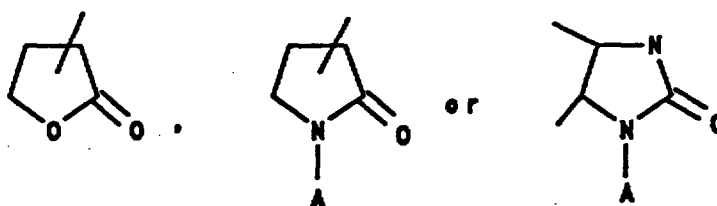


20

Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazo-
lyl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25



30

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,
(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group

35

selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

5 such as γ -butyrolactam, γ -butyrolactone, imidazolidi-
none or N-aminoimidazolidinone, or a six membered aro-
matic ring with one to three N heteroatoms such as
pyridyl, pyridazinyl or pyrazinyl, or a six membered
10 saturated ring with one or two N, O, S or Se
heteroatoms and an adjacent appended O heteroatom such
as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-
piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclo-
propyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or
2-dioxothiopholinyl; hydroxy group; α -hydroxy-
15 (C_1 - C_3)alkyl group selected from hydroxymethyl,
 α -hydroxyethyl, α -hydroxy-1-methylethyl or
 α -hydroxypropyl; halo(C_1 - C_3)alkyl group such as bromo-
methyl, fluoromethyl, difluoromethyl, trifluoromethyl,
chloromethyl, dichloromethyl, trichloromethyl,
20 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoro-
methyl, 2-bromoethyl or 2-iodoethyl; acyl or haloacyl
group selected from acetyl, propionyl, chloroacetyl,
trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl, (C_6 - C_{10})-
aroyl selected from benzoyl or naphthoyl, halo substi-
25 tuted (C_6 - C_{10})aroyl such as pentafluorobenzoyl, 4-
chlorobenzoyl, 3-bromophenylcarbonyl or 3,4-difluoro-
benzoyl, (C_1 - C_4)alkylbenzoyl such as from 4-toluoyl,
2-toluoyl or 4-(1-methylethyl)benzoyl, or (hetero-
cycle)carbonyl, the heterocycle selected from a five
30 membered aromatic or saturated ring with one N, O, S or
Se heteroatom optionally having a benzo or pyrido ring
fused thereto:

5

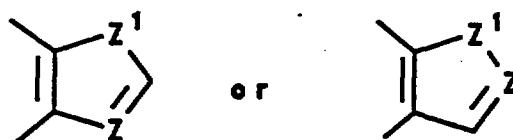


Z = N, O, S or Se

10

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrroli-
dinyll, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl,
furanyl, benzofuranyl, tetrahydrothienyl, thienyl, or
benzothieryl, or a five membered aromatic ring with two
N, O, S or Se heteroatoms optionally having a benzo or
pyrido ring fused thereto:

15

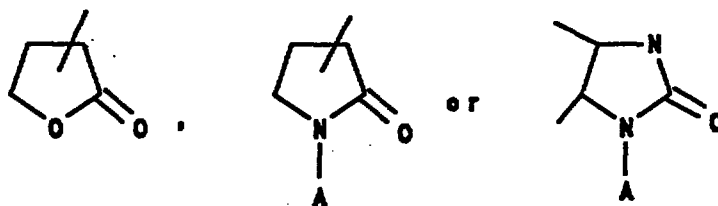


Z or Z' = N, O, S or Se

20

such as imidazolyl, pyrazolyl, benzimidazolyl, oxazo-
lyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazol-
yl, or a five membered saturated ring with one or two
N, O, S or Se heteroatoms and an adjacent appended O
heteroatom:

25



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35

(A is selected from hydrogen; straight or branched
(C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl,
(C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group
selected from benzyl, 1-phenylethyl, 2-phenylethyl or
phenylpropyl)

such as γ -butyrolactam, γ -butyrolactone, imidazolidinone or N-aminoimidazolidinone, or a six membered aromatic ring with one to three N heteroatoms such as pyridyl, pyridazinyl or pyrazinyl, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom such as 2,3-dioxo-1-piperazinyl, 4-ethyl-2,3-dioxo-1-piperazinyl, 4-methyl-2,3-dioxo-1-piperazinyl, 4-cyclopropyl-2-dioxo-1-piperazinyl, 2-dioxomorpholinyl or 2-dioxothiomorpholinyl;

and when $R^3 = R^4(CH_2)_nCO-$ and $n = 2-4$,

R^4 is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C_1-C_6)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-

dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxy-piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino;

and when $R^3 = R^{4'}(CH_2)_nSO_2-$ and $n = 0$,

$R^{4'}$ is selected from amino; hydroxyamino; straight or
5 branched mono(C_1-C_6)alkylamino group selected from
methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,

1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-di-
10 methylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,
1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-
ethylpropylamino and where appropriate their

diastereomers and enantiomers; (C_3-C_8)cycloalkylamino
group selected from cyclopropyl, trans-1,2-dimethyl-
cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-
15 dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-
dimethylcyclobutyl, cyclopentyl, cyclohexyl,
cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or
bicyclo[2.2.2]oct-2-ylamino and where appropriate their

20 diastereomers and enantiomers; straight or branched
chain di-(C_1-C_6)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
25 propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino
30 and where appropriate their diastereomers and
enantiomers; (C_1-C_6)alkoxyamino group selected from
methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxy-

amino; (C_3-C_8)cycloalkoxyamino group selected from
cyclopropoxy, trans-1,2-dimethylcyclopropoxy,
35 cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclo-
propoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy,
trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclo-
butoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy,

cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers;

(C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as pyrrolyl, N-methylindolyl, indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl, thienyl or benzothienyl;

and when R³ = R^{4'} (CH₂)_nSO₂- and n = 1-4,

R^{4'} is selected from hydrogen; amino; straight or branched (C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; and the pharmaceutically acceptable organic and inorganic salts or metal complexes.

Most particularly preferred compounds are compounds according to the above formula V and VI in which X is selected from halogen or trifluoromethane-

sulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine;

Y is selected from $-N_2^+Cl^-$ or N_3 ;

R or R^1 are selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;

and when $R^2 =$ methyl or ethyl,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

R^3 selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C_1-C_6)alkylamino group

selected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl,

1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-

dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl,

n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-

dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl,

1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and

where appropriate their diastereomers and enantiomers;

(C_3-C_8)cycloalkylamino group selected from cyclopropyl,

trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclo-

propyl, trans-2,3-dimethylcyclopropyl, cis-2,3-di-

methylcyclopropyl, cyclobutyl, trans-2,3-dimethyl-

cyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl,

cyclohexyl, cycloheptyl, cyclooctyl, bicyclo-

[2.2.1]hept-2-yl, or bicyclo[2.2.2]oct-2-ylamino and

where appropriate their diastereomers and enantiomers;

straight or branched chain di-(C_1-C_6)alkylamino group

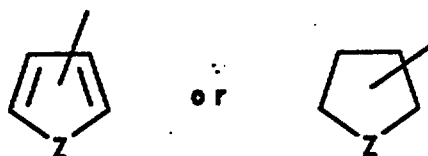
selected from dimethylamino, diethylamino, methyl-

(ethyl)amino, ethyl(1-methylethyl)amino or a

combination of methyl, ethyl, n-propyl, 1-methyl-

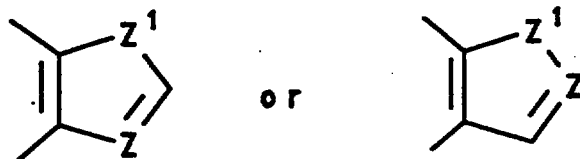
ethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; straight or branched (C₁-C₂)alkyl group selected from methyl or ethyl; (C₆-C₁₀)aryl group selected from phenyl,

a-naphthyl or β -naphthyl; substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, nitro, amino); α -hydroxy(C_1-C_3)alkyl group selected from hydroxymethyl; halo(C_1-C_3)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

such as indolyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 2-pyrrolinyl, tetrahydrofuranyl, furanyl, benzofuranyl, tetrahydrothienyl or thienyl, or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



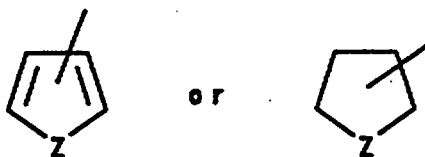
Z or Z' = N, O, S or Se

such as imidazolyl, pyrazolyl, benzimidazolyl, indazolyl, thiazolyl or benzothiazolyl; (C_1-C_4)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C_1-C_3)alkyl group, (C_6-C_{10})aryl group

selected from phenyl, α -naphthyl, β -naphthyl];
 (C_1-C_4) alkoxy group such as allyloxy, methoxy, ethoxy,
 n-propoxy, n-butoxy or tert-butoxy; C_6 -aryloxy group
 selected from phenoxy or substituted phenoxy (substi-
 tution selected from halo, (C_1-C_4) alkyl); (C_7-C_{10}) -
 aralkyloxy group such as benzyloxy, 1-phenylethyloxy or
 2-phenylethyloxy;

and when $R^3 = R^4(CH_2)_nCO-$ and $n=1-4$,

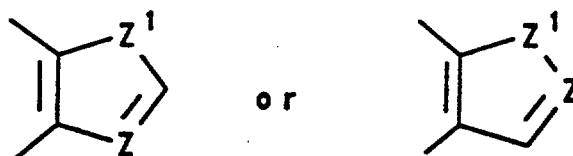
R^4 is selected from hydrogen; (C_1-C_2) alkyl group
 selected from methyl or ethyl; (C_6-C_{10}) aryl group
 selected from phenyl, α -naphthyl or β -naphthyl;
 substituted (C_6-C_{10}) aryl group (substitution selected
 from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl);
 acyloxy or haloacyloxy group, selected from acetyl,
 propionyl, chloroacetyl, trichloroacetyl, (C_3-C_6) -
 cycloalkylcarbonyl, (C_6-C_{10}) aroylel selected from benzoyl
 or naphthoyl, halo substituted (C_6-C_{10}) aroylel such as
 pentafluorobenzoyl, 4-chlorobenzoyl, 3-bromobenzoyl or
 3,4-difluorobenzoyl, (C_1-C_4) alkylbenzoyl such as 4-
 toluoyl, 2-toluoyl, 4-(1-methylethyl)benzoyl or
 (heterocycle)carbonyl, the heterocycle selected from a
 five membered aromatic or saturated ring with one N, O,
 S or Se heteroatom optionally having a benzo or pyrido
 ring fused thereto:



$Z = N, O, S \text{ or } Se$

such as tetrahydrofuranyl, furanyl, benzofuranyl,
 tetrahydrothienyl, thienyl or benzothienyl, or a five
 membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:

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Z or Z' = N, O, S or Se

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such as pyrazolyl, benzimidazolyl, benzoxazolyl, indazolyl, thiazolyl or benzothiazolyl, or a six membered aromatic ring with one or two N heteroatoms such as pyridyl or pyridazinyl; (C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy, n-propoxy, n-butoxy or tert-butoxy; α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group such as bromomethyl, fluoromethyl, difluoromethyl, trifluoro- methyl, chloromethyl, dichloromethyl, trichloromethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-bromoethyl or 2-iodoethyl; and when R³ = R⁴(CH₂)_nCO- and n = 2-4, R⁴ is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, or

bicyclo[2.2.2]oct-2-ylamino and where appropriate their diastereomers and enantiomers; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethylpropylamino and where appropriate their diastereomers and enantiomers; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, or bicyclo[2.2.1]oct-2-yloxyamino and where appropriate their diastereomers and enantiomers; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazoli-

dinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-
methylbicyclo[2.2.1]hept-2-yl and where appropriate
5 their diastereomers and enantiomers; (C_1-C_4) alkoxycar-
bonylamino group selected from tert-butoxycarbonyl-
amino, allyloxycarbonylamino, methoxycarbonylamino,
ethoxycarbonylamino or propoxycarbonylamino;
and when $R^3 = R^{4'}(CH_2)_nSO_2^-$ and $n = 0$,
10 $R^{4'}$ is selected from amino; hydroxyamino; straight or
branched mono(C_1-C_6)alkylamino group selected from
methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-
15 dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,
1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-
ethylpropylamino and where appropriate their diastereo-
mers and enantiomers; straight or branched chain
20 di- (C_1-C_6) alkylamino group selected from dimethyl-
amino, diethylamino, methyl(ethyl)amino, ethyl(1-
methylethyl)amino or a combination of methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methyl- propyl,
2-methylpropyl, 1,1-dimethylethyl, n-pentyl-2-methyl-
25 butyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-
methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-di-
methylbutyl, 1,3-dimethylbutyl or 1-methyl-1-ethyl-
propylamino and where appropriate their diastereomers
30 and enantiomers; straight or branched (C_1-C_2) alkyl
group selected from methyl or ethyl; (C_6-C_{10}) aryl group
selected from phenyl, α -naphthyl or β -naphthyl;
and when $R^3 = R^{4'}(CH_2)_nSO_2^-$ and $n = 1-4$,
 $R^{4'}$ is selected from hydrogen; straight or branched
35 (C_1-C_2) alkyl group selected from methyl or ethyl;
and the pharmacologically acceptable organic and
inorganic salts or metal complexes.

Compounds of special interest are compound according to the above formula in which X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine;

Y is selected from $-N_2^+Cl^-$ or N_3 ;

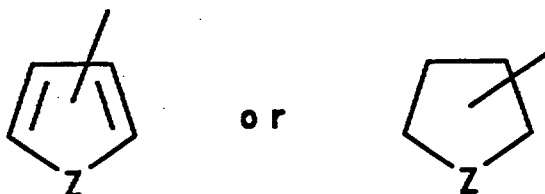
R or R^1 are selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl; $R^3 =$ methyl or ethyl,

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen, R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

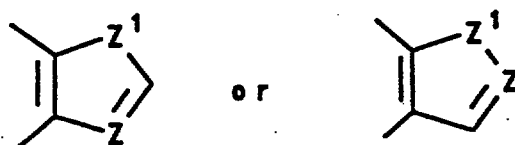
and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, or S heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O or S

such as furanyl or thienyl, or a five membered aromatic ring with two N, O or S heteroatoms optionally having a benzo or pyrido ring fused thereto:



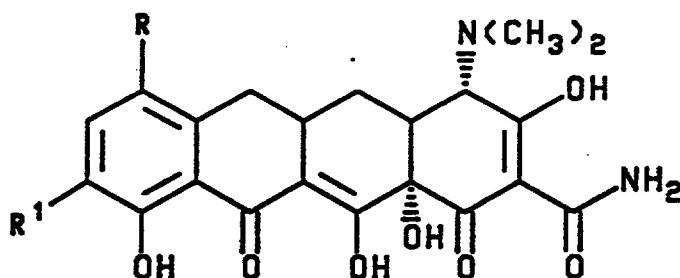
Z or Z^1 = N, O, or S

such as pyrazolyl, benzimidazolyl or thiazolyl;
(C₁-C₄)alkoxy group such as allyloxy, methoxy, ethoxy,
n-propoxy, n-butoxy or tert-butoxy; C₆-aryloxy group
selected from phenoxy or substituted phenoxy (substi-
tution selected from halo, (C₁-C₄)alkyl); (C₇-C₁₀)-
aralkyloxy group such as benzyloxy, 1-phenylethyloxy or
2-phenylethyloxy;
and when R³ = R⁴(CH₂)_nCO- and n=1-4,
R⁴ is selected from hydrogen; (C₁-C₂)alkyl group
selected from methyl or ethyl; (C₆-C₁₀)aryl group
selected from phenyl, α-naphthyl or β-naphthyl;
and when R³ = R^{4'}(CH₂)_nSO₂- and n = 0,
R^{4'} is selected from straight or branched (C₁-C₂)alkyl
group selected from methyl or ethyl; (C₆-C₁₀)aryl
group selected from phenyl, α-naphthyl or β-naphthyl;
and the pharmacologically acceptable organic and
inorganic salts or metal complexes.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The novel compounds of the present invention may be readily prepared in accordance with the following schemes.

The starting 7-azido-9-(substituted)-6-demethyl-6-deoxytetracyclines or 9-azido-7-(substituted)-6-demethyl-6-deoxytetracyclines described in formula 1 or the salts thereof are prepared by procedures known to those skilled in the art including those described in J. J. Hlavka, et al., J. Am. Chem. Soc., 84, 1426(1962).



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1a. $R^1 = N_3$ and $R = NR^2R^3$, $R^2 = R^3$

1b. $R^1 = N_3$ and $R = NR^2R^3$, $R^2 \neq R^3$

1c. $R = N_3$ and $R^1 = NR^2R^3$, $R^2 = R^3$

1d. $R = N_3$ and $R^1 = NR^2R^3$, $R^2 \neq R^3$

1e. $R^1 = N_3$ and $R = X$, $X = \text{halogen, hydrogen}$

1f. $R = N_3$ and $R^1 = X$, $X = \text{halogen, hydrogen}$

The starting 7-azido-9-(substituted)-6-de-

5 methyl-6-deoxytetracycline, 1, or 9-azido-7-(substituted)-6-demethyl-6-deoxytetracycline, 1', described in formula 1 is prepared according to Scheme 1 or Scheme 2.

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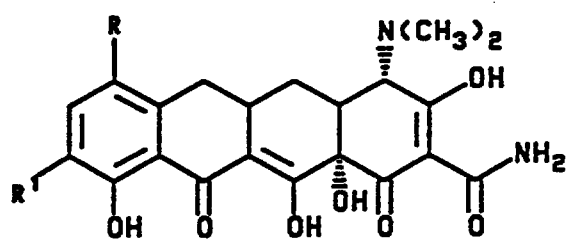
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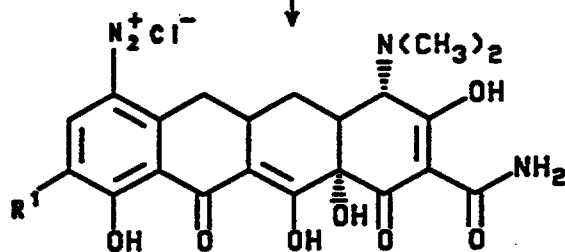
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Scheme 1



2

(1)



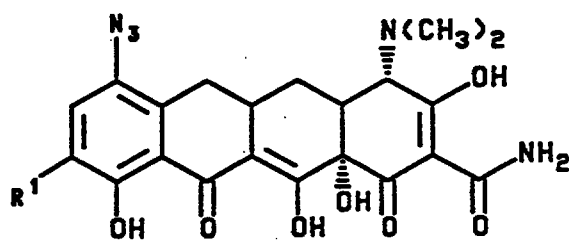
3

(2)

Reagents.

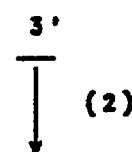
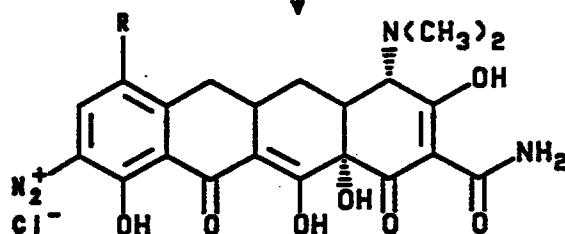
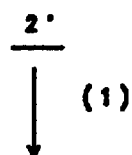
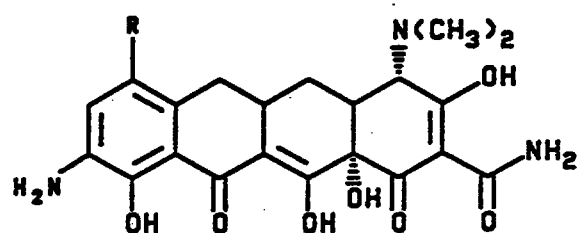
1. BuONO₂
0.1N CH₃OH/HCl

2. NaN₃
0.1N CH₃OH/HCl



1

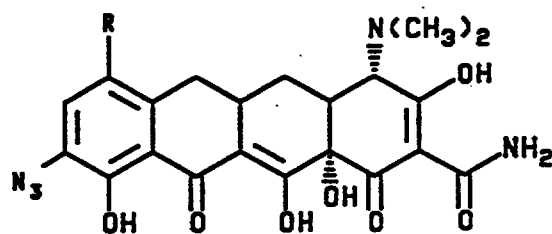
Scheme 2



Reagents.

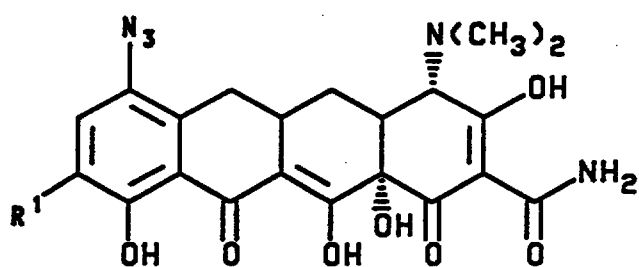
1. BuONO₂
0.1N CH₃OH/HCl

2. NaN₃
0.1N CH₃OH/HCl



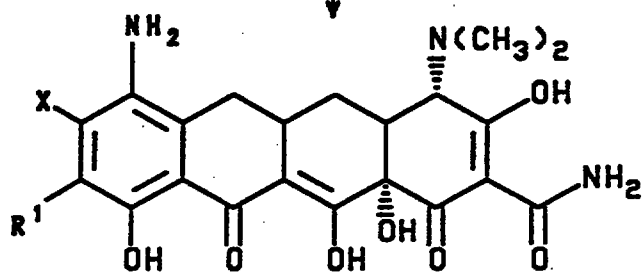
In accordance with Scheme 1 or 2, a 7-amino-9-(substituted)-6-demethyl-6-deoxytetracycline 2, or 9-amino-7-(substituted)-6-demethyl-6-deoxytetracycline 2', or their mineral acid or halide salt, dissolved in 0.1N methanolic hydrogen chloride, is treated with an excess of n-butyl nitrite to give a 7-diazonium-9-(substituted)-6-demethyl-6-deoxytetracycline, 3, or 9-diazonium-7-(substituted)-6-demethyl-6-deoxytetracycline, 3', or their mineral acid or halide salt. The formed diazonium compound, 3 or 3', or their mineral acid or halide salt, dissolved in 0.1 N methanolic hydrogen chloride, is treated with one equivalent of sodium azide to give the corresponding 7-azido-9-(substituted)-6-demethyl-6-deoxytetracycline, 1, or 9-azido-7-(substituted)-6-demethyl-6-deoxytetracycline, 1', or their mineral acid or halide salt.

Scheme 3



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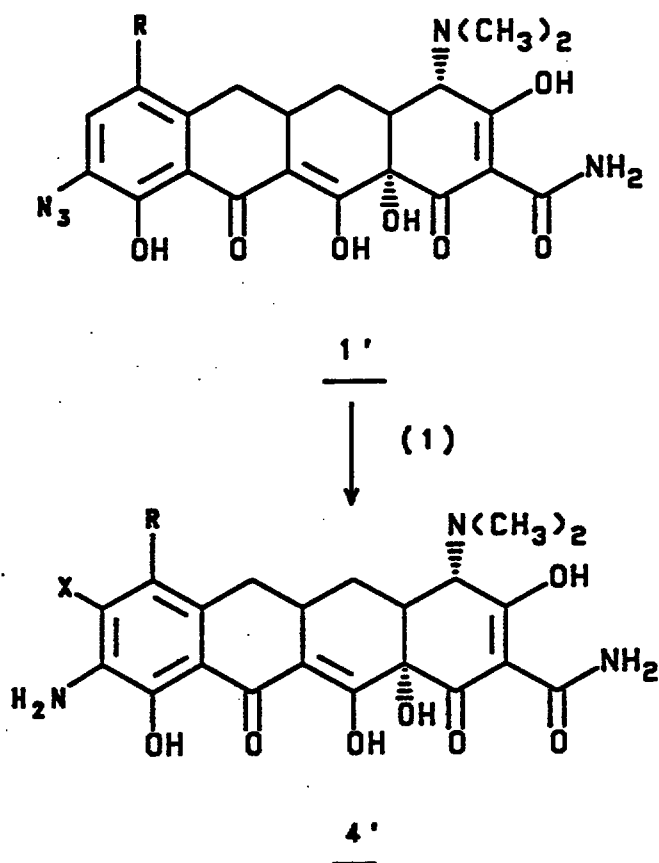
(1)



4

1. Strong acid
(HCl, H₂SO₄, CF₃SO₃H, CH₃SO₃H,
HI, HF and HBr)

Scheme 4



1. Strong acid
(HCl, H₂SO₄, CF₃SO₃H, CH₃SO₃H,
HI, HF and HBr)

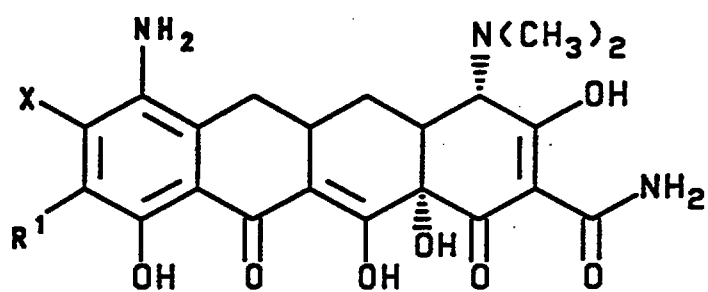
In accordance with Scheme 3 or 4, a 7-azido-9-(substituted)-6-demethyl-6-deoxytetracycline, 1, or 9-azido-7-(substituted)-6-demethyl-6-deoxytetracycline, 1', or their mineral acid or halide salt, is treated with a strong acid, such as sulfuric acid, hydrochloric acid, methanesulfonic acid, trifluoromethanesulfonic acid, hydrobromic, hydroiodic, or hydrogen fluoride to produce a 7-amino-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline, 4, or 9-amino-8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 4', or their mineral acid or halide salt.

The 7-amino-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline, 4, or 9-amino-8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 4', or their mineral acid or halide salt, can be further converted as described in Schemes 5, 6, 7 and 8.

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Scheme 5

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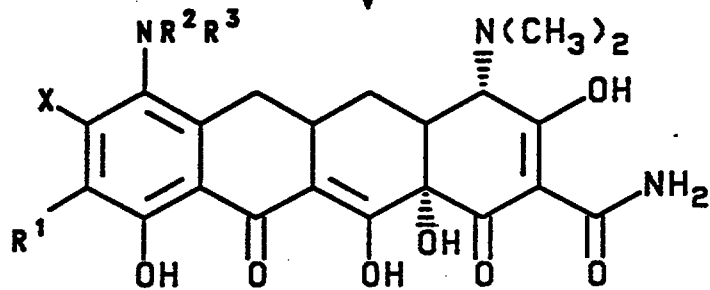
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4'

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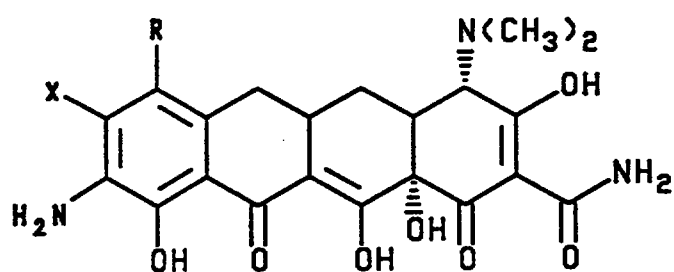
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Scheme 6

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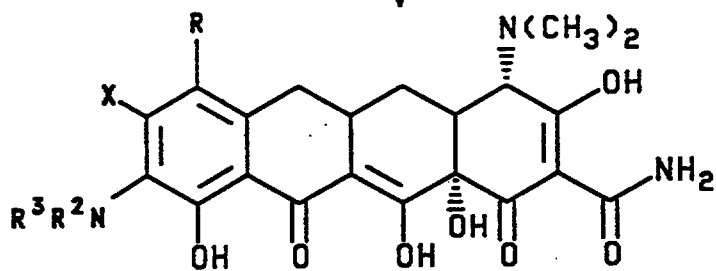


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4'



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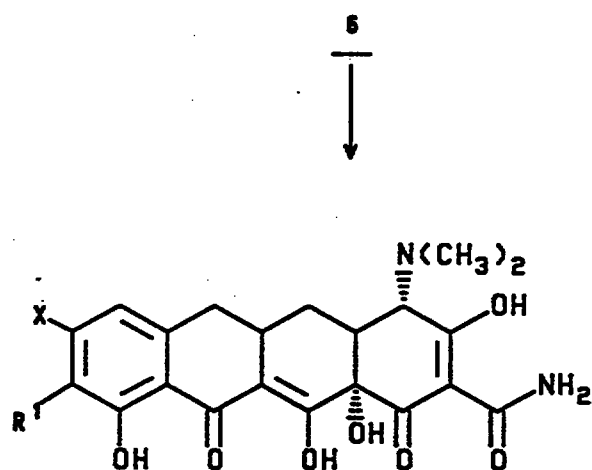
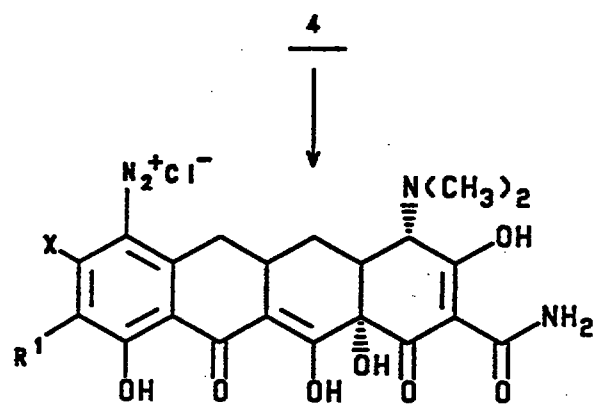
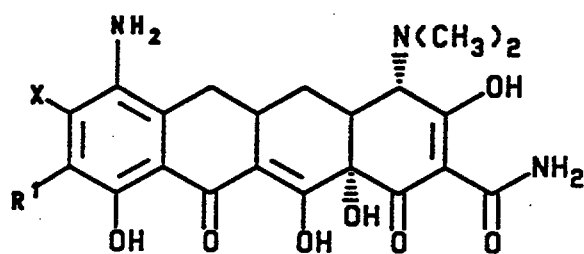
5'

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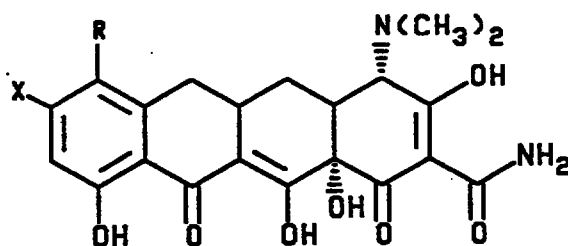
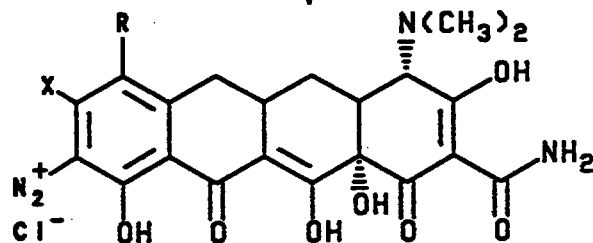
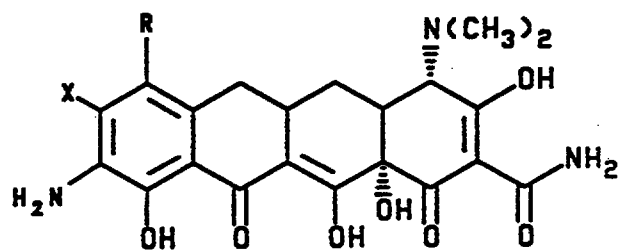
In accordance with Scheme 5 or 6, a 7-amino-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline, 4, or a 9-amino-8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 4', or their mineral acid or halide salt, is treated with an acyl chloride, acyl anhydride, mixed acyl anhydride, sulfonyl chloride or sulfonyl anhydride in the presence of a suitable acid scavenger in a variety of solvents to form the corresponding 7-(acyl or sulfonyl amino)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline, 5, or 9-(acyl or sulfonyl amino)-8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 5', or their mineral acid or halide salt. The acid scavenger is selected from sodium bicarbonate, sodium acetate, pyridine, triethylamine, N,O-bis(trimethylsilyl)acetamide, N,O-bis(trimethylsilyl)trifluoroacetamide, potassium carbonate or a basic ion-exchange resin. The solvents are selected from water-tetrahydrofuran, N-methylpyrrolidone, 1,3-dimethyl-2-imidazolidinone, hexamethylphosphoramide, 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)pyrimidinone or 1,2-dimethoxyethane.

Scheme 7



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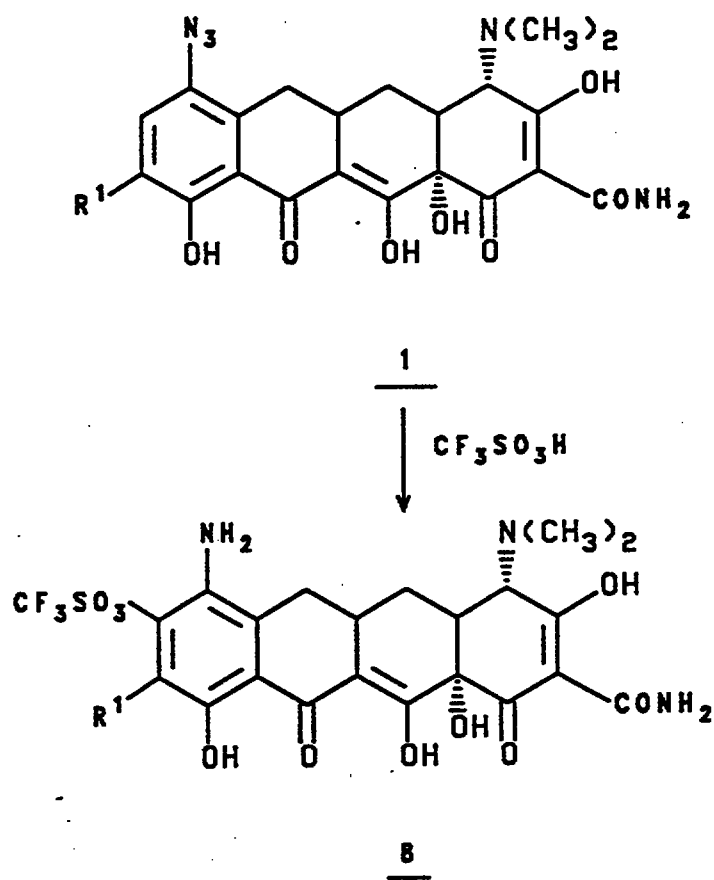
Scheme 8



In accordance with Scheme 7 or 8, a 7-amino-8-(substituted)-9-(substituted)-6-demethyl-6-deoxy-tetracycline, 4, or 9-amino-8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 4', or their mineral acid or halide salt, is converted to the respective diazonium salt, 6 or 6', using procedures known to those skilled in the art including those described in J. J. Hlavka, et al., J. Am. Chem. Soc., 84, 1420(1962).

The diazonium salts, 6 or 6', are reduced to their respective 8-(substituted)-7-(substituted)-6-demethyl-6-deoxytetracycline, 7, or 8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracycline, 7', by heating in an alcohol.

Scheme 9

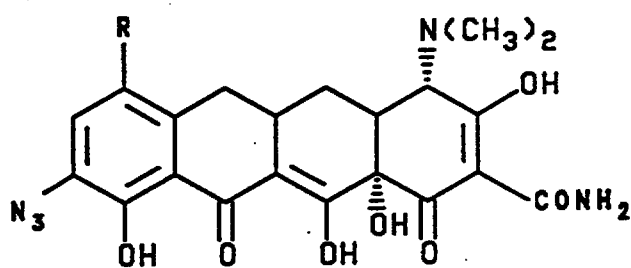


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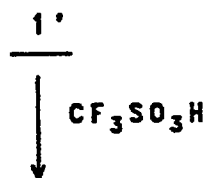
Scheme 10

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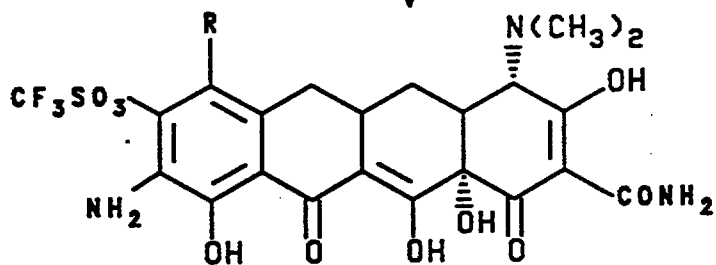
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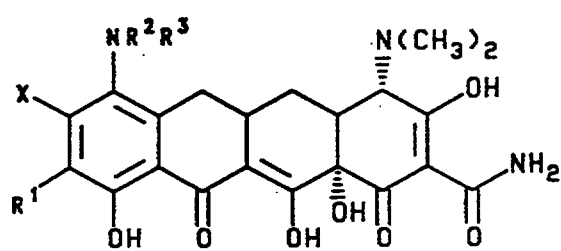
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8'

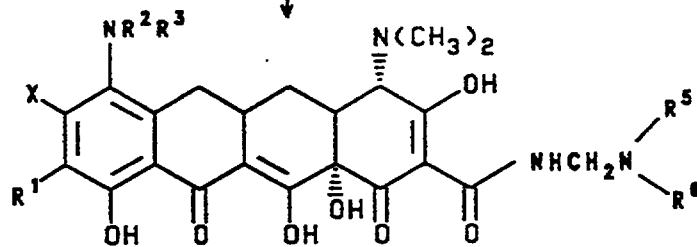
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In accordance with Scheme 9 or 10, a 7-azido-9-(substituted)-6-demethyl-6-deoxytetracycline, 1, or a 9-azido-7-(substituted)-6-demethyl-6-deoxytetracycline, 1', is treated with trifluoromethanesulfonic acid to give the desired 7-amino-9-(substituted)-8-(trifluoromethanysulfonyloxy)-6-demethyl-6-deoxytetracycline, 8, or 9-amino-7-(substituted)-8-(trifluoromethanysulfonyloxy)-6-demethyl-6-deoxytetracycline, 8'.

Scheme 11



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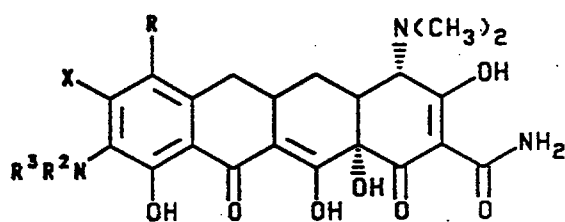
9

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Scheme 12

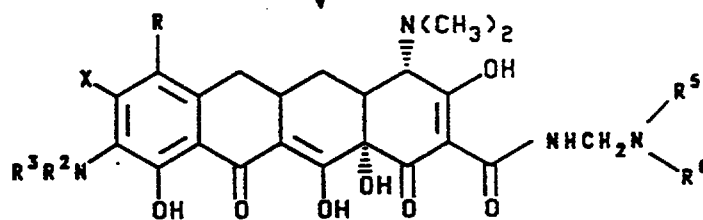
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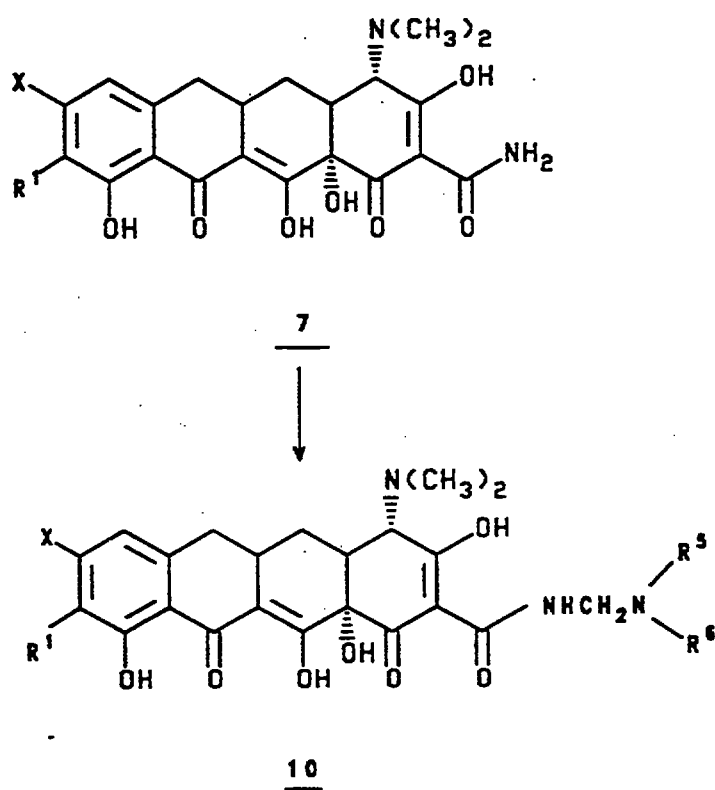
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Scheme 13

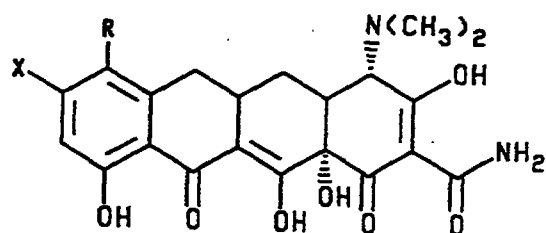


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Scheme 14

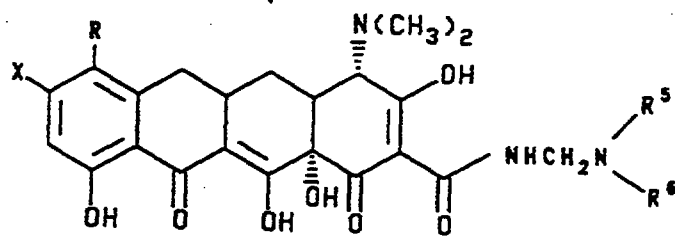
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10'

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In accordance with Schemes 11-14, Compounds 5, 5', 7, or 7' are selectively N-alkylated in the presence of formaldehyde and either a primary amine such as methylamine, ethylamine, benzylamine, methyl glycinate, (L or D)lysine, (L or D)alanine or their substituted congeners; or a secondary amine such as morpholine, pyrrolidine, piperidine or their substituted congeners to give their corresponding Mannich base adduct, 9, 9', 10, or 10'.

The 7-(substituted)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracyclines may be obtained as metal complexes such as aluminum, calcium, iron, magnesium, manganese and complex salts; inorganic and organic salts and corresponding Mannich base adducts using methods known to those skilled in the art (Richard C. Larock, Comprehensive Organic Transformations, VCH Publishers, 411-415, 1989). Preferably, the 7-(substituted)-8-(substituted)-9-(substituted)-6-demethyl-6-deoxytetracyclines are obtained as inorganic salts such as hydrochloric, hydrobromic, hydroiodic, phosphoric, nitric or sulfate; or organic salts such as acetate, benzoate, citrate, cysteine or other amino acids, fumarate, glycolate, maleate, succinate, tartrate, alkylsulfonate or arylsulfonate. In all cases the salt formation occurs with the C(4)-dimethylamino group. The salts are preferred for oral and parenteral administration.

5

BIOLOGICAL ACTIVITY

Method for in Vitro Antibacterial Evaluation

(Table I)

10 The minimum inhibitory concentration (MIC),
the lowest concentration of the antibiotic which in-
hibits growth of the test organism, is determined by
the agar dilution method using Muller-Hinton II agar
(Baltimore Biological Laboratories). An inoculum
15 density of $1-5 \times 10^5$ CFU/ml and an antibiotic concen-
tration ($32 \leq 0.015 \mu\text{g/ml}$) is used. The plates are in-
cubated for 18 hours at 35°C in a forced air incubator.
The test organisms comprise strains sensitive to
tetracycline and genetically defined strains that are
20 resistant to tetracycline, due to inability to bind
bacterial ribosomes (tetM).

E. coli in Vitro Protein Translation System (Table II)

25 An in vitro, cell free, protein translation
system using extracts from E. coli strain MRE 600
(tetracycline sensitive) and a derivative of MRE 600
containing the tetM determinant has been developed
based on literature methods [J.M. Pratt, Coupled
Transcription-translation in Prokaryotic Cell-free
30 Systems, Transcription and Translation, a Practical
Approach, (B.D. Hames and S.J. Higgins, eds) p.
179-209, IRL Press, Oxford-Washington, 1984].

35 Using the system described above, the
tetracycline compounds of the present invention are
tested for their ability to inhibit protein synthesis
in vitro. Briefly, each 10 μl reaction contains S30
extract (a whole extract) made from either tetracycline
sensitive cells or an isogenic tetracycline resistant

(tetM) strain, low molecular weight components necessary for transcription and translation (i.e., ATP and GTP), a mix of 19 amino acids (no methionine), ³⁵S labeled methionine, DNA template (either pBR322 or pUC119), and either DMSO (control) or the novel tetracycline compound to be tested ("novel TC") dissolved in DMSO.

The reactions are incubated for 30 minutes at 37°C. Timing is initiated with the addition of the S30 extract, the last component to be added. After 30 minutes, 2.5 µl of the reaction is removed and mixed with 0.5 ml of 1N NaOH to destroy RNA and tRNA. Two to three ml of 25% trichloroacetic acid is added and the mixture incubated at room temperature for 15 minutes. The trichloroacetic acid precipitated material is collected on Whatman GF/C filters and washed with a solution of 10% trichloroacetic acid. The filters are dried and the retained radioactivity, representing incorporation of ³⁵S-methionine into polypeptides, is counted using standard liquid scintillation methods.

The percent inhibition (P.I.) of protein synthesis is determined to be:

$$P.I. = 100 - \left(\frac{\text{Retained radioactivity of novel TC containing sample}}{\text{Retained radioactivity of DMSO control reaction}} \right) \times 100$$

In Vivo Antibacterial Evaluation (Table III)

The therapeutic effects of tetracyclines are determined against an acute lethal infection with Staphylococcus aureus strain Smith (tetracycline sensitive). Female, mice, strain CD-1 (Charles River Laboratories), 20 ± 2 grams, are challenged by an intraperitoneal injection of sufficient bacteria (suspended in hog mucin) to kill non-treated controls within 24-48 hours. Antibacterial agents, contained in 0.5 ml of 0.2% aqueous agar, are administered subcutaneously or orally 30 minutes after infection. When

an oral dosing schedule is used, animals are deprived of food for 5 hours before and 2 hours after infection. Five mice are treated at each dose level. The 7 day survival ratios from 3 separate tests are pooled for calculation of median effective dose (ED_{50}).

Testing Results

The claimed compounds exhibit antibacterial activity against a spectrum of tetracycline sensitive and resistant Gram-positive and Gram-negative bacteria, especially, strains of E. coli, S. aureus and E. faecalis, containing the tetM resistance determinants (Table I). Notable is 8-chloro-9-(formylamino)-4-(dimethylamino)-6-demethyl-6-deoxytetracycline, compound A in Table I, which has good in vitro activity against tetracycline resistant strains containing the tetM resistance determinant (such as S. aureus UBMS 88-5 and S. aureus UBMS 90-1 and 90-2) and is equally as effective as minocycline against tetracycline susceptible strains.

Protein synthesis, determined using cell-free extracts from the tetracycline susceptible strain MRE600, is inhibited by tetracycline, minocycline and the 8-chloro-9-(formylamino)-4-(dimethylamino)-6-demethyl-6-deoxytetracycline of this invention (Table II). Protein synthesis, determined using cell-free extracts from strain MRE600 (tetM), is resistant to tetracycline and minocycline, since less than 20% inhibition is achieved even at 1mg/ml concentration of minocycline vs 90% inhibition at 0.3mg/ml of the tetracycline sensitive ribosome extracts prepared from strain MRE600 (Table II). In contrast, 8-chloro-9-(formylamino)-4-(dimethylamino)-6-demethyl-6-deoxytetracycline effectively inhibited protein synthesis in extracts prepared from either MRE600 or MRE600 (tetM) (Table II). The evidence presented indicates that 8-chloro-9-(formylamino)-4-(dimethylamino)-6-demethyl-6-deoxytetracycline is an inhibitor

of protein synthesis at the ribosome level. The
ability of 8-chloro-9-(formylamino)-4-(dimethylamino)-
6-demethyl-6-deoxytetracycline to inhibit bacterial
growth almost certainly reflects directed inhibition of
bacterial protein synthesis. Therefore, it is expected
to exhibit a bacteriostatic effect against susceptible
bacteria, as is the case with other tetracyclines.

The antibacterial activity of 8-chloro-
9-(formylamino)-4-(dimethylamino)-6-demethyl-6-deoxy-
tetracycline is also demonstrated by in vivo efficacy
in animals infected with S. aureus Smith (Table III).

The improved efficacy of 8-chloro-9-(formyl-
amino)-4-(dimethylamino)-6-demethyl-6-deoxytetra-
cycline is demonstrated by the in vitro activity
against isogenic strains into which the resistance
determinants, such as tetM, were cloned (Table I); the
inhibition of protein synthesis by tetM ribosomes
(Table II); and the in vivo activity against experi-
mental infections (Table III).

LEGEND FOR COMPOUNDS

	LETTER	NAME
5		
	A	8-Chloro-4-(dimethylamino)-9-(formyl- amino)-1,4,4a,5,5a,6,11,12a-octahydro- 3,10,12,12a-tetrahydroxy-1,11-dioxo-2- naphthacenecarboxamide hydrochloride or sulfate
10		
	B	8-Chloro-4,7-bis(dimethylamino)-1,4,4a,5- 5a,6,11,12a-octahydro-3,10,12,12a-tetra- hydroxy-1,11-dioxo-2-naphthacenecarbox- amide sulfate
15		
	C	7-Amino-8-chloro-4-(dimethylamino)-1,4- 4a,5,5a,6,11,12a-octahydro-3,10,12,12a- tetrahydroxy-1,11-dioxo-2-naphthacene- carboxamide hydrochloride
20		
	D	8-(Aminocarbonyl)-2-chloro-10-(dimethyl- amino)-5,6a,10,10a,11,11a,12-octahydro- 5,7-dioxo-1-naphthacenediazonium chloride
25		
	E	8-Chloro-4-(dimethylamino)-1,4,4a,5,5a,6- 11,12a-octahydro-3,10,12,12a-tetrahydr- oxy-1,11-dioxo-2-naphthacenecarboxamide sulfate
30		
	F	8-Chloro-4,7-bis(dimethylamino)-9- (formylamino)-1,4,4a,5,5a,6,11,12a-octa- hydro-3,10,12,12a-tetrahydroxy-1,11-di- oxo-2-naphthacenecarboxamide sulfate
	G	9-Amino-8-chloro-4-(dimethylamino)-1,4,- 4a,5,5a,6,11,12a-octahydro-3,10,12,12a- tetrahydroxy-1,11-dioxo-2-naphthacenecar- boxamide
35		
	H	9-Amino-8-chloro-4,7-(dimethylamino)-1,4- 4a,5,5a,6,11,12a-octahydro-3,10,12,12a- tetrahydroxy-1,11-dioxo-2-naphthacenecar- boxamide sulfate

LEGEND FOR COMPOUNDS

(Cont'd.)

5	LETTER	NAME
10	I	[7S-(7alpha, 10aalpha)]-[9-(Aminocarbo- nyl)-3-chloro-7-(dimethylamino)-5,5a,6- 6a,7,10,10a,12-octahydro-1,8,10a,11- tetrahydroxy-10,12-dioxo-2-naphthacenyl]- carbamic acid methyl ester
15	J	[4S-(4alpha, 12aalpha)]-8-Chloro-4-(di- methylamino)-9-hydrazino-1,4,4a,5,5a,6- 11,12a-octahydro-3,10,12,12a-tetra- hydroxy-1,11-dioxo-2-naphthacenecarbox- amide monohydrochloride
	K	Tetracycline hydrochloride
	L	Minocycline hydrochloride
20	M	[4S(4alpha,12aalpha)]-9-Amino-8-chloro-7- (diethylamino)-4-dimethylamino)-1,4,4a,- 5,5a,6,11,12a-octahydro-3,10,12,12a- tetrahydroxy-1,11-dioxo-2-naphthacene- carboxamide

25

30

35

Table I

ANTIBACTERIAL ACTIVITY OF 8-(HALOGEN)-7-(SUBSTITUTED)-9-(SUBSTITUTED)-6-DE METHYL-6-DEOXYTETRACYCLINES
NIC(ug/ml)

Organism	Compound											
	A	B	C	D	E	F	G	H	I	J	K	L
<i>E. coli</i> UBMS 88-1 (tetB)	32	>32	>32	>32	>32	>32	>32	>32	>32	32	>32	16
<i>E. coli</i> UBMS 88-2 (sensitive)	0.12	8	2	32	16	1	4	8	NT	2	0.25	0.25
<i>E. coli</i> UBMS 89-1 (tetM)	NG	>32	32	32	16	0.5	NG	NG	8	16	16	8
<i>E. coli</i> UBMS 89-2 (sensitive)	0.25	16	4	32	16	1	4	16	16	4	1	1
<i>E. coli</i> ATCC 25922	0.12	8	2	16	8	0.25	1	4	8	1	0.5	0.5
<i>S. aureus</i> UBMS 88-4 (sensitive)	<0.015	0.03	0.5	0.5	0.25	0.12	<0.015	0.12	0.06	0.06	0.12	0.03
<i>S. aureus</i> UBMS 88-5 (tetM)	0.12	0.5	32	4	2	0.25	1	1	0.5	0.5	>32	4
<i>S. aureus</i> UBMS 88-7 (tetK)	16	0.5	>32	8	4	4	2	0.25	2	1	>32	0.12
<i>S. aureus</i> UBMS 90-1 (tetM)	0.25	0.05	32	4	2	0.5	1	2	0.5	0.5	>32	4

NG = No growth

NT = Not tested

Table I (Cont'd.)

ANTIBACTERIAL ACTIVITY OF 8-(HALOGEN)-7-(SUBSTITUTED)-9-(SUBSTITUTED)-6-DEETHYL-6-DEOXYTETRACYCLINES
MIC(μ g/ml)

Organism	Compound											
	A	B	C	D	E	F	G	H	I	J	K	L
<i>S. aureus</i> UBMS 90-3 (sensitive)	<0.015	0.06	0.12	0.5	0.12	0.06	<0.015	0.12	0.06	0.03	0.06	0.03
<i>S. aureus</i> UBMS 90-2 (tetM)	0.03	0.5	8	2	1	0.12	0.25	0.5	0.5	0.5	32	4
<i>S. aureus</i> IVES 2943 (meth. resistant)	32	1	>32	16	4	8	8	1	4	2	>32	4
<i>S. aureus</i> SMITH (MP) (sensitive)	<0.015	0.06	0.25	0.5	0.12	0.06	<0.015	0.06	0.06	0.03	0.06	0.03
<i>S. aureus</i> IVES 1983 (MP) (meth. resistant)	32	1	>32	16	4	8	8	4	4	2	>32	4
<i>S. aureus</i> ATCC 29213 (sensitive)	<0.015	≤ 0.015	0.12	0.12	0.03	0.06	<0.015	<0.015	≤ 0.015	≤ 0.015	≤ 0.015	≤ 0.015
<i>Enteroc. spp.</i> 12201	0.5	1	32	2	1	0.5	2	4	2	0.05	32	8
<i>S. faecal.</i> ATCC 29212	<0.015	1	8	2	2	0.06	0.25	0.5	0.5	0.5	16	1
<i>S. haemol.</i> AVAH 88-3	NT	0.25	1	1	0.5	0.12	0.12	0.12	0.5	0.25	1	0.12

NG = No growth

NT = Not tested

TABLE II
INHIBITION OF PROTEIN SYNTHESIS BY E. COLI
CELL-FREE RIBOSOMES WITH TETRACYCLINES

5

	<u>Compound</u>	<u>Conc.</u>	<u>% Inhibition</u>	
			<u>Wild Type S30</u>	<u>tetM S30</u>
10	H	1.0 mg/ml	57	29
		0.3 mg/ml	62	21
		0.1 mg/ml	52	19
	L	1.0 mg/ml	90	19
		0.3 mg/ml	91	0
		0.1 mg/ml	66	0
15	A	1.0 ml/ml	93	NT
		0.3 mg/ml	98	NT

NT = Not Tested

20

TABLE III
PROTECTIVE ACTIVITY IN MICE INFECTED WITH
STAPHYLOCOCCUS AUREUS SMITH

	<u>Compound</u>	<u>ED₅₀ (mg/kg)</u>
25	H	4-8
	B	>16
	M	>16
	A HCL	4-8
	A H ₂ SO ₄	4-8
30	J	>16

35

When the compounds are employed as anti-bacterials, they can be combined with one or more pharmaceutically acceptable carriers, for example, solvents, diluents and the like, and may be administered orally in such forms as tablets, capsules, dispersible powders, granules, or suspensions containing, for example, from about 0.05 to 5% of suspending agent, syrups containing, for example, from about 10 to 50% of sugar, and elixirs containing, for example, from about 20 to 50% ethanol, and the like, or parenterally in the form of sterile injectable solutions or suspensions containing from about 0.05 to 5% suspending agent in an isotonic medium. Such pharmaceutical preparations may contain, for example, from about 25 to about 90% of the active ingredient in combination with the carrier, more usually between about 5% and 60% by weight.

An effective amount of compound from 2.0 mg/kg of body weight to 100.0 mg/kg of body weight should be administered one to five times per day via any typical route of administration including but not limited to oral, parenteral (including subcutaneous, intravenous, intramuscular, intrasternal injection or infusion techniques), topical or rectal, in dosage unit formulations containing conventional non-toxic pharmaceutically acceptable carriers, adjuvants and vehicles. It will be understood, however, that the specific dose level and frequency of dosage for any particular patient may be varied and will depend upon a variety of factors including the activity of the specific compound employed, the metabolic stability and length of action of that compound, the age, body weight, general health, sex, diet, mode and time of administration, rate of excretion, drug combination, the severity of the particular condition, and the host undergoing therapy.

These active compounds may be administered orally as well as by intravenous, intramuscular, or subcutaneous routes. Solid carriers include starch,

lactose, dicalcium phosphate, microcrystalline cellulose, sucrose and kaolin, while liquid carriers include sterile water, polyethylene glycols, non-ionic
5 surfactants and edible oils such as corn, peanut and sesame oils, as are appropriate to the nature of the active ingredient and the particular form of administration desired. Adjuvants customarily employed in the preparation of pharmaceutical compositions may be advantageously included, such as flavoring agents, coloring agents, preserving agents, and antioxidants, for example, vitamin E, ascorbic acid, BHT and BHA.
10

The preferred pharmaceutical compositions from the standpoint of ease of preparation and administration are solid compositions, particularly tablets
15 and hard-filled or liquid-filled capsules. Oral administration of the compounds is preferred.

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

The pharmaceutical forms suitable for injectable use include sterile aqueous solutions or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions.
30 In all cases, the form must be sterile and fluid. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or
35 dispersion medium containing, for example, water, ethanol, polyol (e.g., glycerol, propylene glycol and

liquid polyethylene glycol), suitable mixtures thereof,
and vegetable oil.

5 The invention will be more fully described in
conjunction with the following specific examples which
are not to be construed as limiting the scope of the
invention.

10

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Example 1

[7S-(7alpha, 10alpha)]-9-(Aminocarbonyl)-4,7-bis(dimethylamino)-5,5a,6,6a,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenediazonium chloride sulfate (1:1)

To a 0°C solution of 3.0 g of 9-amino-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate dissolved in 100 ml of 0.1N methanolic hydrogen chloride is added, dropwise, 6.6 ml of butyl nitrite. The reaction is stirred at 0°C for 1 hour, poured into 400 ml of diethyl ether, collected and dried to give 2.64 g of the desired product.

MS(FAB): m/z 484 (M + H)

Example 2

[4S-(4alpha, 12aalpha)]-9-Azido-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride (1:1)

To a room temperature solution of 2.64 g of product from Example 1 dissolved in 84 ml of 0.1N methanolic hydrogen chloride is added 0.353 g of sodium azide. The mixture is stirred at room temperature for 4 hours, poured into 500 ml of diethyl ether and collected to give 2.5 g of the desired product.

IR(KBr): 2080 cm⁻¹.

Example 3

[4S-(4alpha, 12aalpha)]-9-Amino-8-chloro-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate

One gram of product from Example 2 is added to 10 ml of 0°C concentrated sulfuric acid. The reaction is stirred at 0°C for 1.5 hours, poured into 500 ml of diethyl ether, collected and dried to give 1.1 g of the desired product.

MS(FAB): m/z 507 (M + H).

Example 4

[4S-(4 α ,12 $\alpha\alpha$)]-

8-Chloro-4,7-bis(dimethylamino)-9-(formylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-
hydroxy-1,11-dioxo-2-naphthacenecarboxamide
sulfate (1:1)

To a 0°C solution of 0.092 g of product from Example 3 dissolved in 5.0 ml of 98% formic acid is added 0.0164 g of sodium acetate. The resulting mixture is stirred at 0°C for 10 minutes, followed by the addition of 0.23 ml of acetic anhydride. The reaction is stirred at room temperature of 1 hour, poured into diethyl ether and collected to give 0.045 g of solid. The collected solid is triturated with 50 ml of ethyl acetate and filtered. The filtrate is concentrated in vacuo to give 0.019 g of the desired product.
MS(FAB): m/z 535 (M + H).

Example 5

[4S-(4 α ,12 $\alpha\alpha$)]-

8-Chloro-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-
octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamide sulfate (1:1)

To a 0°C solution of 0.090 g of product from Example 3 dissolved in 35 ml of 0.1N methanolic hydrogen chloride is added 0.2 ml of butyl nitrite. The reaction is stirred at room temperature for 1 hour, poured into 70 ml of diethyl ether and collected give 0.070 g of the desired diazonium chloride intermediate.

A solution of 0.070 g of the above intermediate dissolved in 20 ml of methyl alcohol is heated at the reflux temperature for 45 minutes, poured into diethyl ether and collected to give 0.056 g of the desired product.

MS(FAB): m/z 491 (M⁺).

Example 6

[4S-(4 α ,12 $\alpha\alpha$)]-

7-Amino-8-chloro-4-(dimethylamino)-1,4,4a,5,5a,6,11,
12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamide hydrochloride (1:1)

Three grams of 7-azido-6-demethyl-6-deoxy-tetracycline hydrochloride, prepared by the procedure described in J. Am. Chem. Soc., 84:1426-1430, is added to 120 ml of cold concentrated hydrochloric acid and stirred for 1 3/4 hours at ice bath temperature. The reaction mixture is concentrated in vacuo to give 2.9 g of the desired product.

MS(FAB): m/z 464 (M + H).

Example 7

[6aS-(6 $\alpha\alpha$,10 $\alpha\alpha$)]-

8-(Aminocarbonyl)-2-chloro-10-(dimethylamino)-5,6a,10,
10a,11,11a,12-octahydro-5,7-dioxo-1-naphtha
cenediazonium chloride hydrochloride

To a 0°C solution of 0.50 g of product from Example 6 dissolved in 15 ml of 0.1N methanolic hydrogen chloride is added 1.0 ml of butyl nitrite. The reaction is stirred at 0°C for 1 hour, poured into 500 ml of diethyl ether and collected to give 0.48 g of the desired product.

IR(KBr): 2200 cm⁻¹.

Example 8

[4S-(4 α ,12 $\alpha\alpha$)]-7-Azido-8-chloro-4-(dimethyl-
amino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

To a room temperature solution of 0.48 g of product from Example 7 dissolved in 20 ml of 0.1N methanolic hydrogen chloride is added 0.055 g of sodium azide. The reaction mixture is stirred at room temperature for 4 hours, poured into 100 ml of diethyl ether and collected to give 0.366 g of the desired product.

MS(FAB): m/z 490 (M + H)

Example 9

[4S-(4 α ,12 $\alpha\alpha$)]-

5 8-Chloro-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-
octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamide hydrochloride (1:1)

10 To a 0°C solution of 0.095 g of product from
Example 6 dissolved in 5 ml of 0.1N methanolic hydrogen
chloride is added 0.3 ml of butyl nitrite. The reac-
tion mixture is stirred at 0°C for 1 hour, poured into
diethyl ether and collected to give 0.070 g of the de-
sired intermediate.

15 A solution of 0.050 g of the above intermedi-
ate dissolved in 15 ml of methyl alcohol is heated at
the reflux temperature for 1 hour and concentrated in
vacuo to give 0.035 g of the desired product.

MS(FAB): m/z 449 (M + H).

Example 10

[4S-(4 α ,12 $\alpha\alpha$)]-

20 9-Amino-8-chloro-4-(dimethylamino)-1,4,4a,5,5a,6,11,
12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamide hydrochloride (1:1)

25 To 10 ml of concentrated hydrochloric acid
at 0°C is added 0.20 g of 9-azido-6-demethyl-6-deoxy-
tetracycline hydrochloride prepared by the procedure
described in J. Am. Chem. Soc., 84: 1426-1430. The
reaction is stirred at 0°C for 1 1/2 hours and concen-
trated in vacuo to give 0.195 g of the desired product.
MS(FAB): m/z 464 (M + H).

30 Example 11

[4S-(4 α ,12 $\alpha\alpha$)]-

8-Chloro-4-(dimethylamino)-9-(formylamino)-1,4,4a,5,5a,
6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-
dioxo-2-naphthacenecarboxamide hydrochloride (1:1)

35 To a 0°C solution of 0.103 g of product from
Example 10, as the hydrochloride, dissolved in 6 ml of
98% formic acid is added 0.23 ml of acetic anhydride.
The resulting mixture is stirred 0°C for 5 minutes

followed by 1 hour at room temperature. The reaction is poured into 500 ml of diethyl ether and collected to give 0.090 g of the desired product.

MS(FAB): m/z 492 (M + H).

Example 12

[4S-(4 α ,12 α)]-

7-Amino-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-9-iodo-1,11-dioxo-2-naphthacenecarboxamide sulfate (1:1)

To a 0°C solution of 0.285 g of 7-amino-6-demethyl-6-deoxytetracycline dissolved in 5 ml of concentrated sulfuric acid is added 1.2 equivalents of N-iodosuccinimide. The reaction is stirred at 0°C for 15 minutes then poured into 400 ml of diethyl ether. The resulting solid is collected and dried to give 0.23 g of the desired product.

¹H NMR(DMSO-d₆): δ 8.0 (C-8 H).

Example 13

[6aS-(6a α ,10a α)]-8-(Aminocarbonyl)-10-(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-3-iodo-5,7-dioxo-1-naphthacene-diazonium chloride sulfate (1:1:1)

To a 0°C solution of 0.15 g of product from Example 12 dissolved in sufficient 0.1N methanolic hydrogen chloride to affect solution is added, dropwise, 0.143 ml of n-butyl nitrite. The reaction is stirred at 0°C for 30-45 minutes then poured into cold, stirring diethyl ether. The resulting solid is collected, washed with diethyl ether and dried to give 0.12 g of the desired product.

¹H NMR(DMSO-d₆): δ 8.52 (C-8 H).

Example 14

[4S-(4alpha, 12aalpha)]-7-Azido-4-(dimethylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-
hydroxy-9-iodo-1,11-dioxo-2-naphthacenecarboxamide
sulfate (1:1)

The title compound is prepared by the procedure of Example 8, using 2.2 g of product from Example 13, 60 ml of 0.1N methanolic hydrogen chloride and 0.203 g of sodium azide to give (after purification) 0.65 g of the desired product.

IR(KBr): 2100 cm^{-1} .

MS(FAB): m/z 582 (M + H).

Example 15

[4S-(4alpha, 12aalpha)]-7-Amino-8-chloro-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-9-iodo-1,11-dioxo-2-naphthacene-carboxamide sulfate (1:1)

A mixture of 0.2 g of product from Example 14 and 1 ml of concentrated hydrochloric acid is stirred at room temperature for 2 hours. The reaction mixture is triturated with iso-propanol and ether, collected and dried to give 0.18 g of the desired product.

MS(FAB): m/z 590 (M + H).

Example 16

[7S-(7alpha, 10aalpha)]-9-(Aminocarbonyl)-4-(diethylamino)-7-(dimethylamino)-5,5a,6,6a,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenediazonium chloride sulfate (2:1)

To a 0°C solution of 1.85 g 9-amino-7-(diethylamino)-6-demethyl-6-deoxytetracycline, prepared by the procedure described in U.S. Patent Application Serial No. 07/771,697, filed October 4, 1991 dissolved in 40 ml of 0.1N methanolic hydrogen chloride is added 1.85 ml of n-butyl nitrite. The reaction mixture is stirred at 0°C for 2 hours, poured into diethyl ether, the solid is collected and washed with diethyl ether to give 2.1 g of the desired product.

¹H NMR(DMSO-d₆): δ7.9 (C-8 H).

Example 17

[4S-(4alpha, 12aalpha)]-9-Azido-7-(diethylamino)-
4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,
12,12a-tetrahydroxy-1,11-dioxo-2-naphthacene-
carboxamide disulfate

To a room temperature solution of 1.192 g of product from Example 16 dissolved in 75 ml of 0.1N methanolic hydrogen chloride is added 0.104 g of sodium azide. The reaction is stirred at room temperature for 2 hours, poured slowly into diethyl ether and collected to give 0.8 g of the desired product.

¹H NMR(DMSO-d₆): δ7.5 (C-8 H).

Example 18

[4S-(4alpha, 12aalpha)]-9-Azido-7-(diethylamino)-
4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,
12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
dihydrochloride

To a room temperature solution of 0.6 g of product from Example 17 dissolved in water is added solid sodium acetate to achieve pH 5. The mixture is extracted 2 times with chloroform, the organic layer is dried over sodium sulfate and concentrated in vacuo.

The residue is redissolved in 5 ml of methanol and 2 drops of concentrated hydrochloric acid is added. The reaction solution is then added dropwise to 120 ml of diethyl ether. The resulting solid is collected to give 0.4 g of the desired product.

IR(KBr): 2100 cm⁻¹.

Example 19

[4S-(4alpha, 12aalpha)]-9-Amino-8-chloro-7-(diethyl-
amino)-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octa-
hydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphtha-
cenecarboxamide sulfate

A mixture of 0.23 g of product from Example 18 and 5 ml of concentrated hydrochloric acid is stirred at room temperature for 2 hours. The resulting

solid is triturated with isopropanol and diethyl ether. The solid is collected, washed with diethyl ether and dried to give 0.21 g of the desired product.

MS(FAB): m/z 535 (M + H).

Example 20

[7S-(7alpha, 10aalpha)]-[9-(Aminocarbonyl)-3-chloro-7-(dimethylamino)-5,5a,6,6a,7,10,10a,12-octahydro-1,8,-10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester

To a room temperature solution of 0.20 g of product from Example 10, dissolved in 4 ml of 1-methyl-2-pyrrolidinone, is added 0.30 g of sodium bicarbonate. The mixture is stirred for 5 minutes followed by the addition of 34 μ l of methyl chloroformate. The reaction is stirred at room temperature for 1 hour, filtered into 200 ml of diethyl ether and collected to give 0.066 g of the desired product.

MS(FAB): m/z 522 (M + H).

Example 21

[4S-(4alpha, 12aalpha)]-8-Chloro-4-(dimethylamino)-9-hydrazino-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide monohydrochloride

To 0.30 g of product from Example 10, dissolved in 8 ml of 0.10 N methanolic hydrogen chloride, is added 0.60 ml of n-butyl nitrite. The reaction is stirred at ice bath temperature for 1 hour, poured into 200 ml of diethyl ether and collected to give 0.260 g. Fifty milligrams of the collected material is added to 3 ml of 6% sulfurous acid, stirred at room temperature for 1 hour and concentrated in vacuo to give 0.037 g of the desired product.

CI-MS: m/z 479 (M + H).

Example 22

[4S-(4alpha, 12aalpha)]-9-Amino-4,7-bis(dimethylamino)-
8-fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

The title compound is prepared by the procedure of Example 3, using the product from Example 2 and liquid hydrogen fluoride.

Example 23

[6aS-(6aalpha, 10alpha)]-3-Amino-8-(aminocarbonyl)-10-
(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6
6a,9-tetrahydroxy-5,7-dioxo-2-naphthacenyl ester
trifluoromethanesulfonic acid

The title compound is prepared by the procedure of Example 3, using 9-azido-6-demethyl-6-deoxytetracycline prepared by the procedure described in J. Am. Chem. Soc., 84:1426-1430 and trifluoromethanesulfonic acid.

Example 24

[4S-(4alpha, 12aalpha)]-9-Amino-4-(dimethylamino)-8-
fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

The title compound is prepared by the procedure of Example 22, using 9-azido-6-demethyl-6-deoxytetracycline prepared by the procedure described in the above reference.

Example 25

[4S-(4alpha, 12aalpha)]-4-(Dimethylamino)-8-fluoro-
9-(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12-
12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

The title compound is prepared by the procedure of Example 4, using the product from Example 24.

Example 26

[4S-(4alpha, 12aalpha)]-4-(Dimethylamino)-8-fluoro-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra
hydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

The title compound is prepared by the procedures described in Examples 1 and 5, using the product from Example 24.

Example 27

[4S-(4alpha, 12alpha)]-4,7-Bis(dimethylamino)-8-fluoro-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-
hydroxy-1,11-dioxo-2-naphthacenecarboxamide

The title compound is prepared by the procedure of Example 5, using the product of Example 22.

Example 28

[7S-(7alpha, 10aalpha)]-[9-(Aminocarbonyl)-7-(dimethyl-
amino)-3-fluoro-5,5a,6,6a,7,10,10a,12-octahydro-1,8-
10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic
acid methyl ester

The title compound is prepared by the procedure of Example 20, using the product from Example 24.

Example 29

[6aS-(6aalpha, 10alpha)]-3-Amino-8-(aminocarbonyl)-1,
10-bis(dimethylamino)-5,6a,7,10,10a,11,11a,12-octa-
hydro-4,6,6a,9-tetrahydroxy-5,7-dioxo-2-naphtha-
cenyl ester trifluoromethanesulfonic acid

The title compound is prepared by the procedure of Example 3, using the product from Example 3 and trifluoromethanesulfonic acid.

Example 30

[4S-(4alpha, 12aalpha)]-7-Amino-4-(dimethylamino)-8-
fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride

The title compound is prepared by the procedure of Example 3, using 7-azido-6-demethyl-6-

deoxytetracycline prepared by the procedure described in J. Am. Chem. Soc., 84:1426-1430 and liquid hydrogen fluoride at -30°C.

Example 31

[7S-(7alpha, 10alpha)]-[9-(Aminocarbonyl)-3-chloro-4,7-bis(dimethylamino)-5,5a,6,6a,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthaceny]carbamic acid 2-(dimethylamino)ethyl ester

The title compound is prepared by the procedure of Example 27, using the product from the Example 3 and beta-dimethylaminoethyl chloroformate.

Example 32

[4S-(4alpha,12alpha)]-8-Chloro-9-[[[(diethylamino)-oxy]carbonyl]amino]-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide

The title compound is prepared by the procedure of Example 27, using the product from Example 3 and diethylaminoxy chloroformate.

Example 33

[4S-(4alpha,12alpha)]-8-Chloro-7-(diethylamino)-4-(dimethylamino)-9-(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate

The title compound is prepared by the procedure of Example 4, using the product from Example 19.

Example 34

[6aS-(6alpha,10alpha)]-[8-(Aminocarbonyl)-2-chloro-10-(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-5,7-dioxo-1-naphthaceny]carbamic acid methyl ester

The title compound is prepared by the procedure of Example 20, using the product from Example 6.

Example 35

[4S-(4 α ,12 $\alpha\alpha$)]-

4-(Dimethylamino)-8-fluoro-7-(formylamino)-1,4,4a,5,-
5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-
dioxo-2-naphthacenecarboxamide hydrochloride

The title compound is prepared by the procedure of Example 4, using the product from Example 8.

Example 36

[7S-(7 α ,10 $\alpha\alpha$)]-[9-(Aminocarbonyl)-7-(dimethyl-
amino)-3-fluoro-5,5a,6,6a,7,10,10a,12-octahydro-1,8,-
10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]-
carbamic acid methyl ester

The title compound is prepared by the procedure of Example 20, using the product from Example 24.

Example 37

[7S-(7 α ,10 $\alpha\alpha$)]-9-(Aminocarbonyl)-7-(dimethyl-
amino)-3-fluoro-5,5a,6,6a,7,10,10a,12-octahydro-1,8,-
10a,11-tetrahydroxy-10,12-dioxo-carbamic acid

The title compound is prepared by the procedure of Example 33, using the product of Example 24.

Example 38

[6S-(6 $\alpha\alpha$,10 α)]-8-(Aminocarbonyl)-10-(dimethyl-
amino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-
tetrahydroxy-3-[(methoxycarbonyl)amino]-5,7-dioxo-
2-naphthacenyl ester trifluoromethanesulfonic acid

The title compound is prepared by the procedure of Example 20, using the product from Example 23.

Example 39

[4S-(4 α ,12 $\alpha\alpha$)]-8-Chloro-4-(dimethylamino)-9-
[[[(dimethylamino)oxy]carbonyl]amino]-1,4,4a,5,5a,6,-
11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-
2-naphthacenecarboxamide

The title compound is prepared by the procedure of Example 20, using the product from Example 10 and dimethylaminoxyl chloroformate.

Example 40

[4S-(4alpha,12aalpha)]-8-Chloro-9-[[[(diethylamino)-
oxy]carbonyl]amino]-4-(dimethylamino)-1,4,4a,5,5a,6,-
11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-
2-naphthacenecarboxamide

The title compound is prepared by the pro-
cedure of Example 20, using the product from Example 10
and diethylamino chloroformate.

Example 41

[4S-(4alpha,12aalpha)]-
9-Amino-8-bromo-4-(dimethylamino)-1,4,4a,5,5a,6,11,
12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamide hydrobromide (1:1)

The title compound is prepared by the pro-
cedure of Example 3, using 9-azido-6-demethyl-6-
deoxytetracycline prepared by the procedure described
on J. Am. Chem. Soc., 84:1426-1430 and a solution of
hydrogen bromide in acetic acid (30 wt%).

Example 42

[4S-(4alpha,12aalpha)]-
9-Amino-8-bromo-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,
11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-
naphthacenecarboxamine hydrobromide

The title compound is prepared by the pro-
cedure of Example 3, using the product from Example 2
and a solution of hydrogen bromide in acetic acid (30
wt%).

Example 43

[4S-(4alpha,12aalpha)]-9-Amino-4,7-bis(dimethylamino)-
8-iodo-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydroiodide

The title compound is prepared by the pro-
cedure of Example 3, using the product from Example 2
and hydroiodic acid.

Example 44

[4S-(4alpha,12aalpha)]-9-Amino-4-(dimethylamino)-8-
5 iodo-1,4,4a,5,5a,11,12,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamine
hydroiodide

The title compound is prepared by the pro-
cedure of Example 3, using 9-azido-6-demethyl-6-
deoxytetracycline prepared by the procedure describefd
10 on J. Am. Chem. Soc., 84:1426-1430 and hydroiodic acid.

Example 45

[7S-(7alpha,10aalpha)]-[9-(Aminocarbonyl)-7-(dimethyl-
amino)-3-iodo-5,5a,6,7,10,10a,12-octahydro-1,8,10a,11-
15 tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic
acid methyl ester

The title compound is prepared by the pro-
cedure of Example 20, using the product from Example
44.

Example 46

[7S-(7alpha,10aalpha)]-[9-(Aminocarbonyl)-3-bromo-7-
20 (dimethylamino)-5,5a,6,7,10,10a,12-octahydro-1,8,10a,
11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic
acid methyl ester

The title compound is prepared by the pro-
cedure of Example 20, using the product from Example
25 41.

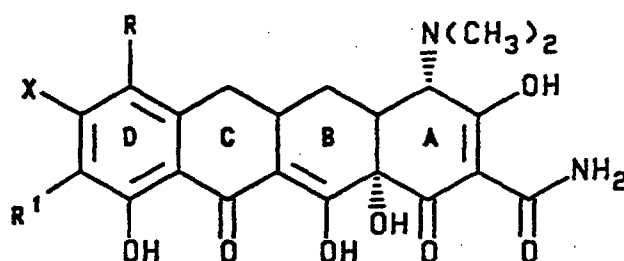


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We claim:

1. A compound of the formula:

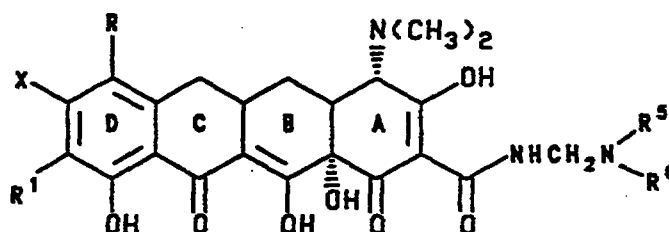
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wherein:

X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine; R and R¹ are the same or different and are selected from hydrogen; nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or -NR²R³;

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and when R or R¹ = -NR²R³ and R² = hydrogen, R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; and when R² = methyl or ethyl,

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R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl; and when R² = n-propyl,





-280-

R^3 = n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl
or 2-methylpropyl;

and when R^2 = 1-methylethyl,

R^3 = n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R^2 = n-butyl,

R^3 = n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R^2 = 1-methylpropyl,

R^3 = 2-methylpropyl;

and when R or R^1 = $-NR^2R^3$ and R^2 = hydrogen,

R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when R^3 = $R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C_1-C_6)alkylamino group se-

lected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-

ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,

2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-

pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methyl-

pentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-

methyl-1-ethylpropylamino and the diastereomers and

enantiomers of said straight or branched mono(C_1-C_6)-

alkylamino group; (C_3-C_8)cycloalkylamino group select-

ed from cyclopropyl, trans-1,2-dimethylcyclopropyl,

cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclo-

propyl, cis-2,3-dimethylcyclopropyl, cyclobutyl,

trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclo-

butyl, cyclopentyl, cyclohexyl, cycloheptyl,

cyclooctyl, bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]-

oct-2-ylamino and the diastereomers and enantiomers of

said (C_3-C_8)cycloalkylamino group; straight or branched

chain di-(C_1-C_6)alkylamino group selected from

dimethylamino, diethylamino, methyl(ethyl)amino, ethyl-

(1-methylethyl)amino or a combination of methyl,

ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-

propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,

2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,

3-methylbutyl, n-hexyl, 1-methylpentyl,



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1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-
ethylpropylamino and the diastereomers and enantiomers
of said straight or branched chain di-(C₁-C₆)alkylamino
group; (C₁-C₆)alkoxyamino group selected from methoxy,
ethoxy, propoxy, butoxy, pentoxy or hexoxyamino;
(C₃-C₈)cyclo-alkoxyamino group selected from
cyclopropoxy, trans-1,2-dimethylcyclopropoxy,
cis-1,2-dimethylcyclo- propoxy,
trans-2,3-dimethylcyclopropoxy, cis-2,3-
dimethylcyclopropoxy, cyclobutoxy, trans-2,3-
dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-
yloxyamino and the diastereomers and enantiomers of
said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxy-
amino group selected from benzyloxy, 2-phenylethoxy,
α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-
methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl
group selected from aziridinyl, azetidiny, pyrro-
lidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl,
cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrro-
lidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo-
[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl,
7-azabicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-
2-yl and the diastereomers and enantiomers of said
(C₂-C₈)azacycloalkyl group; azaheterocycloalkyl group
selected from morpholinyl, piperazinyl, 4-methyl-
piperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxy-
piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl,
isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methyl-
bicyclo[2.2.1]hept-2-yl and the diastereomers and
enantiomers of said azaheterocycloalkyl group; aza-
heterocyclic group selected from 1-imidazolyl,
1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
1-tetrazolyl, and 2-tetrazolyl; carboxy(C₂-C₄)alkyl-



amino group selected from aminoacetic acid, α -amino-propionic acid, or α -aminobutyric acid and their optical isomers; (heterocyclo)amino group selected from 2- or 3-furyl, 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2- or 5-pyridazinyl, 2-pyrazinyl, 2-(imidazolyl)amino and their substituted analogues (substitution selected from straight or branched (C_1-C_6) alkyl); (C_6-C_{10}) aryl amino group selected from phenylamino or naphthylamino; substituted (C_6-C_{10}) aryl amino group selected from 4-(acetamido)phenyl, 2-, 3- or 4-halophenyl, 2-, 3-, or 4- (C_1-C_4) alkylphenyl, or 2-, 3- or 4-carboxyphenylamino; (C_7-C_{10}) arylalkyl amino group selected from benzyl, 2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C_1-C_4) alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C_3-C_6) cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C_3-C_6) cycloalkyl group (substitution selected from (C_1-C_3) alkyl, cyano, amino or (C_1-C_3) acyl); (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) aryl group (substitution selected from halo, (C_1-C_4) alkoxy, trihalo- (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy); (C_7-C_9) aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; α -hydroxy (C_1-C_3) alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; α -mercapto- (C_1-C_3) alkyl group selected from mercaptomethyl, α -mercaptoethyl, α -mercapto-1-methylethyl or α -mercaptopropyl; halo (C_1-C_3) alkyl group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:





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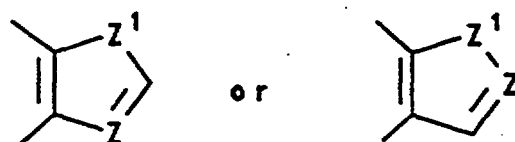


Z = N, O, S or Se

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or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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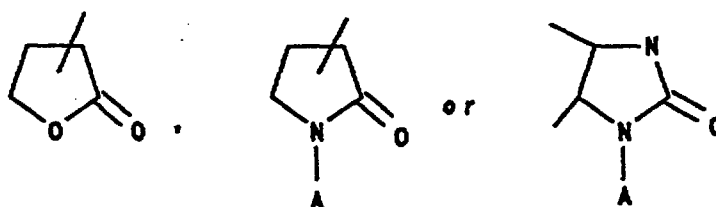


Z or Z' = N, O, S or Se

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or a five membered saturated ring with one or two N, heteroatoms and an adjacent appended O heteroatom:

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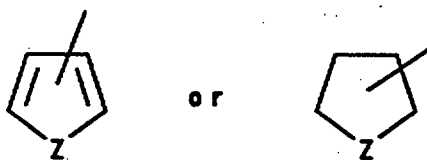
(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; acyl or haloacyl group selected

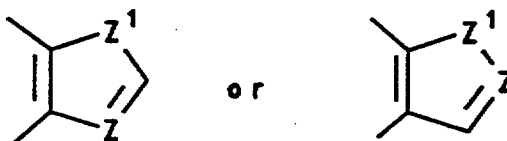


from acetyl, propionyl, chloroacetyl, trifluoroacetyl,
 (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from
 benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl,
 (C₁-C₄)alkylbenzoyl, or (heterocycle)carbonyl, the
 heterocycle selected from a five membered aromatic or
 saturated ring with one N, O, S or Se heteroatom
 optionally having a benzo or pyrido ring fused thereto:



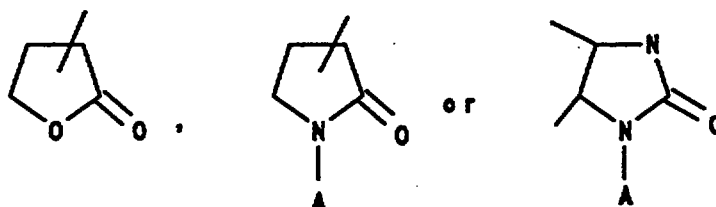
Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:



Z or Z¹ = N, O, S or Se

or a five membered saturated ring with one or two N, O,
 S or Se heteroatoms and an adjacent appended O
 heteroatom:



(A is selected from hydrogen; straight or branched
 (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitu-
 tion selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-
 alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl,
 (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group



selected from benzyl, 1-phenyl- ethyl, 2-phenylethyl or phenylpropyl)

5 or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent
 10 appended O heteroatom; (C_1-C_4) alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched
 15 butoxycarbonyl or allyloxycarbonyl; α -aminomethoxycarbonyl; halomethoxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C_1-C_3) alkyl group, halogen, (C_6-C_{10}) aryl group selected from
 20 phenyl, α -naphthyl, β -naphthyl, substituted (C_6-C_{10}) -aryl group (substitution selected from halo, (C_1-C_4) -alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy), halo (C_1-C_3) alkyl group, a heterocycle group selected
 from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



or



* C L M S *

Z - N, O, S or Se

30 (C_1-C_4) alkoxy group; C_6 -aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C_1-C_4) alkyl, nitro, cyano, thiol, amino, carboxy, di- (C_1-C_3) alkylamino); (C_7-C_{10}) aralkyloxy group; vinyloxy or substituted vinyloxy group (substitution selected from (C_1-C_4) alkyl, cyano, carboxy, or
 35 (C_6-C_{10}) aryl selected from phenyl, α -naphthyl or β -naphthyl); $R^a R^b$ amino (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4) alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,



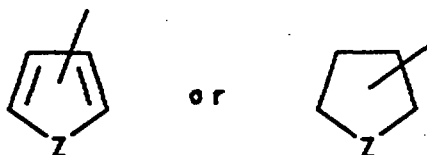
-286-

1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or
 $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is
 5 selected from $-N(C_1-C_3)-$ alkyl [straight or branched],
 $-NH$, $-NOB$ [B is selected from hydrogen or
 (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy group, wherein
 $R^a R^b$ is a straight or branched (C_1-C_4) alkyl selected
 from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
 10 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$,
 $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from
 $-N(C_1-C_3)-$ alkyl [straight or branched], $-NH$, $-NOB$ [B
 is selected from hydrogen or (C_1-C_3) alkyl], O or S;
 and when $R^3 = R^4 (CH_2)_n CO-$ and $n=1-4$,
 15 R^4 is selected from hydrogen; straight or branched
 (C_1-C_4) alkyl group selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
 2-methylpropyl or 1,1-dimethylethyl; (C_3-C_6) cycloalkyl
 group selected from cyclopropyl, cyclobutyl, cyclo-
 20 pentyl or cyclohexyl; substituted (C_3-C_6) cycloalkyl
 group (substitution selected from (C_1-C_3) alkyl, cyano,
 amino or (C_1-C_3) acyl); (C_6-C_{10}) aryl group selected from
 phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) -
 aryl group (substitution selected from halo, (C_1-C_4) -
 5 alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino, cyano,
 (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy);
 (C_7-C_9) aralkyl group; acyloxy or haloacyloxy group,
 selected from acetyl, propionyl, chloroacetyl, tri-
 chloroacetyl, (C_3-C_6) cycloalkylcarbonyl, (C_6-C_{10}) aro-
 30 yl selected from benzoyl or naphthoyl, halo substituted
 (C_6-C_{10}) aro-yl, (C_1-C_4) alkylbenzoyl, (heterocycle)car-
 bonyl, the heterocycle selected from a five membered
 aromatic or saturated ring with one N, O, S or Se
 heteroatom optionally having a benzo or pyrido ring
 35 fused thereto:





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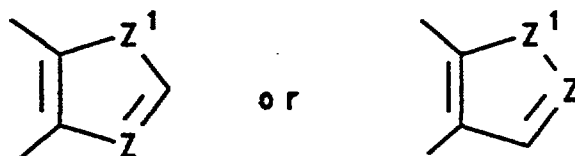


Z = N, O, S or Se

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or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

15

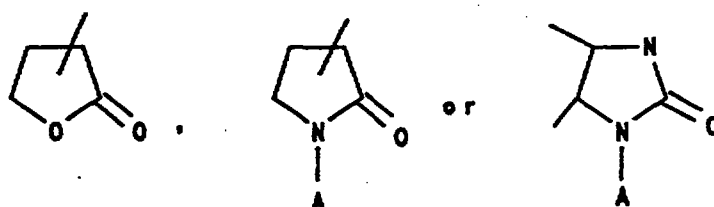


Z or Z¹ = N, O, S or Se

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or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



30

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

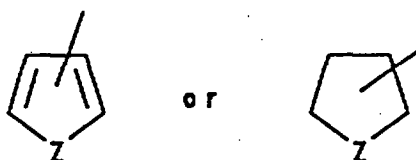
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or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one



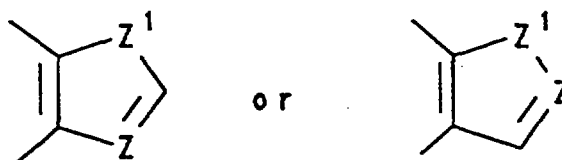
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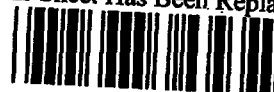
or two N, O, S or Se heteroatoms and an adjacent
 appended O heteroatom; (C₁-C₄)alkoxy group; C₆-aryloxy
 group selected from phenoxy or substituted phenoxy
 (substitution selected from halo, (C₁-C₄)alkyl, nitro,
 cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino);
 (C₇-C₁₀)aralkyloxy group; (C₁-C₃)alkylthio group
 selected from methylthio, ethylthio, propylthio or
 allylthio; C₆-arylthio group selected from phenylthio
 or substituted phenylthio (substitution selected from
 halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino,
 carboxy, di(C₁-C₃)alkylamino); C₆-arylsulfonyl group
 selected from phenylsulfonyl or substituted
 phenylsulfonyl (substitution selected from halo,
 (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino,
 cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or
 carboxy); (C₇-C₈)aralkylthio group; a heterocycle group
 selected from a five membered aromatic or saturated
 ring with one N, O, S or Se heteroatom optionally
 having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

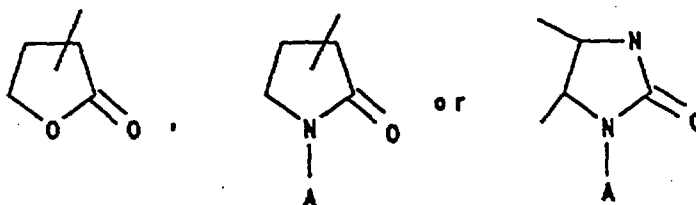
or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:

Z or Z¹ = N, O, S or Se



-289-

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C_1-C_4) alkyl; C_6 -aryl; substituted C_6 -aryl (substitution selected from halo, (C_1-C_4) alkoxy, trihalo- (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxy-carbonyl, (C_1-C_3) alkylamino or carboxy); (C_7-C_9) -aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; hydroxy group; mercapto group; α -hydroxy (C_1-C_3) alkyl group selected from hydroxymethyl, α -hydroxyethyl or α -hydroxy-1-methylethyl or α -hydroxypropyl; halo (C_1-C_3) alkyl group; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C_3-C_6) cycloalkylcarbonyl, (C_6-C_{10}) aroyl selected from benzoyl or naphthoyl, halo substituted (C_6-C_{10}) aroyl, (C_1-C_4) -alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:





5



Z = N, O, S or Se

10

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

15

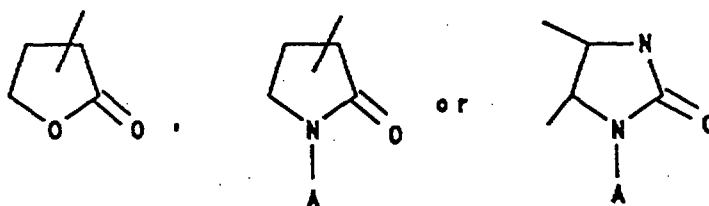


Z or Z' = N, O, S or Se

20

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



30

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

35

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxycarbonyl group



selected from methoxycarbonyl, ethoxycarbonyl, straight
 or branched propoxycarbonyl, allyloxycarbonyl or
 straight or branched butoxycarbonyl; $R^a R^b$ amino-
 5 (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a straight or
 branched (C_1-C_4) alkyl selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 10 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$
 alkyl [straight or branched], $-NH$, $-NOB$ [B is selected
 from hydrogen or (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy
 group, wherein $R^a R^b$ is a straight or branched
 15 (C_1-C_4) alkyl selected from methyl, ethyl, n-propyl,
 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W-$
 $(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl
 [straight or branched], $-NH$, $-NOB$ [B is selected from
 hydrogen or (C_1-C_3) alkyl], O or S;
 and when $R^3 = R^4 (CH_2)_n CO-$ and $n = 2-4$,
 20 R^4 is selected from amino; hydroxyamino; straight or
 branched mono(C_1-C_6)alkylamino group selected from
 methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
 n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-
 25 dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,
 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
 1,2-dimethylbutyl, 1,3-dimethylbutyl or 1-methyl-1-
 ethylpropylamino and the diastereomers and enantiomers
 of said straight or branched mono(C_1-C_6)alkylamino
 30 group; (C_3-C_8) cycloalkylamino group selected from
 cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-
 1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl,
 cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-
 2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl,
 35 cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl,
 bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino
 and the diastereomers and enantiomers of said
 (C_3-C_8) cycloalkylamino group; straight or branched



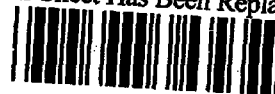
chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers straight or branched chain di-(C₁-C₆)alkylamino group; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yloxyamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-2-yl and the diastereomers and enantiomers of said (C₂-C₈)azacycloalkyl group; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,



2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and the diastereomers and enantiomers of said azahetero-
5 cycloalkyl group; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; carboxy(C₂-C₄)alkylamino group selected from amino-
10 acetic acid, α-aminopropionic acid, or α-aminobutyric acid and their optical isomers; (heterocyclo)amino group selected from 2- or 3-furyl, 2- or 3-thienyl, 2-, 3- or 4-pyridyl, 2- or 5-pyridazinyl, 2-pyrazinyl, or 2-(imidazolyl)amino and their substituted analogues (substitution selected from straight or branched
15 (C₁-C₆)alkyl); (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; substituted (C₆-C₁₀)aryl- amino group selected from 4-(acetamido)phenyl, 2-, 3- or 4-halophenyl, 2-, 3-, or 4-(C₁-C₄)alkylphenyl, or 2-, 3- or 4-carboxyphenylamino; (C₇-C₁₀)arylalkylamino group
20 selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenyl- propylamino; (C₁-C₄)alkoxycarbonylamino group selected from tert-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxy-
25 carbonylamino;
and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0,
R^{4'} is selected from amino; hydroxyamino; straight or
branched mono(C₁-C₆)alkylamino group selected from
30 methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2- dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl- pentyl, 1,1-dimethyl-butyl, 2,2-dimethylbutyl, 3- methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl,
35 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers of said straight or branched mono(C₁-C₆)- alkylamino group; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl,



5 cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkylamino group; straight or branched chain di-(C₁-C₆)alkylamino group selected from 10 dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 15 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers of said straight or branched chain di-(C₁-C₆)alkylamino group; (C₁-C₆)alkoxyamino group selected from methoxy, 20 ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, 25 cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yl-oxyamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrro- 35 lidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-aza-



-295-

bicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-2-yl and the diastereomers and enantiomers of said
(C₂-C₈)azacycloalkyl group; azaheterocycloalkyl group
selected from morpholinyl, piperazinyl, 4-methyl-
piperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxy-
piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl,
isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methyl-
bicyclo[2.2.1]hept-2-yl and the diastereomers and
enantiomers of said azaheterocycloalkyl group;
azaheterocyclic group selected from 1-imidazolyl,
1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group
selected from phenylamino or naphthylamino;
(C₇-C₁₀)arylalkylamino group selected from benzyl,
2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl,
(1-naphthyl)methyl or phenylpropylamino; straight or
branched (C₁-C₄)alkyl group selected from methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl or 1,1-dimethylethyl;
(C₃-C₆)cycloalkyl group selected from cyclopropyl,
cyclobutyl, cyclopentyl or cyclohexyl; substituted
(C₃-C₆)cycloalkyl group (substitution selected from
(C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)-
aryl group selected from phenyl, α -naphthyl or
 β -naphthyl; substituted (C₆-C₁₀)aryl group (substitu-
tion selected from halo, (C₁-C₄)alkoxy, trihalo-
(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycar-
bonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl
group; halo(C₁-C₃)alkyl group; a heterocycle group
selected from a five membered aromatic or saturated
ring with one N, O, S or Se heteroatom optionally
having a benzo or pyrido ring fused thereto:

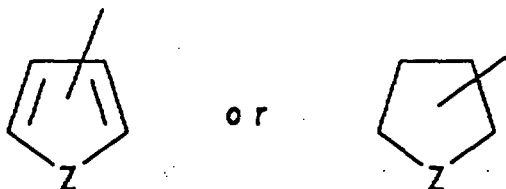


* C L N S *



-296-

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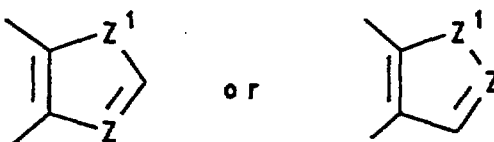


$$Z = N, O, S \text{ or } Se$$

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or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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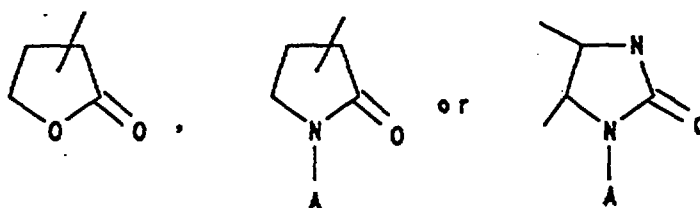


$$Z \text{ or } Z' = N, O, S \text{ or } Se$$

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or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

35

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one

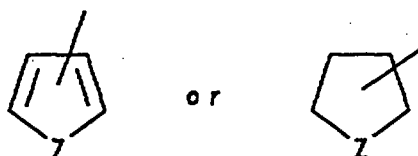


or two N, O, S or Se heteroatoms and an adjacent
 appended O heteroatom; $R^a R^b$ amino(C_1-C_4)alkoxy group,
 wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl
 5 selected from methyl, ethyl, n-propyl, 1-methylethyl,
 n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is
 (CH_2)_n, n=2-6, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected
 from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$
 10 [B is selected from hydrogen or (C_1-C_3)alkyl], O or S;
 or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or
 branched (C_1-C_4)alkyl selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is (CH_2)_n, n=2-6, or $-(CH_2)_2 W-$
 15 (CH_2)₂- wherein W is selected from $-N(C_1-C_3)$ alkyl
 [straight or branched], $-NH$, $-NOB$ [B is selected from
 hydrogen or (C_1-C_3)alkyl], O or S;
 and when $R^3 = R^{4'} (CH_2)_n SO_2-$ and n= 1-4,
 $R^{4'}$ is selected from hydrogen; straight or branched
 20 (C_1-C_4)alkyl group selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
 2-methylpropyl or 1,1-dimethylethyl; (C_1-C_4)carboxy-
 alkyl group; (C_3-C_6)cycloalkyl group selected from
 cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl;
 25 substituted (C_3-C_6)cycloalkyl group (substitution
 selected from (C_1-C_3)alkyl, cyano, amino or (C_1-C_3)-
 acyl); (C_6-C_{10})aryl group selected from phenyl,
 α-naphthyl or β-naphthyl; substituted (C_6-C_{10})aryl
 group (substitution selected from halo, (C_1-C_4)alkoxy,
 trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)-
 30 alkoxy carbonyl, (C_1-C_3)alkylamino or carboxy);
 (C_7-C_9)aralkyl group selected from benzyl, 1-phenyl-
 ethyl, 2-phenylethyl or phenylpropyl; (C_1-C_4)alkoxy
 group; C_6 -aryloxy group selected from phenoxy or
 substituted phenoxy (substitution selected from halo,
 35 (C_1-C_3)alkyl, nitro, cyano, thiol, amino, carboxy,
 di-(C_1-C_3)alkylamino); (C_7-C_{10})aralkyloxy group;
 $R^a R^b$ amino(C_1-C_4)alkoxy group, wherein $R^a R^b$ is a
 straight or branched (C_1-C_4)alkyl selected from methyl,



-298-

ethyl, n-propyl, 1-methylethyl, n-butyl,
 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$,
 n=2-6, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from
 5 $-N(C_1-C_3)alkyl$ [straight or branched], $-NH$, $-NOB$ [B is
 selected from hydrogen or $(C_1-C_3)alkyl$], O or S; or
 $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or
 branched $(C_1-C_4)alkyl$ selected from methyl, ethyl,
 10 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, n=2-6, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$
 $alkyl$ [straight or branched], $-NH$, $-NOB$ [B is selected
 from hydrogen or $(C_1-C_3)alkyl$], O or S; $(C_1-C_3)alkyl-$
 15 thio group selected from methylthio, ethylthio or
 n-propylthio; C_6 -arylthio group selected from
 phenylthio or substituted phenylthio (substitution
 selected from halo, $(C_1-C_3)alkyl$, nitro, cyano, thiol,
 amino, carboxy, di- $(C_1-C_3)alkylamino$); $(C_7-C_8)aralkyl-$
 20 thio group; a heterocycle group selected from a five
 membered aromatic or saturated ring with one N, O, S or
 Se heteroatom optionally having a benzo or pyrido ring
 fused thereto:



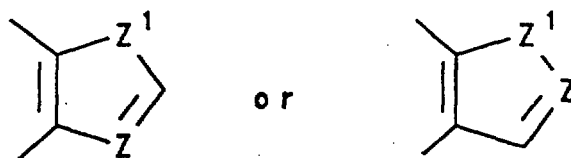
Z = N, O, S or Se

30 or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:





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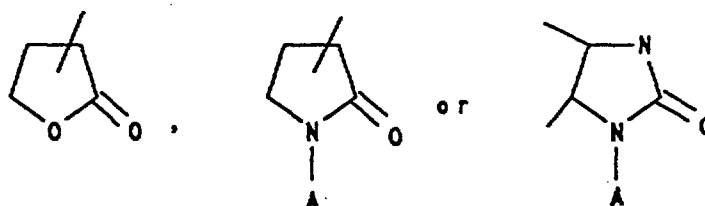


Z or Z¹ = N, O, S or Se

10

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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20

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

25

30

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; hydroxy group; mercapto group; amino; hydroxyamino; straight or branched mono(C₁-C₆)-alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the

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diastereomers and enantiomers of said straight or
branched mono(C_1 - C_6)alkylamino group; (C_3 - C_8)cyclo-
alkylamino group selected from cyclopropyl,
5 trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclo-
propyl, trans-2,3-dimethylcyclopropyl, cis-2,3-di-
methylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclo-
butyl, cis-2,3-dimethylcyclobutyl, cyclopentyl,
10 cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]-
hept-2-yl, bicyclo[2.2.2]oct-2-ylamino and the
diastereomers and enantiomers of said (C_3 - C_8)cyclo-
alkylamino group; straight or branched chain
di-(C_1 - C_6)alkylamino group selected from dimethylamino,
15 diethylamino, methyl(ethyl)amino, ethyl(1-methyl-
ethyl)amino or a combination of methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methyl-
butyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-
methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
20 butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-
dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethyl-
propylamino and the diastereomers and enantiomers of
said straight or branched chain di-(C_1 - C_6)alkylamino
group; (C_1 - C_6)alkoxyamino group selected from methoxy,
25 ethoxy, propoxy, butoxy, pentoxy or hexoxyamino;
(C_3 - C_8)cycloalkoxyamino group selected from cyclo-
propoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-di-
methylcyclopropoxy, trans-2,3-dimethylcyclopropoxy,
cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-
30 2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy,
cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yl-
oxyamino and the diastereomers and enantiomers of said
(C_3 - C_8)cycloalkoxyamino group; (C_7 - C_{10})aralkoxyamino
35 group selected from benzyloxy, 2-phenylethoxy,
 α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-
methoxy, or phenylpropoxyamino; (C_2 - C_8)azacycloalkyl
group selected from aziridinyl, azetidiny, pyrro-



-301-

lidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl,
 cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrro-
 lidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo-
 [2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-
 azabicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-
 2-yl and the diastereomers and enantiomers of said
 (C_2-C_8)azacycloalkyl group; azaheterocycloalkyl group
 selected from morpholinyl, piperazinyl, 4-methyl-
 piperazinyl, 4-hydroxypiperazinyl, 4-(C_1-C_4)alkoxy-
 piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl,
 isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methyl-
 bicyclo[2.2.1]hept-2-yl and their diastereomers and
 enantiomers of said azaheterocycloalkyl group;
 azaheterocyclic group selected from 1-imidazolyl,
 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl),
 1-tetrazolyl, or 2-tetrazolyl; (C_6-C_{10})arylamino group
 selected from phenylamino or naphthylamino;
 (C_7-C_{10})arylalkylamino group selected from benzyl,
 2-phenylethyl, α -phenylethyl, (2-naphthyl)methyl,
 (1-naphthyl)methyl or phenylpropylamino; halo(C_1-C_3)-
 alkyl group; acyl or haloacyl group selected from
 acetyl, propionyl, chloroacetyl, trifluoroacetyl,
 (C_3-C_6)cycloalkylcarbonyl, (C_6-C_{10})aroyl selected from
 benzoyl or naphthoyl, halo substituted (C_6-C_{10})aroyl,
 or (heterocycle)carbonyl, the heterocycle selected from
 a five membered aromatic or saturated ring with one N,
 O, S or Se heteroatom optionally having a benzo or
 pyrido ring fused thereto:



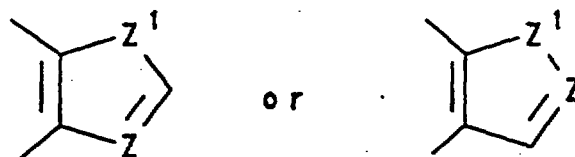
Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:



-302-

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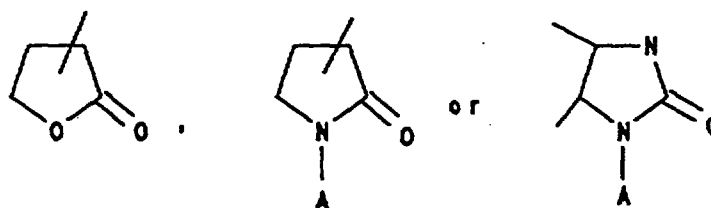


$Z \text{ or } Z^1 = N, O, S \text{ or } Se$

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or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C_1-C_4) alkyl; C_6 -aryl; substituted C_6 -aryl (substitution selected from halo, (C_1-C_4) alkoxy, trihalo- (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxy-carbonyl, (C_1-C_3) alkylamino or carboxy); (C_7-C_9) -aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

30

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C_1-C_4) alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight or branched butoxycarbonyl; R^5 is selected from hydrogen; straight or branched (C_1-C_3) alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; (C_7-C_9) aralkyl group; a heterocycle group

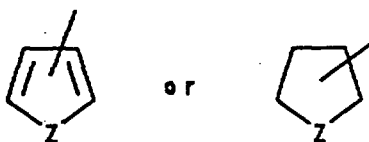
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-303-

selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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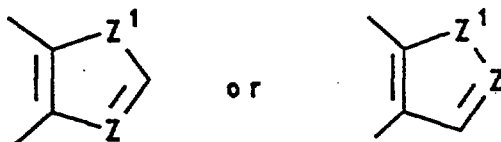


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Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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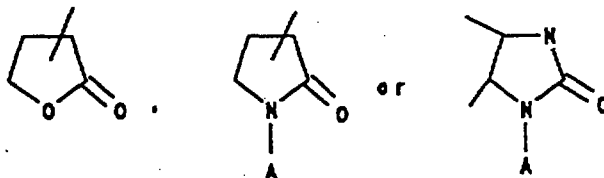


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Z or Z' = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo-(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

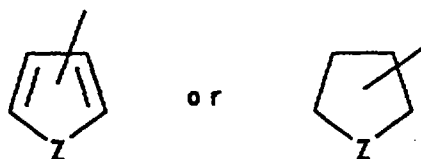
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or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent

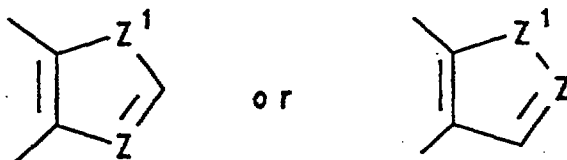


-304-

appended O heteroatom; or $-(CH_2)_nCOOR^7$ where $n=0-4$ and R^7 is selected from hydrogen; straight or branched (C_1-C_3) alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; or (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl, β -naphthyl; R^6 is selected from hydrogen; straight or branched (C_1-C_3) -alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl or β -naphthyl; (C_7-C_9) aralkyl group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

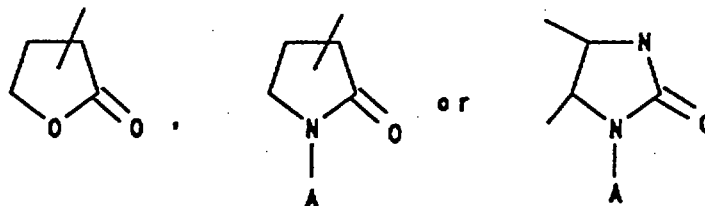
 $Z = N, O, S \text{ or } Se$

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

 $Z \text{ or } Z' = N, O, S \text{ or } Se$

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:





10 (A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)-aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; or -(CH₂)_nCOOR^{7'} where n=0-4 and R^{7'} is selected from hydrogen; straight or branched (C₁-C₃)alkyl selected from methyl, ethyl, n-propyl or 1-methylethyl; or (C₆-C₁₀)aryl selected from phenyl, α-naphthyl or β-naphthyl; with the proviso that R⁵ and R⁶ cannot both be hydrogen;

20 or R⁵ and R⁶ taken together are -(CH₂)₂W(CH₂)₂-, wherein W is selected from (CH₂)_n and n=0-1, -NH, -N(C₁-C₃)alkyl [straight or branched], -N(C₁-C₄)alkoxy, oxygen, sulfur or substituted congeners selected from (L or D)proline, ethyl(L or D)prolinate, morpholine, pyrrolidine or piperidine; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

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2. A compound according to Claim 1,
wherein:

X is selected from halogen or trifluoromethylsulfonyloxy; the halogen is selected from bromine, chlorine, or fluorine;

R and R^1 are the same or different and are selected from hydrogen; amino; halogen (selected from chlorine, bromine, fluorine or iodine); or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl;
 $R^3 =$ methyl or ethyl,

This Sheet Has Been Replaced



* C L M S *



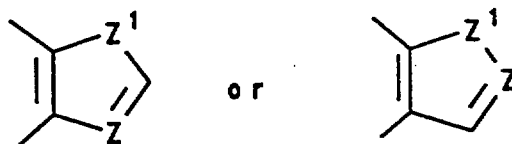
367

and when R or $R^1 = -NR^2R^3$ and $R^2 = \text{hydrogen}$,
 R^3 is selected from $R^4(\text{CH}_2)_n\text{CO-}$ or $R^{4'}(\text{CH}_2)_n\text{SO}_2^-$;
 and when $R^3 = R^4(\text{CH}_2)_n\text{CO-}$ and $n=0$,
 R^4 is selected from hydrogen; straight or branched
 (C_1-C_2) alkyl group selected from methyl or ethyl; a
 heterocycle group selected from a five membered
 aromatic or saturated ring with one N, O, or S
 heteroatom optionally having a benzo or pyrido ring
 fused thereto:



$Z = \text{N, O or S}$

or a five membered aromatic ring with two N, O or S
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:



$Z \text{ or } Z' = \text{N, O, or S}$



(C_1-C_4) alkoxy group; C_6 -aryloxy group selected from
 phenoxy or substituted phenoxy (substitution selected
 from halo, (C_1-C_4) alkyl); $(\text{C}_7-\text{C}_{10})$ aralkyloxy group;
 α -aminomethoxycarbonyl; or halomethoxycarbonyl;

and when $R^3 = R^4(\text{CH}_2)_n\text{CO-}$ and $n=1-4$,
 R^4 is selected from hydrogen; (C_1-C_2) alkyl group
 selected from methyl or ethyl; $(\text{C}_6-\text{C}_{10})$ aryl group
 selected from phenyl, α -naphthyl or β -naphthyl;

and when $R^3 = R^{4'}(\text{CH}_2)_n\text{SO}_2^-$ and $n = 0$,
 $R^{4'}$ is selected from straight or branched (C_1-C_2) alkyl
 group selected from methyl or ethyl; $(\text{C}_6-\text{C}_{10})$ aryl
 group selected from phenyl, α -naphthyl or β -naphthyl;
 R^5 is selected from hydrogen; straight or branched



308

(C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl;

R⁶ is selected from hydrogen; straight or branched

(C₁-C₃)alkyl group selected from methyl, ethyl, n-propyl or 1-methylethyl; with the proviso that R⁵ and R⁶ cannot both be hydrogen;

or R⁵ and R⁶ taken together are -(CH₂)₂W(CH₂)₂-,

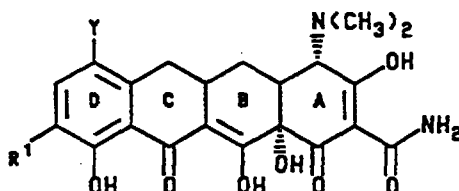
wherein W is selected from (CH₂)_n and n=0-1, -NH,

-N(C₁-C₃)alkyl [straight or branched], -N(C₁-C₄)alkoxy, oxygen, sulfur or substituted congeners selected from

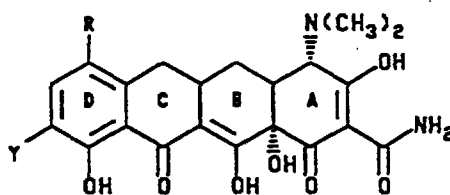
(L or D)proline, ethyl(L or D)prolinate, morpholine, pyrrolidine or piperidine; and the pharmacologically

acceptable organic and inorganic salts or metal complexes.

3 A compound of the formula:



III



IV

wherein:

Y is selected from -N₂⁺Cl⁻ or -N₃;

R or R¹ is selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine);

cyano; hydroxy; or -NR²R³;

and when R or R¹ = -NR²R³ and R² = hydrogen,

R³ = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;





309



and when R^2 = methyl or ethyl,

R^3 = methyl, ethyl, n-propyl, 1-methylethyl, n-butyl,
1-methylpropyl or 2-methylpropyl;

and when R^2 = n-propyl,

R^3 = n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl
or 2-methylpropyl;

and when R^2 = 1-methylethyl,

R^3 = n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R^2 = n-butyl,

R^3 = n-butyl, 1-methylpropyl or 2-methylpropyl;

and when R^2 = 1-methylpropyl,

R^3 = 2-methylpropyl;

and when R or R^1 = $-NR^2R^3$ and R^2 = hydrogen,

R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

and when R^3 = $R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; amino; hydroxyamino;

straight or branched mono(C_1-C_6)alkylamino group se-
lected from methyl, ethyl, n-propyl, 1-methylethyl,

n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-

dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethyl-
propyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,

1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl,

1-methyl-1-ethylpropylamino and the diastereomers and
enantiomers of said straight or branched mono(C_1-C_6)-

alkylamino group; (C_3-C_8)cycloalkylamino group

selected from cyclopropyl, trans-1,2-dimethyl-

cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-

dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,

cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-

dimethylcyclobutyl, cyclopentyl, cyclohexyl, cyclo-

heptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl,

bicyclo[2.2.2]oct-2-ylamino and the diastereomers and

enantiomers of said (C_3-C_8)cycloalkylamino group;

straight or branched chain di-(C_1-C_6)alkylamino group

selected from dimethylamino, diethylamino,

methyl(ethyl)amino, ethyl(1-methylethyl)amino or a



310

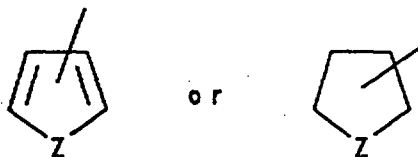


combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers of said straight or branched chain di-
(C₁-C₆)alkylamino group; (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy, propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected from cyclopropoxy, trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yloxyamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, or 2-azabicyclo[2.2.2]oct-2-yl and where appropriate their diastereomers and enantiomers; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, or 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and where appropriate their diastereomers and enantiomers; azaheterocyclic



311

group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; α-hydroxy-(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl, α-hydroxy-1-methylethyl or α-hydroxypropyl; α-mercapto(C₁-C₃)alkyl group selected from mercaptomethyl, α-mercaptoethyl, α-mercapto-1-methylethyl or α-mercaptopropyl; halo(C₁-C₃)alkyl group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



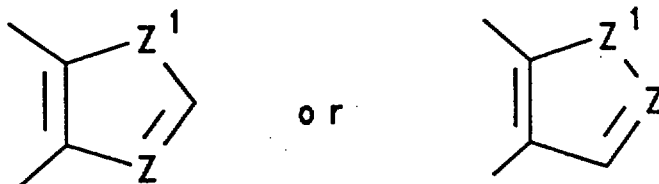
Z = N, O, S or Se





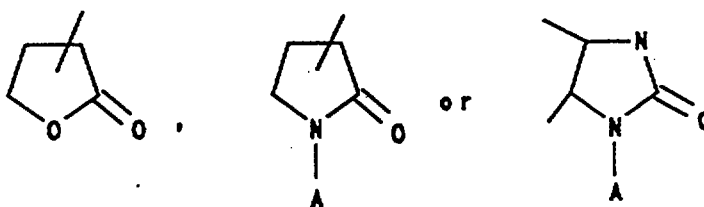
312

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



$Z \text{ or } Z^1 = N, O, S \text{ or } Se$

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



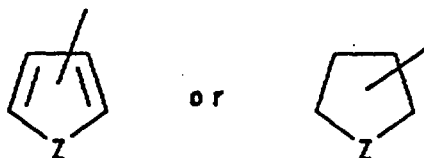
(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl, (C₁-C₄)alkylbenzoyl, or (heterocycle)carbonyl, the



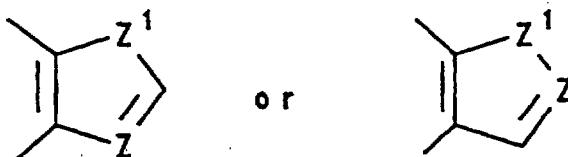
3.13

heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



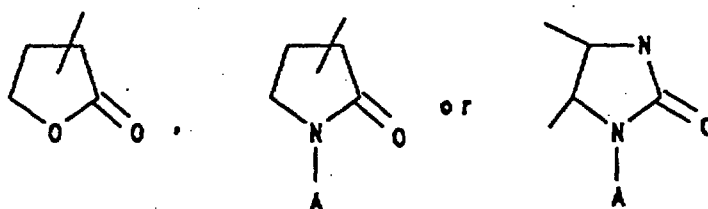
Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)



* C L M S *



314

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent
 5 appended O heteroatom; (C_1-C_4) alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight or branched
 10 butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C_1-C_3) alkyl group, halogen, (C_6-C_{10}) aryl group selected from phenyl, α -naphthyl, β -naphthyl, sub-
 15 stituted (C_6-C_{10}) aryl group (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy), halo (C_1-C_3) alkyl group, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

25 (C_1-C_4) alkoxy group; C_6 -aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C_1-C_4) alkyl, nitro, cyano, thiol, amino, carboxy, di- (C_1-C_3) alkylamino); (C_7-C_{10}) aralkyloxy group; vinyloxy or substituted vinyloxy group (sub-
 30 stitution selected from (C_1-C_4) alkyl, cyano, carboxy, or (C_6-C_{10}) aryl selected from phenyl, α -naphthyl or β -naphthyl); $R^a R^b$ amino (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4) alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W (CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ -alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) -
 35



315

alkyl], O or S; or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a
 straight or branched (C_1-C_4) alkyl selected from methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from
 $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is
 selected from hydrogen or (C_1-C_3) alkyl], O or S;
 and when $R^3 = R^4(CH_2)_n CO-$ and $n=1-4$,
 R^4 is selected from hydrogen; straight or branched
 (C_1-C_4) alkyl group selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
 2-methylpropyl or 1,1-dimethylethyl; (C_3-C_6) cycloalkyl
 group selected from cyclopropyl, cyclobutyl, cyclo-
 pentyl or cyclohexyl; substituted (C_3-C_6) cycloalkyl
 group (substitution selected from (C_1-C_3) alkyl, cyano,
 amino or (C_1-C_3) acyl); (C_6-C_{10}) aryl group selected from
 phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) -
 aryl group (substitution selected from halo,
 (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino,
 cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or
 carboxy); (C_7-C_9) aralkyl group; acyloxy or haloacyloxy
 group, selected from acetyl, propionyl, chloroacetyl,
 trichloroacetyl, (C_3-C_6) cycloalkylcarbonyl, (C_6-C_{10}) -
 aroyl selected from benzoyl or naphthoyl, halo
 substituted (C_6-C_{10}) aroyl, (C_1-C_4) alkylbenzoyl,
 (heterocycle)carbonyl, the heterocycle selected from a
 five membered aromatic or saturated ring with one N, O,
 S or Se heteroatom optionally having a benzo or pyrido
 ring fused thereto:

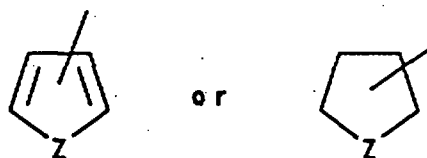


* C L M S *



316

5



Z = N, O, S or Se

10

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

15

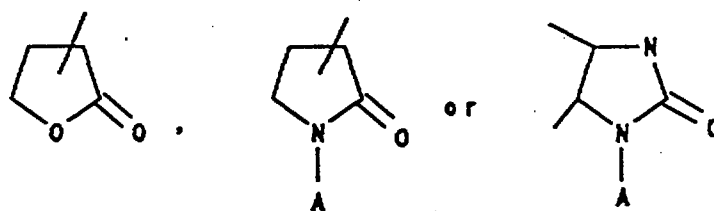


Z or Z¹ = N, O, S or Se

20

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

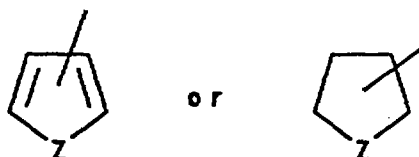
35

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring



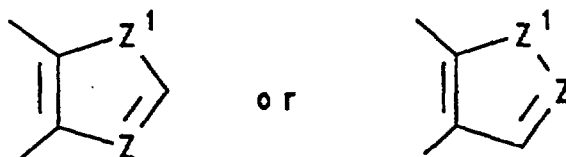
317

with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxy group; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkyl-amino); (C₇-C₁₀)aralkyloxy group; (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₈)aralkylthio group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



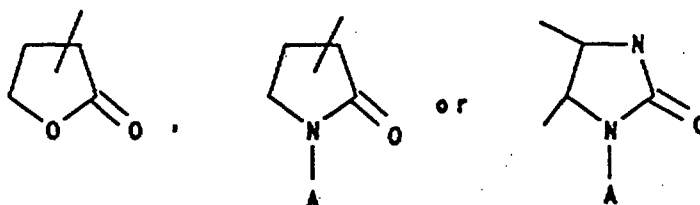
Z or Z' = N, O, S or Se





318

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; hydroxy group; mercapto group; α-hydroxy(C₁-C₃)alkyl group selected from hydroxymethyl, α-hydroxyethyl or α-hydroxy-1-methylethyl or α-hydroxypropyl; halo(C₁-C₃)alkyl group; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl, (C₁-C₄)-alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:





319

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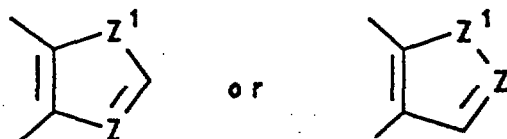


Z = N, O, S or Se

10

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

15

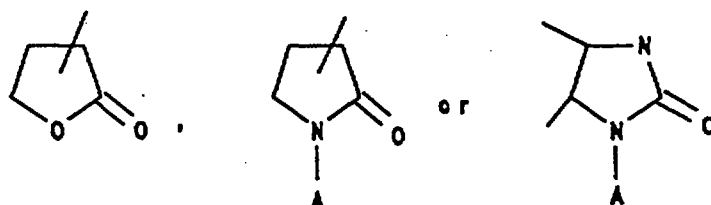


Z or Z¹ = N, O, S or Se

20

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

35

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxycarbonyl



320



group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight butoxycarbonyl; $R^a R^b$ amino(C_1-C_4)alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; and when $R^3 = R^4(CH_2)_n CO-$ and $n = 2-4$, R^4 is selected from amino; hydroxyamino; straight or branched mono(C_1-C_6)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers of said straight or branched mono(C_1-C_6)alkylamino group; (C_3-C_8)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino and the diastereomers and enantiomers of said (C_3-C_8)cycloalkylamino group;



straight or branched chain di-(C₁-C₆)alkylamino group
selected from dimethylamino, diethylamino,
methyl(ethyl)amino, ethyl(1-methylethyl)amino or a com-
bination of methyl, ethyl, n-propyl, 1-methylethyl,
n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
2,2-dimethylpropyl, 3-methylbutyl, n-hexyl,
1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl,
1-methyl-1-ethylpropylamino and the diastereomers and
enantiomers of said straight or branched chain
di-(C₁-C₆)alkylamino group; (C₁-C₆)alkoxyamino group
selected from methoxy, ethoxy, propoxy, butoxy, pentoxy
or hexoxyamino; (C₃-C₈)cycloalkoxyamino group selected
from cyclopropoxy, trans-1,2-dimethylcyclopropoxy,
cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclo-
propoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy,
trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclo-
butoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy,
cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy,
bicyclo[2.2.1]oct-2-yloxyamino and the diastereomers
and enantiomers of said (C₃-C₈)cycloalkoxyamino group;
(C₇-C₁₀)aralkoxyamino group selected from benzyloxy,
2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy,
(1-naphthyl)methoxy, or phenylpropoxyamino;
(C₂-C₈)azacycloalkyl group selected from aziridinyl,
azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl,
2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl,
trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]-
hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo-
[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl,
2-azabicyclo[2.2.2]oct-2-yl and the diastereomers and
enantiomers of said (C₂-C₈)azacycloalkyl group;
azaheterocycloalkyl group selected from morpholinyl,
piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl,
4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetra-
hydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl,



2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and the diastereomers and enantiomers of said azaheterocycloalkyl group; azaheterocyclic group selected from 1-imidazolyl, 1-pyrrolyl, 1-(1,2,3-triazolyl), 4-(1,2,4-triazolyl), 1-tetrazolyl, or 2-tetrazolyl; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the diastereomers and enantiomers of said straight or branched mono(C₁-C₆)alkylamino group; (C₃-C₈)cycloalkylamino group selected from cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkylamino group; straight or branched chain di-(C₁-C₆)alkylamino group selected from dimethylamino, diethylamino, methyl(ethyl)amino, ethyl(1-methylethyl)amino or a combination of methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-

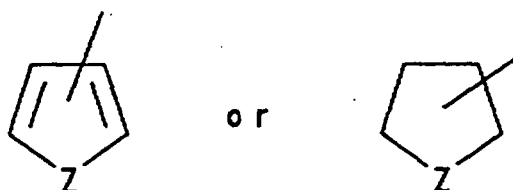


5 propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino
and the diastereomers and enantiomers of said straight
or branched chain di-(C₁-C₆)alkylamino group;
10 (C₁-C₆)alkoxyamino group selected from methoxy, ethoxy,
propoxy, butoxy, pentoxy or hexoxyamino; (C₃-C₈)cyclo-
alkoxyamino group selected from cyclopropoxy, trans-
1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy,
trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclo-
propoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy,
15 cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohex-
oxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-
2-yloxy, bicyclo[2.2.1]oct-2-yloxyamino and the
diastereomers and enantiomers of said (C₃-C₈)cyclo-
alkoxyamino group; (C₇-C₁₀)aralkoxyamino group select-
20 ed from benzyloxy, 2-phenylethoxy, α-phenylethoxy,
(2-naphthyl)methoxy, (1-naphthyl)methoxy, or
phenylpropoxyamino; (C₂-C₈)azacycloalkyl group select-
ed from aziridinyl, azetidiny, pyrrolidinyl,
pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl,
25 cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrro-
lidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo-
[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-aza-
bicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-2-yl
and the diastereomers and enantiomers of said (C₂-C₈)-
30 azacycloalkyl group; azaheterocycloalkyl group selected
from morpholinyl, piperazinyl, 4-methylpiperazinyl,
4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl,
thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazo-
lidinyl, pyrazolidinyl, 2-methylpyrazolidinyl,
35 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methyl-
bicyclo[2.2.1]hept-2-yl and the diastereomers and
enantiomers of said azaheterocycloalkyl group;
(C₆-C₁₀)arylamino group selected from phenylamino or



324

naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group; halo(C₁-C₃)alkyl group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

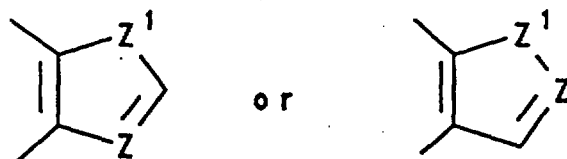
or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:





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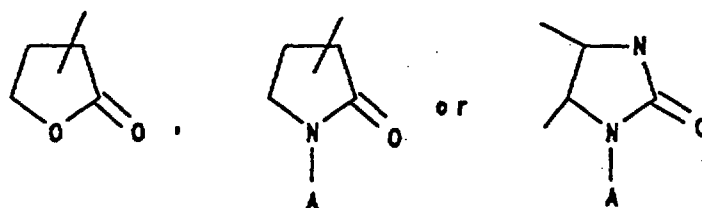


Z or Z' = N, O, S or Se

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or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

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(A is selected from hydrogen; straight or branched (C_1-C_4) alkyl; C_6 -aryl; substituted C_6 -aryl (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) -alkyl, nitro, amino, cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy); (C_7-C_9) aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

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or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; $R^a R^b$ amino (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4) alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3) alkyl], O or S; or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4) alkyl selected from methyl, ethyl,

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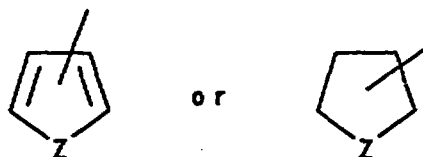


n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$
 alkyl [straight or branched], $-NH$, $-NOB$ [B is selected
 from hydrogen or (C_1-C_3) alkyl], O or S;
 and when $R^3 = R^{4'} (CH_2)_n SO_2-$ and $n=1-4$,
 $R^{4'}$ is selected from hydrogen; amino; straight or
 branched (C_1-C_4) alkyl group selected from methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, 2-methylpropyl or 1,1-dimethylethyl;
 (C_1-C_4) carboxyalkyl group; (C_3-C_6) cycloalkyl group
 selected from cyclopropyl, cyclobutyl, cyclopentyl or
 cyclohexyl; substituted (C_3-C_6) cycloalkyl group sub-
 stitution selected from (C_1-C_3) alkyl, cyano, amino or
 (C_1-C_3) acyl; (C_6-C_{10}) aryl group selected from phenyl,
 α -naphthyl or β -naphthyl; substituted (C_6-C_{10}) aryl
 group (substitution selected from halo, (C_1-C_4) alkoxy,
 trihalo (C_1-C_3) alkyl, nitro, amino, cyano, $(C_1-C_4)-$
 alkoxy carbonyl, (C_1-C_3) alkylamino or carboxy);
 (C_7-C_9) aralkyl group selected from benzyl, 1-phenyl-
 ethyl, 2-phenylethyl or phenylpropyl; (C_1-C_4) alkoxy
 group; C_6 -aryloxy group selected from phenoxy or
 substituted phenoxy (substitution selected from halo,
 (C_1-C_3) alkyl, nitro, cyano, thiol, amino, carboxy,
 di- (C_1-C_3) alkylamino); (C_7-C_{10}) aralkyloxy group;
 $R^a R^b$ amino (C_1-C_4) alkoxy group, wherein $R^a R^b$ is a
 straight or branched (C_1-C_4) alkyl selected from methyl,
 ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
 propyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from
 $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is
 selected from hydrogen or (C_1-C_3) alkyl], O or S; or
 $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or
 branched (C_1-C_4) alkyl selected from methyl, ethyl,
 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or
 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or
 $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)-$



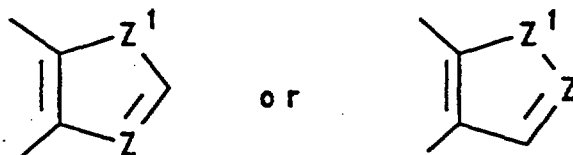
327

alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; (C₁-C₃)alkylthio group selected from methylthio, ethylthio or n-propylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₃)alkyl, nitro, cyano, thiol, amino, carboxy, di(C₁-C₃)alkylamino); (C₇-C₈)aralkylthio group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z¹ = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

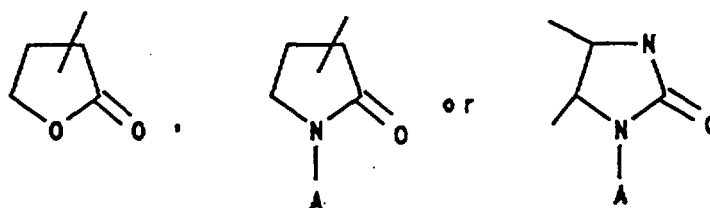


* C L M S *



328

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

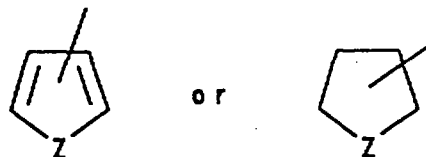
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or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; hydroxy group; mercapto group; halo(C₁-C₃)alkyl group; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl, (C₁-C₄)alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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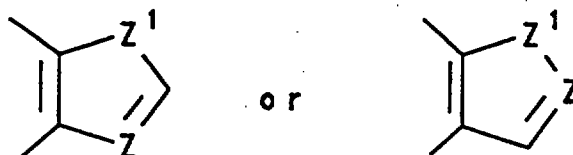
Z = N, O, S or Se



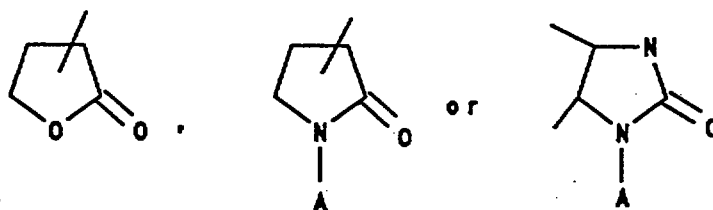


329

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or $Z^1 = N, O, S$ or Se
or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C_1-C_4) alkyl; C_6 -aryl; substituted C_6 -aryl (substitution selected from halo, (C_1-C_4) alkoxy, trihalo (C_1-C_3) -alkyl, nitro, amino, cyano, (C_1-C_4) -alkoxycarbonyl, (C_1-C_3) alkylamino or carboxy); (C_7-C_9) -aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

or a six membered aromatic ring with one to three heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C_1-C_4) alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight butoxycarbonyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

4 A compound according to Claim 3 wherein:
 Y is $-N_2^+Cl^-$ or $-N_3$;
 R or R^1 are selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;
 and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl;
 $R^3 =$ methyl or ethyl,
 and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,
 R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$;

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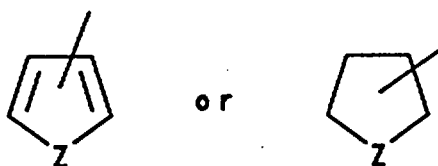
* C L M S *



331

and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,
 R^4 is selected from hydrogen; straight or branched
 (C_1-C_2) alkyl group selected from methyl or ethyl; a
 heterocycle group selected from a five membered aro-
 matic or saturated ring with one N, O, or S heteroatom
 optionally having a benzo or pyrido ring fused thereto:

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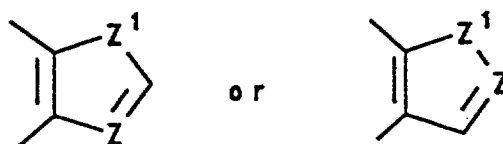


$Z = N, O \text{ or } S$

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or a five membered aromatic ring with two N, O or S
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:

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$Z \text{ or } Z^1 = N, O, \text{ or } S$

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(C_1-C_4) alkoxy group; C_6 -aryloxy group selected from
 phenoxy or substituted phenoxy (substitution selected
 from halo, (C_1-C_4) alkyl); (C_7-C_{10}) aralkyloxy group and
 when $R^3 = R^4(CH_2)_nCO-$ and $n=1-4$,

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R^4 is selected from hydrogen; (C_1-C_2) alkyl group se-
 lected from methyl or ethyl; (C_6-C_{10}) aryl group select-
 ed from phenyl, α -naphthyl or β -naphthyl;

and when $R^3 = R^{4'}(CH_2)_nSO_2-$ and $n = 0$,

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$R^{4'}$ is selected from straight or branched (C_1-C_2) alkyl
 group selected from methyl or ethyl; (C_6-C_{10}) aryl group
 selected from phenyl, α -naphthyl or β -naphthyl; and
 the pharmacologically acceptable organic and inorganic
 salts or metal complexes.

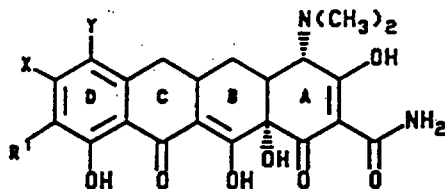
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A compound of the formula:

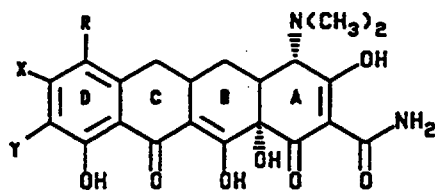




332



V



VI

wherein:

Y is selected from $-N_2^+Cl^-$ or N_3 ;

X is selected from halogen or trifluoromethanesulfonyloxy; the halogen is selected from bromine, chlorine, fluorine or iodine;

R or R^1 is selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl;

and when $R^2 =$ methyl or ethyl,

$R^3 =$ methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ n-propyl,

$R^3 =$ n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ 1-methylethyl,

$R^3 =$ n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ n-butyl,

$R^3 =$ n-butyl, 1-methylpropyl or 2-methylpropyl;

and when $R^2 =$ 1-methylpropyl,

$R^3 =$ 2-methylpropyl;





333



and when R or $R^1 = -NR^2R^3$ and $R^2 = \text{hydrogen}$,
 R^3 is selected from $R^4(\text{CH}_2)_n\text{CO-}$ or $R^{4'}(\text{CH}_2)_n\text{SO}_2^-$;
 and when $R^3 = R^4(\text{CH}_2)_n\text{CO-}$ and $n=0$,
 R^4 is selected from hydrogen; amino; hydroxyamino;
 straight or branched mono($\text{C}_1\text{-C}_6$)alkylamino group se-
 lected from methyl, ethyl, n-propyl, 1-methylethyl,
 n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethyl-
 ethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl,
 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methyl-
 pentyl, 1,1-dimethylbutyl, 2,2-dimethylbutyl,
 3-methylpentyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl,
 1-methyl-1-ethylpropylamino and the diastereomers and
 enantiomers of said straight or branched mono($\text{C}_1\text{-C}_6$)-
 alkylamino group; ($\text{C}_3\text{-C}_8$)cycloalkylamino group se-
 lected from cyclopropyl, trans-1,2-dimethyl-
 cyclopropyl, cis-1,2-dimethylcyclopropyl, trans-2,3-
 dimethylcyclopropyl, cis-2,3-dimethylcyclopropyl,
 cyclobutyl, trans-2,3-dimethylcyclobutyl, cis-2,3-
 dimethylcyclobutyl, cyclopentyl, cyclohexyl, cyclo-
 heptyl, cyclooctyl, bicyclo[2.2.1]hept-2-yl, bicyclo-
 [2.2.2]oct-2-ylamino and the diastereomers and
 enantiomers of said ($\text{C}_3\text{-C}_8$)cycloalkylamino group;
 straight or branched chain di-($\text{C}_1\text{-C}_6$)alkylamino group
 selected from dimethylamino, diethylamino, methyl-
 (ethyl)amino, ethyl(1-methylethyl)amino or a combina-
 tion of methyl, ethyl, n-propyl, 1-methylethyl,
 n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-
 dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-
 dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl,
 n-hexyl, 1-methylpentyl, 1,1-dimethylbutyl, 2,2-
 dimethylbutyl, 3-methylpentyl, 1,2-dimethylbutyl,
 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino and the
 diastereomers and enantiomers of said straight or
 branched chain di-($\text{C}_1\text{-C}_6$)alkylamino group; ($\text{C}_1\text{-C}_6$)-
 alkoxyamino group selected from methoxy, ethoxy, pro-
 poxy, butoxy, pentoxy or hexoxyamino; ($\text{C}_3\text{-C}_8$)cyclo-
 alkoxyamino group selected from cyclopropoxy, trans-



1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yloxyamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-2-yl and the diastereomers and enantiomers of said (C₂-C₈)azacycloalkyl group; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxypiperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and the diastereomers and enantiomers of said azaheterocycloalkyl group; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; straight or branched (C₁-C₄)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C₃-C₆)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; substituted (C₃-C₆)cycloalkyl group (substitution selected from (C₁-C₃)alkyl, cyano, amino or (C₁-C₃)acyl); (C₆-C₁₀)-



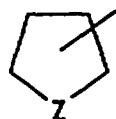
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aryl group selected from phenyl, α -naphthyl or β -naphthyl; substituted (C_6-C_{10})aryl group (substitution selected from halo, (C_1-C_4)alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano, (C_1-C_4)-alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy); (C_7-C_9)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl; α -hydroxy- (C_1-C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl, α -hydroxy-1-methylethyl or α -hydroxypropyl; α -mercapto(C_1-C_3)alkyl group selected from mercaptomethyl, α -mercaptoethyl, α -mercapto-1-methylethyl or α -mercaptopropyl; halo(C_1-C_3)alkyl group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

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or

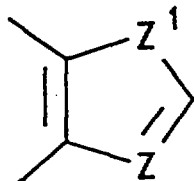


Z = N, O, S or Se

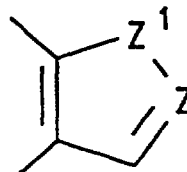
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or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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or



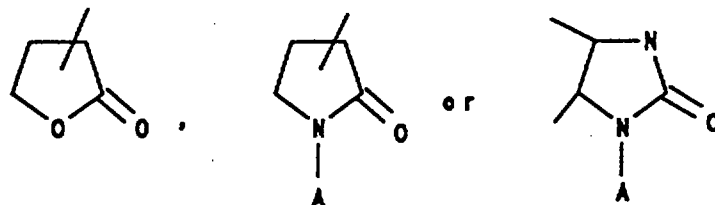
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Z or Z¹ = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



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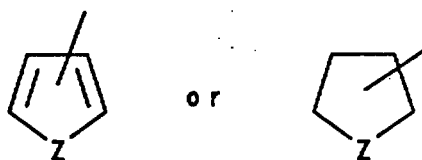


10 (A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

20 or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl, (C₁-C₄)alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

25



35 Z = N, O, S or Se



or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



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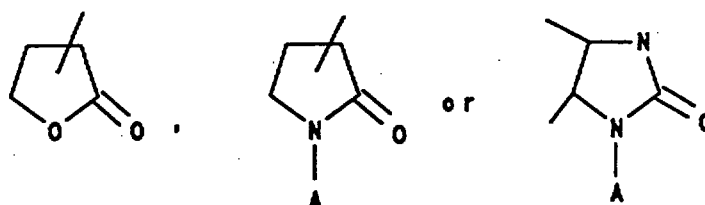


Z or Z¹ - N, O, S or Se

10

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

15



20

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

25

30

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, straight butoxycarbonyl or allyloxycarbonyl; vinyl or substituted vinyl group [substitution selected from (C₁-C₃)alkyl group, halogen, (C₆-C₁₀)aryl group selected from phenyl, α-naphthyl, β-naphthyl, substituted (C₆-C₁₀)aryl group (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy),

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338

halo(C_1-C_3)alkyl group, a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



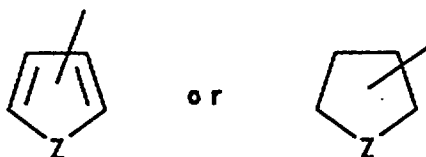
Z - N, O, S or Se



(C_1-C_4)alkoxy group; C_6 -aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C_1-C_4)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C_1-C_3)alkylamino); (C_7-C_{10})aralkyloxy group; vinyloxy or substituted vinyloxy group (substitution selected from (C_1-C_4)alkyl, cyano, carboxy, or (C_6-C_{10})aryl selected from phenyl, α -naphthyl or β -naphthyl); $R^a R^b$ amino(C_1-C_4)alkoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3)alkyl], O or S; or $R^a R^b$ aminoxy group, wherein $R^a R^b$ is a straight or branched (C_1-C_4)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or $R^a R^b$ is $(CH_2)_n$, $n=2-6$, or $-(CH_2)_2 W(CH_2)_2-$ wherein W is selected from $-N(C_1-C_3)$ alkyl [straight or branched], $-NH$, $-NOB$ [B is selected from hydrogen or (C_1-C_3)alkyl], O or S; and when $R^3 = R^4 (CH_2)_n CO-$ and $n=1-4$, R^4 is selected from hydrogen; straight or branched (C_1-C_4)alkyl group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl or 1,1-dimethylethyl; (C_3-C_6)cycloalkyl group selected from cyclopropyl, cyclobutyl, cyclo-

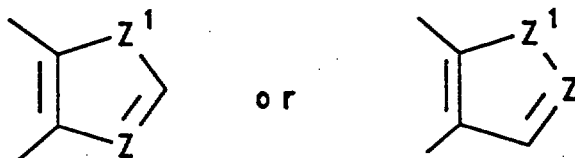


pentyl or cyclohexyl; substituted (C_3-C_6)cycloalkyl
 group (substitution selected from (C_1-C_3)alkyl, cyano,
 amino or (C_1-C_3)acyl); (C_6-C_{10})aryl group selected from
 phenyl, α -naphthyl or β -naphthyl; substituted(C_6-C_{10})-
 aryl group (substitution selected from halo, (C_1-C_4)-
 alkoxy, trihalo(C_1-C_3)alkyl, nitro, amino, cyano,
 (C_1-C_4)alkoxycarbonyl, (C_1-C_3)alkylamino or carboxy);
 (C_7-C_9)aralkyl group; acyloxy or haloacyloxy group,
 selected from acetyl, propionyl, chloroacetyl, tri-
 chloroacetyl, (C_3-C_6)cycloalkylcarbonyl, (C_6-C_{10})-
 aroyl selected from benzoyl or naphthoyl, halo substi-
 tuted (C_6-C_{10})aroyl, (C_1-C_4)alkylbenzoyl, (hetero-
 cycle)carbonyl, the heterocycle selected from a five
 membered aromatic or saturated ring with one N, O, S or
 Se heteroatom optionally having a benzo or pyrido ring
 fused thereto:



$Z = N, O, S \text{ or } Se$

or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 fused thereto:



$Z \text{ or } Z^1 = N, O, S \text{ or } Se$

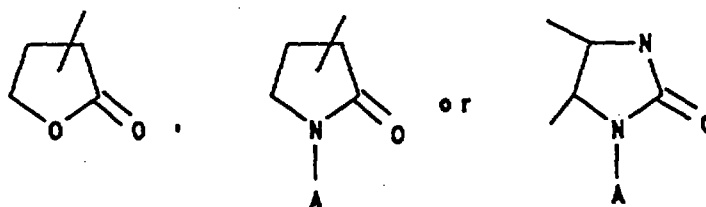
or a five membered saturated ring with one or two N, O,
 S or Se heteroatoms and an adjacent appended O hetero-
 atom:





340

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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

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or a six membered aromatic ring with one to three N, heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxy group; C₆-aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group; (C₁-C₃)alkylthio group selected from methylthio, ethylthio, propylthio or allylthio; C₆-arylthio group selected from phenylthio or substituted phenylthio (substitution selected from halo, (C₁-C₄)alkyl, nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkylamino); C₆-arylsulfonyl group selected from phenylsulfonyl or substituted phenylsulfonyl (substitution selected from halo, (C₁-C₄)-alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₈)aralkylthio group; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

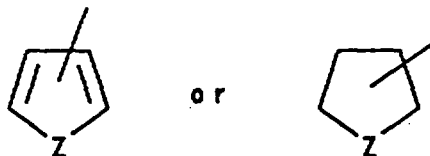
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341

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or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

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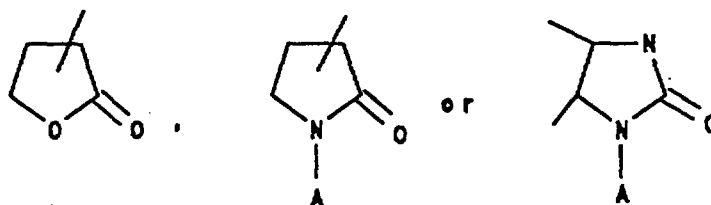


Z or Z¹ = N, O, S or Se

20

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



30

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo- (C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

35

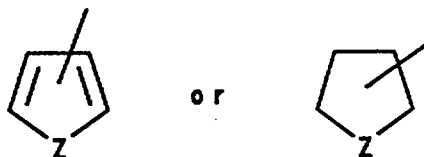
or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring





342

with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; hydroxy group; mercapto group; α -hydroxy(C_1 - C_3)alkyl group selected from hydroxymethyl, α -hydroxyethyl or α -hydroxy-1-methyl-ethyl or α -hydroxypropyl; halo(C_1 - C_3)alkyl group; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C_3 - C_6)cycloalkylcarbonyl, (C_6 - C_{10})aroyl selected from benzoyl or naphthoyl, halo substituted (C_6 - C_{10})aroyl, (C_1 - C_4)alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or Z' = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

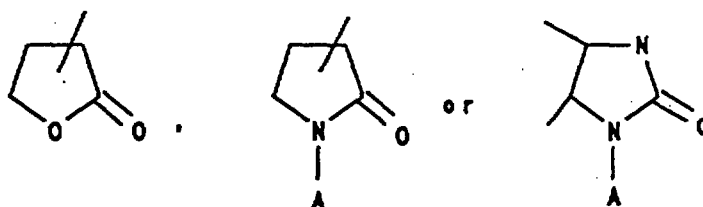


* C L M S *



343

5



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(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

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or a six membered aromatic ring with one to three N, heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight butoxycarbonyl; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched

25

(C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched

30

(C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S;

35

and when R³ = R⁴(CH₂)_nCO- and n = 2-4,



* C L H S *



344



5 R^4 is selected from amino; hydroxyamino; straight or
branched mono(C_1-C_6)alkylamino group selected from
methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-
methylpropyl, 2-methylpropyl, 1,1-dimethylethyl,
n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-
dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,
1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
10 1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-
ethylpropylamino and the diastereomers and enantiomers
of said straight or branched mono(C_1-C_6)alkylamino
group; (C_3-C_8)cycloalkylamino group selected from
cyclopropyl, trans-1,2-dimethylcyclopropyl, cis-1,2-
dimethylcyclopropyl, trans-2,3-dimethylcyclopropyl,
15 cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-2,3-
dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl,
cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl,
bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino
and the diastereomers and enantiomers of said
20 (C_3-C_8)cycloalkylamino group; straight or branched
chain di-(C_1-C_6)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino,
ethyl(1-methylethyl)amino or a combination of methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
25 propyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl,
2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino
30 and the diastereomers and enantiomers of said straight
or branched chain di-(C_1-C_6)alkylamino group;
(C_1-C_6)alkoxyamino group selected from methoxy, ethoxy,
propoxy, butoxy, pentoxy or hexoxyamino; (C_3-C_8)cyclo-
alkoxyamino group selected from cyclopropoxy, trans-
35 1,2-dimethylcyclopropoxy, cis-1,2-dimethylcyclopropoxy,
trans-2,3-dimethylcyclopropoxy, cis-2,3-dimethylcyclo-
propoxy, cyclobutoxy, trans-2,3-dimethylcyclobutoxy,
cis-2,3-dimethylcyclobutoxy, cyclopentoxy, cyclohexoxy,



cycloheptyloxy, cyclooctoxy, bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-yloxyamino and the diastereomers and enantiomers of said (C₃-C₈)cycloalkoxyamino group; (C₇-C₁₀)aralkoxyamino group selected from benzyloxy, 2-phenylethoxy, α-phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)methoxy, or phenylpropoxyamino; (C₂-C₈)azacycloalkyl group selected from aziridinyl, azetidiny, pyrrolidinyl, pyrrolinyl, piperidinyl, 2-methylpyrrolidinyl, cis-3,4-dimethylpyrrolidinyl, trans-3,4-dimethylpyrrolidinyl, 2-azabicyclo[2.1.1]hex-2-yl, 5-azabicyclo[2.1.1]hex-5-yl, 2-azabicyclo[2.2.1]hept-2-yl, 7-azabicyclo[2.2.1]hept-7-yl, 2-azabicyclo[2.2.2]oct-2-yl and the diastereomers and enantiomers of said (C₂-C₈)azacycloalkyl group; azaheterocycloalkyl group selected from morpholinyl, piperazinyl, 4-methylpiperazinyl, 4-hydroxypiperazinyl, 4-(C₁-C₄)alkoxy piperazinyl, thiamorpholinyl, tetrahydro-1,2-oxazinyl, isoxazolidinyl, pyrazolidinyl, 2-methylpyrazolidinyl, 2,5-diazabicyclo[2.2.2]hept-2-yl, 2,5-diaza-5-methylbicyclo[2.2.1]hept-2-yl and the diastereomers and enantiomers of said azaheterocycloalkyl group; (C₆-C₁₀)arylamino group selected from phenylamino or naphthylamino; (C₇-C₁₀)arylalkylamino group selected from benzyl, 2-phenylethyl, α-phenylethyl, (2-naphthyl)methyl, (1-naphthyl)methyl or phenylpropylamino; (C₁-C₄)alkoxycarbonylamino group selected from n-butoxycarbonylamino, allyloxycarbonylamino, methoxycarbonylamino, ethoxycarbonylamino or propoxycarbonylamino; and when R³ = R^{4'} (CH₂)_nSO₂- and n = 0, R^{4'} is selected from amino; hydroxyamino; straight or branched mono(C₁-C₆)alkylamino group selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methylbutyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl, 3-methylbutyl, n-hexyl, 1-methylpentyl,

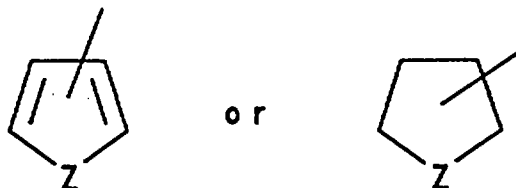


1,1-dimethylbutyl, 2,2-dimethylbutyl, 3-methylpentyl,
1,2-dimethylbutyl, 1,3-dimethylbutyl, 1-methyl-1-
ethylpropylamino and the diastereomers and enantiomers
of said straight or branched mono(C_1-C_6)alkylamino
group; (C_3-C_8)cycloalkylamino group selected from
cyclopropyl, trans-1,2-dimethylcyclopropyl,
cis-1,2-dimethylcyclopropyl, trans-2,3-dimethylcyclo-
propyl, cis-2,3-dimethylcyclopropyl, cyclobutyl, trans-
2,3-dimethylcyclobutyl, cis-2,3-dimethylcyclobutyl,
cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl,
bicyclo[2.2.1]hept-2-yl, bicyclo[2.2.2]oct-2-ylamino
and the diastereomers and enantiomers of said
(C_3-C_8)cycloalkylamino group; straight or branched
chain di-(C_1-C_6)alkylamino group selected from
dimethylamino, diethylamino, methyl(ethyl)amino, ethyl-
(1-methylethyl)amino or a combination of methyl, ethyl,
n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
2-methylpropyl, 1,1-dimethylethyl, n-pentyl, 2-methyl-
butyl, 1,1-dimethylpropyl, 2,2-dimethylpropyl,
3-methylbutyl, n-hexyl, 1-methylpentyl, 1,1-dimethyl-
butyl, 2,2-dimethylbutyl, 3-methylpentyl, 1,2-dimethyl-
butyl, 1,3-dimethylbutyl, 1-methyl-1-ethylpropylamino
and the diastereomers and enantiomers of said straight
or branched chain di-(C_1-C_6)alkylamino group;
(C_1-C_6)alkoxyamino group selected from methoxy, ethoxy,
propoxy, butoxy, pentoxy or hexoxyamino; (C_3-C_8)cyclo-
alkoxyamino group selected from cyclopropoxy,
trans-1,2-dimethylcyclopropoxy, cis-1,2-dimethyl-
cyclopropoxy, trans-2,3-dimethylcyclopropoxy, cis-
2,3-dimethylcyclopropoxy, cyclobutoxy, trans-2,3-di-
methylcyclobutoxy, cis-2,3-dimethylcyclobutoxy, cyclo-
pentoxy, cyclohexoxy, cycloheptyloxy, cyclooctoxy,
bicyclo[2.2.1]hept-2-yloxy, bicyclo[2.2.1]oct-2-
yloxyamino and the diastereomers and enantiomers of
said (C_3-C_8)cycloalkoxyamino group; (C_7-C_{10})aralkoxy-
amino group selected from benzyloxy, 2-phenylethoxy,
 α -phenylethoxy, (2-naphthyl)methoxy, (1-naphthyl)-



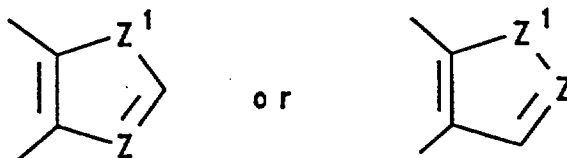
347

methoxy, or phenylpropoxyamino; straight or branched
 (C_1-C_4) alkyl group selected from methyl, ethyl,
 5 n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl,
 2-methylpropyl or 1,1-dimethylethyl; (C_3-C_6) cycloalkyl
 group selected from cyclopropyl, cyclobutyl, cyclo-
 pentyl or cyclohexyl; substituted (C_3-C_6) cycloalkyl
 group (substitution selected from (C_1-C_3) alkyl, cyano,
 10 amino or (C_1-C_3) acyl); (C_6-C_{10}) aryl group selected from
 phenyl, α -naphthyl or β -naphthyl; substituted
 (C_6-C_{10}) aryl group (substitution selected from halo,
 (C_1-C_4) alkoxy, trihalo (C_1-C_3) alkyl, nitro, amino,
 cyano, (C_1-C_4) alkoxycarbonyl, (C_1-C_3) alkylamino or
 15 carboxy); (C_7-C_9) aralkyl group; halo (C_1-C_3) alkyl group;
 a heterocycle group selected from a five membered
 aromatic or saturated ring with one N, O, S or Se
 heteroatom optionally having a benzo or pyrido ring
 fused thereto:



25 $Z = N, O, S \text{ or } Se$

or a five membered aromatic ring with two N, O, S or Se
 heteroatoms optionally having a benzo or pyrido ring
 30 fused thereto:



$Z \text{ or } Z^1 = N, O, S \text{ or } Se$

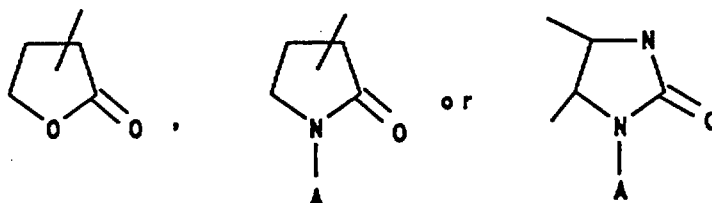


* C L M S *



348

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy group, wherein R^aR^b is a straight or branched (C₁-C₄)alkyl selected from methyl, ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methylpropyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W-(CH₂)₂- wherein W is selected from -N(C₁-C₃)alkyl [straight or branched], -NH, -NOB [B is selected from hydrogen or (C₁-C₃)alkyl], O or S; and when R³ = R^{4'}(CH₂)_nSO₂- and n= 1-4, R^{4'} is selected from hydrogen; amino; straight or branched (C₁-C₄)alkyl group selected from methyl,



349



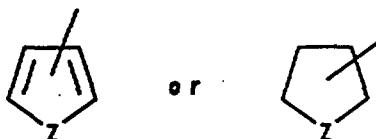
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, 2-methylpropyl or 1,1-dimethylethyl; (C₁-C₄)-
carboxyalkyl group; (C₃-C₆)cycloalkyl group selected
from cyclopropyl, cyclobutyl, cyclopentyl or cyclo-
hexyl; substituted (C₃-C₆)cycloalkyl group (substitu-
tion selected from (C₁-C₃)alkyl, cyano, amino or
(C₁-C₃)acyl); (C₆-C₁₀)aryl group selected from phenyl,
α-naphthyl or β-naphthyl; substituted (C₆-C₁₀)aryl
group (substitution selected from halo, (C₁-C₄)alkoxy,
trihalo(C₁-C₃)alkyl, nitro, amino, cyano, (C₁-C₄)-
alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy);
(C₇-C₉)aralkyl group selected from benzyl, 1-phenyl-
ethyl, 2-phenylethyl or phenylpropyl; (C₁-C₄)alkoxy
group; C₆-aryloxy group selected from phenoxy or sub-
stituted phenoxy (substitution selected from halo,
(C₁-C₃)alkyl, nitro, cyano, thiol, amino, carboxy,
di(C₁-C₃)alkylamino); (C₇-C₁₀)aralkyloxy group;
R^aR^bamino(C₁-C₄)alkoxy group, wherein R^aR^b is a
straight or branched (C₁-C₄)alkyl selected from methyl,
ethyl, n-propyl, 1-methylethyl, n-butyl, 1-methyl-
propyl, or 2-methylpropyl or R^aR^b is (CH₂)_n, n=2-6, or
-(CH₂)₂W(CH₂)₂- wherein W is selected from -N(C₁-C₃)-
alkyl [straight or branched], -NH, -NOB [B is selected
from hydrogen or (C₁-C₃)alkyl], O or S; or R^aR^baminoxy
group, wherein R^aR^b is a straight or branched
(C₁-C₄)alkyl selected from methyl, ethyl, n-propyl,
1-methylethyl, n-butyl, 1-methylpropyl, or 2-methyl-
propyl or R^aR^b is (CH₂)_n, n=2-6, or -(CH₂)₂W(CH₂)₂-
wherein W is selected from -N(C₁-C₃)alkyl [straight or
branched], -NH, -NOB [B is selected from hydrogen or
(C₁-C₃)alkyl], O or S; (C₁-C₃)alkylthio group selected
from methylthio, ethylthio or n-propylthio; C₆-arylthio
group selected from phenylthio or substituted phenyl-
thio (substitution selected from halo, (C₁-C₃)alkyl,
nitro, cyano, thiol, amino, carboxy, di-(C₁-C₃)alkyl-
amino); (C₇-C₈)aralkylthio group; a heterocycle group
selected from a five membered aromatic or saturated



350

ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:

5

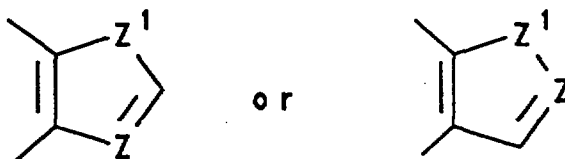


Z = N, O, S or Se

10

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:

15

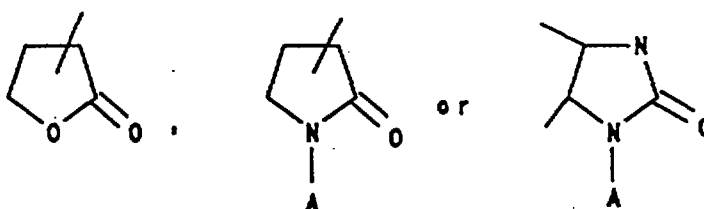


Z or Z' = N, O, S or Se

20

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:

25



30

(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

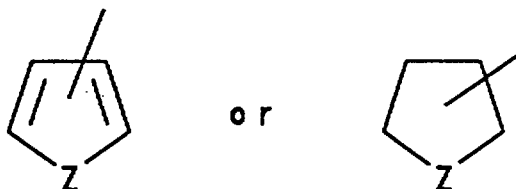
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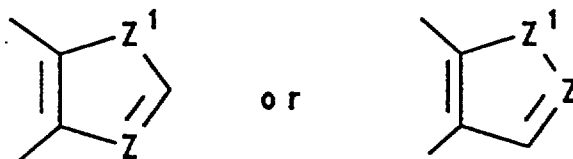
351

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent
 5 appended O heteroatom; hydroxy group; mercapto group; halo(C₁-C₃)alkyl group; acyl or haloacyl group selected from acetyl, propionyl, chloroacetyl, trifluoroacetyl, (C₃-C₆)cycloalkylcarbonyl, (C₆-C₁₀)aroyl selected from
 10 benzoyl or naphthoyl, halo substituted (C₆-C₁₀)aroyl, (C₁-C₄)alkylbenzoyl, or (heterocycle)carbonyl, the heterocycle selected from a five membered aromatic or saturated ring with one N, O, S or Se heteroatom optionally having a benzo or pyrido ring fused thereto:



20 Z = N, O, S or Se

or a five membered aromatic ring with two N, O, S or Se heteroatoms optionally having a benzo or pyrido ring fused thereto:



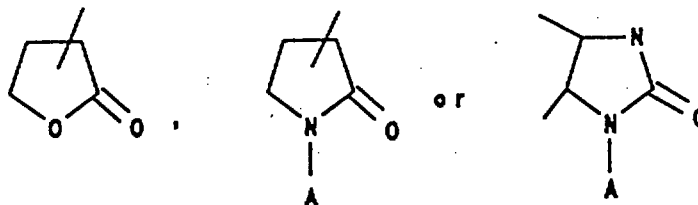
30 Z or Z' = N, O, S or Se

or a five membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom:





352



(A is selected from hydrogen; straight or branched (C₁-C₄)alkyl; C₆-aryl; substituted C₆-aryl (substitution selected from halo, (C₁-C₄)alkoxy, trihalo(C₁-C₃)-alkyl, nitro, amino, cyano, (C₁-C₄)alkoxycarbonyl, (C₁-C₃)alkylamino or carboxy); (C₇-C₉)aralkyl group selected from benzyl, 1-phenylethyl, 2-phenylethyl or phenylpropyl)

15

or a six membered aromatic ring with one to three N heteroatoms, or a six membered saturated ring with one or two N, O, S or Se heteroatoms and an adjacent appended O heteroatom; (C₁-C₄)alkoxycarbonyl group selected from methoxycarbonyl, ethoxycarbonyl, straight or branched propoxycarbonyl, allyloxycarbonyl or straight butoxycarbonyl; and the pharmacologically acceptable organic and inorganic salts or metal complexes.

20

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* C L M S *

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6 A compound according to claim 5 where-
in:

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354

X is selected from halogen or trifluoromethanesulfonyloxy; the halogen (halo) is selected from bromine, chlorine, fluorine or iodine;

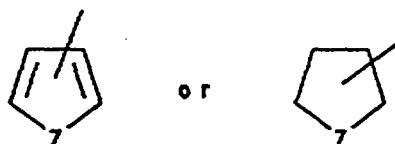
Y is selected from $-N_2^+Cl^-$ or N_3 ;

R or R^1 are selected from nitro; amino; halogen (selected from chlorine, bromine, fluorine or iodine); cyano; hydroxy; or $-NR^2R^3$;

and when R or $R^1 = -NR^2R^3$ and $R^2 =$ methyl or ethyl; $R^3 =$ methyl or ethyl,

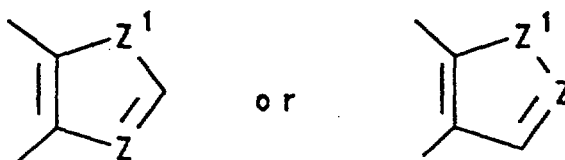
and when R or $R^1 = -NR^2R^3$ and $R^2 =$ hydrogen, R^3 is selected from $R^4(CH_2)_nCO-$ or $R^{4'}(CH_2)_nSO_2-$; and when $R^3 = R^4(CH_2)_nCO-$ and $n=0$,

R^4 is selected from hydrogen; straight or branched (C_1-C_2) alkyl group selected from methyl or ethyl; a heterocycle group selected from a five membered aromatic or saturated ring with one N, O, or S heteroatom optionally having a benzo or pyrido ring fused thereto:



Z = N, O or S

or a five membered aromatic ring with two N, O or S heteroatoms optionally having a benzo or pyrido ring fused thereto:



Z or $Z^1 =$ N, O, or S



(C_1-C_4) alkoxy group; C_6 -aryloxy group selected from phenoxy or substituted phenoxy (substitution selected from halo, (C_1-C_4) alkyl); (C_7-C_{10}) aralkyloxy group; and when $R^3 = R^4(CH_2)_nCO-$ and $n=1-4$,

5 R^4 is selected from hydrogen; (C_1-C_2) alkyl group
selected from methyl or ethyl; (C_6-C_{10}) aryl group
selected from phenyl, α -naphthyl or β -naphthyl;
and when $R^3 = R^{4'}(CH_2)_nSO_2^-$ and $n = 0$,
10 $R^{4'}$ is selected from straight or branched (C_1-C_2) alkyl
group selected from methyl or ethyl; (C_6-C_{10}) aryl
group selected from phenyl, α -naphthyl or β -naphthyl;
and the pharmacologically acceptable organic and in-
organic salts or metal complexes.

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* C L M S *



356



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10

7 A compound according to Claim 1,
[4S-(4 α ,12 α)]-8-Chloro-4-(dimethylamino)-9-(formyl-
amino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
hydrochloride (1:1);

15

[4S-(4 α ,12 α)]-8-Chloro-4,7-bis(dimethylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-
hydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate
(1:1);

20

[4S-(4 α ,12 α)]-7-Amino-8-chloro-4-(dimethylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-
hydroxy-1,11-dioxo-2-naphthacenecarboxamide hydro-
chloride (1:1);

25

[4S-(4 α ,12 α)]-8-Chloro-4-(dimethylamino)-1,4,4a,5,-
5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1, 11-d-
ioxo-2-naphthacenecarboxamide hydrochloride (1:1);

30

[4S-(4 α ,12 α)]-8-Chloro-4,7-bis(dimethylamino)-9-
(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,-
12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
sulfate (1:1);

35

[4S-(4 α ,12 α)]-9-Amino-8-chloro-4-(dimethylamino)-1,4,-
4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-
1,11-dioxo-2-naphthacenecarboxamide hydrochloride
(1:1);

[4S-(4 α ,12 α)]-9-Amino-8-chloro-4,7-bis(dimethylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetra-



357

hydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate;

5

[7S-(7 α , 10 α)]-[9-(Aminocarbonyl)-3-chloro-7-(dimethylamino)-5,5 α ,6,6 α ,7,10,10 α ,12-octahydro-1,8,-10 α ,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester;

10

[4S-(4 α , 12 α)]-8-Chloro-4-(dimethylamino)-9-hydrazino-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide monohydrochloride;

15

[4S-(4 α , 12 α)]-8-Chloro-4-(dimethylamino)-9-(formylamino)-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate (1:1);

20

[4S-(4 α , 12 α)]-8-Chloro-4-(dimethylamino)-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride (1:1);

25

[4S-(4 α , 12 α)]-7-Amino-8-chloro-4-(dimethylamino)-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-9-iodo-1,11-dioxo-2-naphthacenecarboxamide sulfate (1:1);

30

[4S-(α , 12 α)]-9-Amino-8-chloro-7-(diethylamino)-4-(dimethylamino)-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate;

35

[4S-(4 α , 12 α)]-9-Amino-4,7-bis(dimethylamino)-8-fluoro-1,4,4 α ,5,5 α ,6,11,12 α -octahydro-3,10,12,12 α -tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;



* C L M S *



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[4S-(4alpha, 12aalpha)]-9-Amino-4-(dimethylamino)-8-fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

10

[4S-(4alpha, 12aalpha)]-4-(Dimethylamino)-8-fluoro-9-(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

15

[4S-(4alpha, 12aalpha)]-4-(Dimethylamino)-8-fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

20

[7S-(7alpha, 10aalpha)]-[9-(Aminocarbonyl)-7-(dimethylamino)-3-fluoro-5,5a,6,6a,7,10,10a,12-octahydro-1,8-10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester;

25

[6aS-(6aalpha, 10alpha)]-3-Amino-8-(aminocarbonyl)-1-10-bis(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-5,7-dioxo-2-naphthacenyl-ester trifluoromethanesulfonic acid;





359

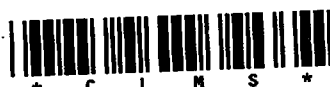
[6aS-(6aalpha, 10alpha)]-3-Amino-8(aminocarbonyl)-10-(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-5,7-dioxo-2-naphthacenyl ester trifluoromethanesulfonic acid;

[4S-(4alpha, 12alpha)]-4,7-Bis(dimethylamino)-8-fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide;

[4S-(4alpha, 12aalpha)]-4-(Dimethylamino)-8-fluoro-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

[7S-(7alpha, 10aalpha)]-[9-(Aminocarbonyl)-3-chloro-4,7-bis(dimethylamino)-5,5a,6,6a,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid 2-(dimethylamino)ethyl ester;

[4S-(4alpha, 12aalpha)]-8-Chloro-9-[[[(diethylamino)-oxy]carbonyl]amino]-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide;



* C L N S *

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360

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[4S-(4alpha,12alpha)]-8-Chloro-7-(diethylamino)-4-(dimethylamino)-9-(formylamino)-1,4,4a,5,5a,6,11,-12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide sulfate;

10

[6aS-(6alpha,10alpha)]-[8-(Aminocarbonyl)-2-chloro-10-(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-5,7-dioxo-1-naphthacenyl]-carbamic acid methyl ester;

15

[4S-(4alpha,12alpha)]-4-(Dimethylamino)-8-fluoro-7-(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

20

[7S-(7alpha,10alpha)]-[9-(Aminocarbonyl)-7-(dimethylamino)-3-fluoro-5,5a,6,6a,7,10,10a,12-octahydro-1,8,-10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester;

25

[4S-(4alpha,12alpha)]-4-(Dimethylamino)-8-fluoro-7-(formylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrochloride;

30

[6S-(6alpha,10alpha)]-8-(Aminocarbonyl)-10-(dimethylamino)-5,6a,7,10,10a,11,11a,12-octahydro-4,6,6a,9-tetrahydroxy-3-[(methoxycarbonyl)amino]-5,7-dioxo-2-naphthacenyl ester trifluoromethanesulfonic acid;

35

[4S-(4alpha,12alpha)]-8-Chloro-4-(dimethylamino)-9-[[[(dimethylamino)oxy]carbonyl]amino]-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide;



* C L M S *



361

5 [4S-(4 α ,12 α)]-8-Chloro-9-[[[(diethylamino)-oxy]carbonyl]amino]-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide;

10 [4S-(4 α ,12 α)]-9-Amino-8-bromo-4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydrobromide (1:1);

15 [4S-(4 α ,12 α)]-9-Amino-8-bromo-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamine hydrobromide;

20 [4S-(4 α ,12 α)]-9-Amino-4,7-bis(dimethylamino)-8-iodo-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydroiodide;

25 [4S-(4 α ,12 α)]-9-Amino-4-(dimethylamino)-8-iodo-1,4,4a,5,5a,6,11,12,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydroiodide;

30 [7S-(7 α ,10 α)]-[9-(Aminocarbonyl)-7-(dimethylamino)-3-iodo-5,5a,6,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester; OR

35 [7S-(7 α ,10 α)]-[9-(Aminocarbonyl)-3-bromo-7-(dimethylamino)-5,5a,6,7,10,10a,12-octahydro-1,8,10a,11-tetrahydroxy-10,12-dioxo-2-naphthacenyl]carbamic acid methyl ester.



* C L N S *



8 A compound according to Claim 3
[4S-(4alpha, 12aalpha)]-9-Azido-4,7-bis(dimethyl-
amino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-
tetrahydroxy-1,11,dioxo-2-naphthacenecarboxamide hydro-
chloride (1:1);

[4S-(4alpha, 12aalpha)]-9-Azido-7-(diethylamino)-
4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,
12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
disulfate; OR

[4S-(4alpha, 12aalpha)]-9-Azido-7-(diethylamino)-
4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,
12,12a-tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide
dihydrochloride.

9 A compound according to Claim 5
[4S-(4alpha, 12aalpha)]-7-Azido-8-chloro-4-(dimethyl-
amino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a
tetrahydroxy-1,11-dioxo-2-naphthacenecarboxamide hydro-
chloride. OR

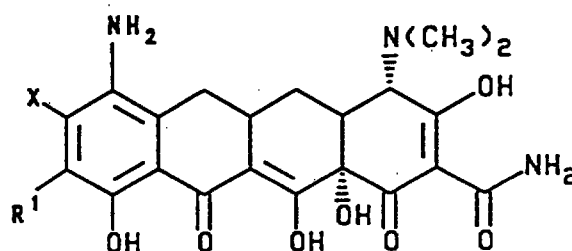
[4S-(4alpha, 12aalpha)]-7-Azido-4-(dimethylamino)-
1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahy-
droxy-9-iodo-1,11-dioxo-2-naphthacenecarboxamide
sulfate (1:1).



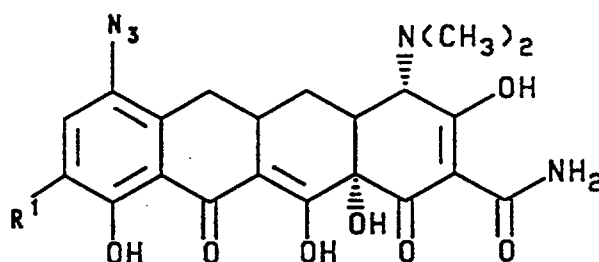


363

10 A method of producing a compound of the formula:



wherein X and R¹ are as defined in Claim 1; which comprises reacting a compound of the formula:



with a strong acid having the formula HX when X = halogen or trifluoromethanesulfonyloxy to obtain the desired compound.





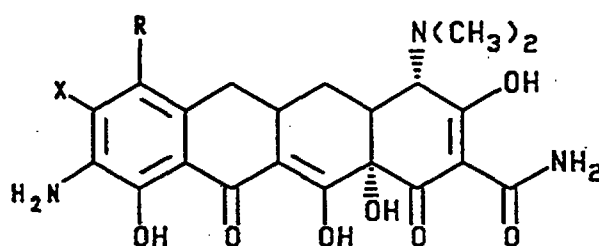
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11 A method of producing a compound of the formula:

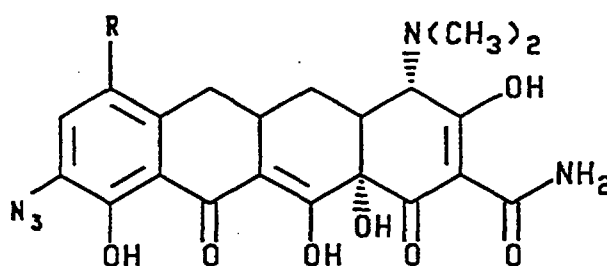
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wherein X and R are as defined in Claim 1; which comprises reacting a compound of the formula:

25



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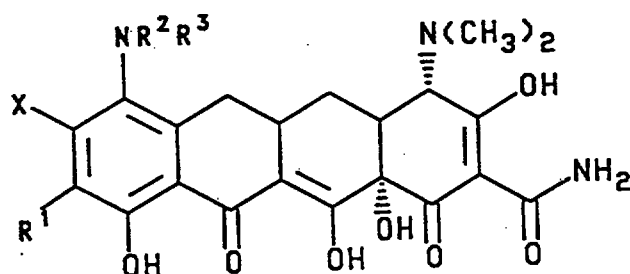
with a strong acid having the formula HX when X = halogen or trifluoromethanesulfonyloxy to obtained the desired compound.



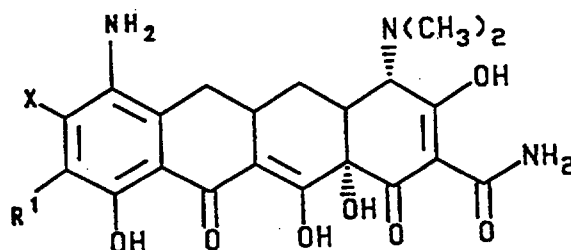
* C L N S *



12 A method of producing a compound of the formula:



wherein X, R¹, R², and R³ are as defined in Claim 1;
which comprises reacting compounds of the formula:

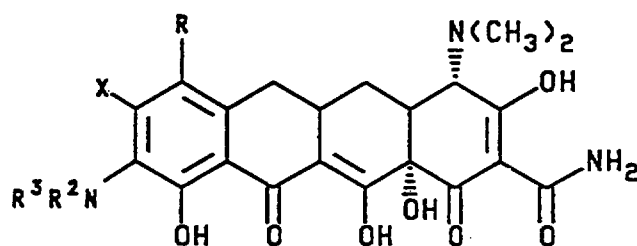




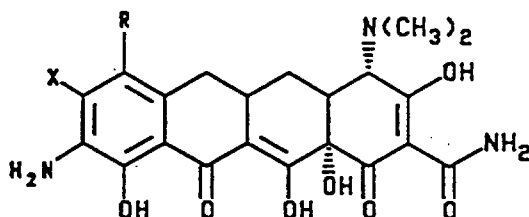
366

with an acyl halide of the formula R^2 - or R^3 -halide, an acyl anhydride of the formula R^2 - or R^3 -anhydride, a mixed acyl anhydride of the formula R^2 - or R^3 -anhydride, a sulfonyl halide of the formula R^2 - or R^3 -halide or sulfonyl anhydride of the formula R^2 - or R^3 -anhydride to obtain the desired compound.

13 A method of producing a compound of the formula:



wherein X, R, R^2 , and R^3 are as defined in Claim 1; which comprises reacting compounds of the formula:



with an acyl halide of the formula R^2 - or R^3 -halide, an acyl anhydride of the formula R^2 - or R^3 -anhydride, a mixed acyl anhydride of the formula R^2 - or R^3 -

anhydride, a sulfonyl halide of the formula R^2 - or R^3 -halide or sulfonyl anhydride of the formula R^2 - or R^3 -anhydride to obtain the desired compound.



367

14 A method for the prevention, treatment or control of bacterial infections in warm-blooded animals which comprises administering to said animal a pharmacologically effective amount of a compound according to Claim 1.

15 A pharmaceutical composition of matter comprising a compound according to Claim 1 in association with a pharmaceutically acceptable carrier.

This Sheet Has Been Replaced



* C L H S *