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# PUBLICATION PARTICULARS AND ABSTRACT

(Section 32(3)(a) – Regulation 22(1)(g) and 31)

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FULL NAMES OF APPLICANT

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3. SAKAGAMI, MASAHIRO

EARLIEST PRIORITY CLAIMED

| COUNTRY | NUMBER | DATE |
|---|---|---|
| 33 JP | 31 2006-124762 | 32 28 APR 2006 |

TITLE OF INVENTION

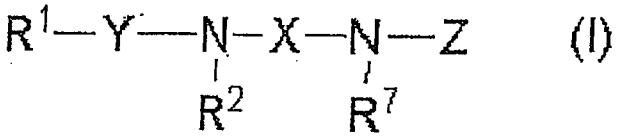
54 AMINE DERIVATIVE HAVING NPY Y5 RECEPTOR ANTAGONIST ACTIVITY

| 57 ABSTRACT (NOT MORE THAT 150 WORDS) | NUMBER OF SHEETS | 268 |
|---|---|---|

If no classification is finished, Form P.9 should accompany this form.
The figure of the drawing to which the abstract refers is attached.

Abstract

This invention provides a compound of the formula (I):



(I)

a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted lower alkyl,

Y is -S(O)n- wherein n is 1 or 2, or -CO-,

$R^2$ is hydrogen or lower alkyl,

$R^7$ is hydrogen or lower alkyl,

X is lower alkylene, lower alkenylene, arylene, cycloalkylene or the like, and

Z is lower alkyl, optionally substituted carbocyclyl, optionally substituted heterocyclyl or the like.

Field of the Invention

[0001]

This invention relates to a new compound having NPY Y5 receptor antagonistic activity. The compound is useful as a pharmaceutical composition, especially an anti-obesity agent.

Background Art

[0002]

Neuropeptide Y (hereinafter referred to as NPY) is a peptide which consists of 36 amino acid residues and was isolated from porcine brain in 1982. NPY is widely distributed in the central nervous system and peripheral tissues of humans and animals.

[0003]

It has been reported that NPY possesses a stimulating activity of food intake, an anti-seizure activity, a learning-promoting activity, an anti-anxiety activity, an anti-stress activity etc. in central nervous system, and it may be pivotally involved in the central nervous system diseases such as depression, Alzheimer's disease and Parkinson's disease. NPY is thought to be associated with the cardiovascular diseases, since it induces a contraction of smooth muscles such as blood vessels or cardiac muscles in the peripheral tissues. Furthermore, NPY is also known to be involved in the metabolic diseases such as obesity, diabetes and hormone abnormalities (Non-patent Document 1). Therefore, an NPY receptor antagonist is expected as a medicine for preventing or treating various diseases involved in the NPY receptor like the above.

[0004]

Subtypes of Y1, Y2, Y3, Y4, Y5, and Y6 have now been identified as the NPY receptor (Non-patent Document 2). It has been suggested that the Y5 receptor is at least involved in the feeding behavior and its antagonist is expected as an anti-obesity agent (Non-patent Document 3).

[0005]

Amine derivatives having sulfonyl group and similar structures to compounds of the present invention and exhibiting NPY Y5 receptor antagonistic activity are disclosed

in Patent Document 1, 2, 3, 4 and the like. Amide derivatives having sulfonyl group and exhibiting NPY Y5 receptor antagonistic activity are disclosed in Patent Document 5, 8, 9, 10 and 11. Derivatives having sulfonyl group and exhibiting NPY Y5 receptor antagonistic activity are disclosed in Patent Document 12. The structures of these compounds are different from those of the compounds of the present invention.

[0006]

Furthermore, although compounds having similar structures to compounds of the present invention are disclosed in Patent Document 6, 7, 13, 14 and the like, the activities of their compounds are quite different from those of the compounds of the present invention and these documents do not suggest the present invention.

[Non-patent Document 1] Trends in Pharmacological Sciences, Vol.15, 153(1994)
[Non-patent Document 2] Trends in Pharmacological Sciences, Vol.18, 372(1997)
[Non-patent Document 3] Peptides, Vol.18, 445(1997)
[Patent Document 1] WO01/002379
[Patent Document 2] WO00/064880
[Patent Document 3] WO99/055667
[Patent Document 4] WO00/068197
[Patent Document 5] WO01/037826
[Patent Document 6] WO2006/014482
[Patent Document 7] WO2005/097738
[Patent Document 8] WO97/20823
[Patent Document 9] US2006/293341
[Patent Document 10] WO2007/002126
[Patent Document 11] WO2006/001318
[Patent Document 12] WO2005/080348
[Patent Document 13] US2007/060598
[Patent Document 14] WO2005/121107

Disclosure of Invention

Problems to be solved by the Invention

[0007]

The object of the present invention is to provide excellent new compounds having NPY Y5 receptor antagonistic activity. In our examination, compounds in Patent Document 1 or 2 showed the strong induction of a drug-metabolizing enzyme and some compounds in Patent Document 10 showed toxicity such as anemia induction.

Means for Solving the Problem

[0008]

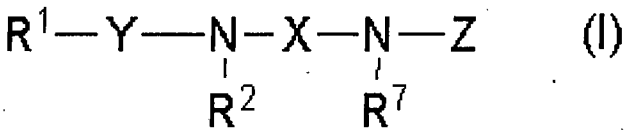
The present inventors have intensively studied to synthesize the following excellent new compounds having NPY Y5 receptor antagonistic activity. Patent Document 5 disclosed that amide derivatives having sulfonyl group are compounds having NPY Y5 receptor antagonistic activity. However, the present inventors found that transportability of compounds which the amide is substituted with the amine through the blood-brain barrier is much higher than that of the unsubstituted compounds. Furthermore, the inventors found that compounds of the present invention have less the induction of a drug-metabolizing enzyme compared to compounds described in Patent Document 1 or 2 to achieve the present invention.

[0009]

The present invention includes the followings.

(1) A compound of the formula (I):

[Formula 1]



(I)

a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted lower alkyl,

Y is -S(O)n- wherein n is 1 or 2, or -CO-,

$R^2$ is hydrogen or optionally substituted lower alkyl,

$R^1$ and $R^2$ taken together may form lower alkylene,

$R^7$ is hydrogen or optionally substituted lower alkyl,

X is optionally substituted lower alkylene,

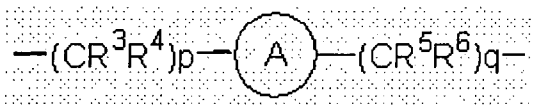
optionally substituted lower alkenylene,

optionally substituted -CO-lower alkylene,

optionally substituted -CO-lower alkenylene or

a group of the formula:

[Formula 2]

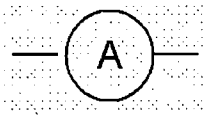


wherein $R^3$, $R^4$, $R^5$ and $R^6$ are each independently hydrogen or optionally substituted

lower alkyl,

a group of the formula:

[Formula 3]

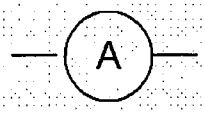


is optionally substituted cycloalkylene, optionally substituted cycloalkenylene, optionally substituted bicycloalkylene, optionally substituted arylene or optionally substituted heterocyclyldiyl,

p and q are each independently an integer between 0 and 2, either p or q is not 0, and

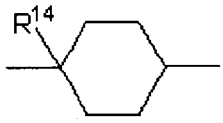
provided that a group of the formula:

[Formula 4]



is not a group of the formula:

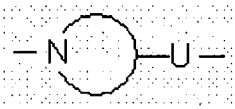
[Formula 5]



wherein $R^{14}$ is optionally substituted phenyl,

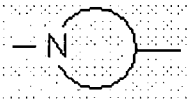
$-NR^2-X-$ may be a group of the formula:

[Formula 6]



wherein a group of the formula:

[Formula 7]



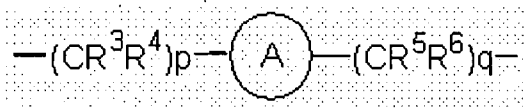
is piperidinediyl, piperazinediyl, pyridindiyl, pyrazinediyl, pyrrolidinediyl or pyrroldiyl, and U is lower alkylene or lower alkenylene,

Z is optionally substituted lower alkyl, optionally substituted lower alkenyl, optionally substituted amino, optionally substituted lower alkoxy, optionally substituted carbocyclyl or optionally substituted heterocyclyl,

provided that Z is not fused heterocyclyl consisting of three rings, optionally substituted thiazolyl or optionally substituted quinazolinyl, and

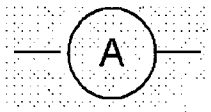
provided that a compound wherein X is a group of the formula:

[Formula 8]



wherein a group of the formula:

[Formula 9]



is optionally substituted cycloalkylene, q is 1, q is 0 and Z is optionally substituted pyrimidinyl is excluded.

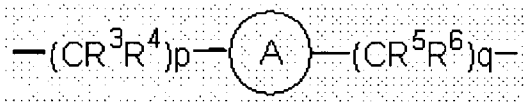
(2) The compound, pharmaceutically acceptable salt or solvate thereof of (1), wherein $R^1$ is lower alkyl.

(3) The compound, pharmaceutically acceptable salt or solvate thereof of (1), wherein Y is $-S(O)_2-$.

(4) The compound, pharmaceutically acceptable salt or solvate thereof of (1), wherein Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl.

(5) The compound, pharmaceutically acceptable salt or solvate thereof of (1), wherein X is a group of the formula:

[Formula 10]



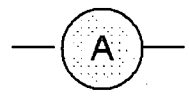
, and

$R^1$ is optionally substituted C2 to C10 alkyl.

(6) The compound, pharmaceutically acceptable salt or solvate thereof of (5), wherein Z is optionally substituted heterocyclyl.

(7) The compound, pharmaceutically acceptable salt or solvate thereof of (5), wherein a group of the formula:

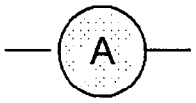
[Formula 11]



is optionally substituted cycloalkylene, optionally substituted cycloalkenylene, optionally substituted bicycloalkylene or optionally substituted piperidinylene.

(8) The compound, pharmaceutically acceptable salt or solvate thereof of (5), wherein a group of the formula:

[Formula 12]



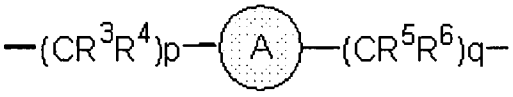
is optionally substituted cyclohexylene or optionally substituted piperidinylene,

p and q are each independently 0 or 1, either p or q is not 0.

(9) The compound, pharmaceutically acceptable salt or solvate thereof of (7) or (8), wherein Z is optionally substituted lower alkyl, optionally substituted phenyl, optionally substituted pyridyl, optionally substituted pyrazolyl, optionally substituted isoxazolyl, optionally substituted oxadiazolyl, optionally substituted pyridazinyl, optionally substituted pyrazinyl, optionally substituted pyrimidinyl or optionally substituted fused heterocyclyl consisting of two rings.

(10) The compound, pharmaceutically acceptable salt or solvate thereof of (1), wherein X is a group of the formula:

[Formula 13]



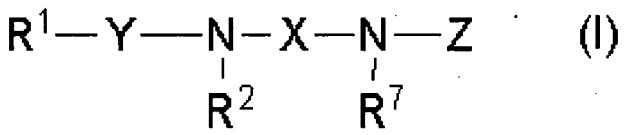
, and

p+q is 1 or 2.

(11) The compound, pharmaceutically acceptable salt or solvate thereof of (10), wherein p+q is 1.

(12) A compound of the formula (I):

[Formula 14]



(I)

a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted lower alkyl,

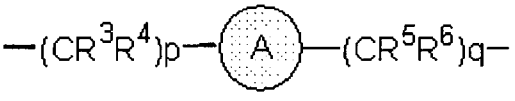
Y is -S(O)2-,

$R^2$ is hydrogen or optionally substituted lower alkyl,

$R^7$ is hydrogen or optionally substituted lower alkyl,

X is a group of the formula:

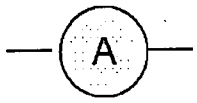
[Formula 15]



wherein $R^5$ and $R^6$ are each independently hydrogen,

a group of the formula:

[Formula 16]



is optionally substituted cycloalkylene,

p is 0, and

q is 1 or 2,

Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl, and

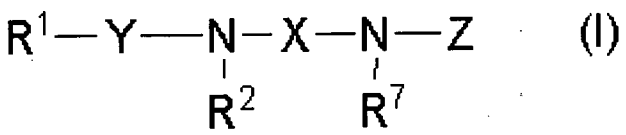
provided that a compound wherein Z is fused heterocyclyl consisting of three rings or optionally substituted pyrimidinyl is excluded.

(13) The compound, pharmaceutically acceptable salt or solvate thereof of (12), wherein Z is optionally substituted phenyl, optionally substituted indanyl, optionally substituted pyridyl, optionally substituted pyridazinyl, optionally substituted pyrimidinyl, optionally substituted pyrazolyl, optionally substituted isoxazolyl, optionally substituted oxadiazolyl or optionally substituted fused heterocyclyl consisting of two rings.

(14) The compound, pharmaceutically acceptable salt or solvate thereof of (12), wherein Z is optionally substituted isoquinolyl, optionally substituted benzothiazolyl, optionally substituted benzoxazolyl, optionally substituted benzopyridyl, optionally substituted benzopyridadinyl, optionally substituted benzimidazolyl, optionally substituted thiazolopyridyl, optionally substituted isoxazolinonyl, optionally substituted oxazolinonyl, optionally substituted benzoxadinonyl or optionally substituted benzoxyazepinonyl.

(15) A compound of the formula (I):

[Formula 17]



(I)

a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted lower alkyl,

Y is $-S(O)_2-$,

$R^2$ is hydrogen or optionally substituted lower alkyl,

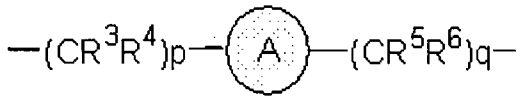
$R^7$ is hydrogen or optionally substituted lower alkyl,

X is a group of the formula:

[Formula 18]



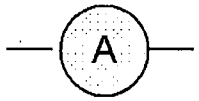
CORRECTED SHEET: 22 OCTOBER 2009



wherein $R^3$ and $R^4$ are each independently hydrogen,

a group of the formula:

[Formula 19]



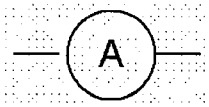
is optionally substituted cycloalkylene,

p is 1 or 2, and

q is 0,

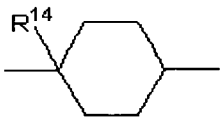
provided that

[Formula 20]



is not

[Formula 21]



wherein $R^{14}$ is optionally substituted phenyl,

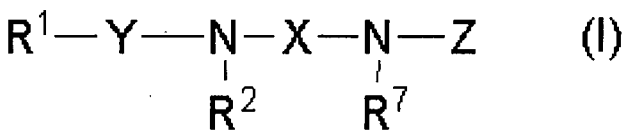
Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl, and

provided that a compound wherein Z is fused heterocyclyl consisting of three rings, optionally substituted thiazolyl or optionally substituted quinazolinyl is excluded.

(16) The compound, pharmaceutically acceptable salt or solvate thereof of (15), wherein Z is optionally substituted phenyl, optionally substituted pyridyl, optionally substituted pyridazinyl, optionally substituted pyrazinyl, optionally substituted pyrimidinyl, optionally substituted quinolyl, optionally substituted isoquinolyl, optionally substituted benzothiazolyl, optionally substituted benzimidazolyl, optionally substituted benzoxazolyl, optionally substituted thiazolopyridyl or optionally substituted oxazolopyridyl.

(17) A compound of the formula (I):

[Formula 22]



a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted lower alkyl,

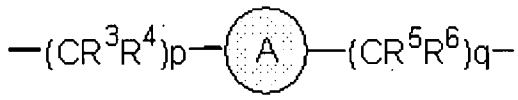
Y is $-S(O)_2-$,

$R^2$ is hydrogen or optionally substituted lower alkyl,

$R^7$ is hydrogen or optionally substituted lower alkyl,

X is a group of the formula:

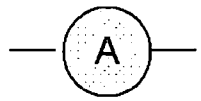
[Formula 23]



wherein $R^3$ and $R^4$ are each independently hydrogen,

a group of the formula:

[Formula 24]



is optionally substituted cycloalkylene,

p is 1 or 2, and

q is 0, and

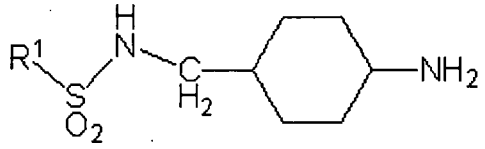
Z is optionally substituted phenyl, optionally substituted pyridyl, optionally substituted pyridazinyl, optionally substituted pyrazinyl, optionally substituted pyrimidinyl, optionally substituted quinolyl, optionally substituted isoquinolyl, optionally substituted benzothiazolyl, optionally substituted benzimidazolyl, optionally substituted benzoxazolyl, optionally substituted thiazolopyridyl or optionally substituted oxazolopyridyl.

(18) A pharmaceutical composition comprising the compound, pharmaceutically acceptable salt or solvate thereof of any one of (1) to (17) as an active ingredient.

(19) A NPY Y5 receptor antagonist comprising the compound, pharmaceutically acceptable salt or solvate thereof of any one of (1) to (17) as an active ingredient.

(20) A compound of the formula:

[Formula 25]

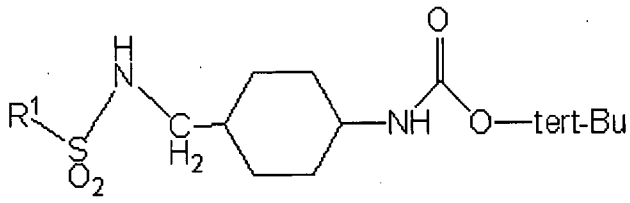


a salt or solvate thereof,

wherein $R^1$ is ethyl or tert-butyl.

(21) A compound of the formula:

[Formula 26]

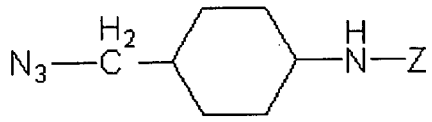


a salt or solvate thereof,

wherein $R^1$ is ethyl, isopropyl or tert-butyl.

(22) A compound of the formula:

[Formula 27]

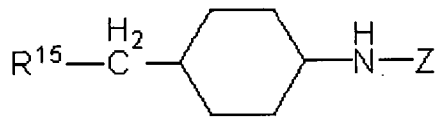


a salt or solvate thereof,

wherein Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl.

(23) A compound of the formula:

[Formula 28]



a salt or solvate thereof,

wherein

$R^{15}$ is $NH_2$or OH, and

Z is optionally substituted pyridyl, optionally substituted pyridazinyl, optionally substituted pyrazinyl, optionally substituted pyrimidinyl, optionally substituted quinolyl, optionally substituted isoquinolyl, optionally substituted benzothiazolyl, optionally substituted benzoxazolyl, optionally substituted benzopyridyl, optionally substituted benzopyridadinyl, optionally substituted benzimidazolyl, optionally substituted benzoxazolyl, optionally substituted thiazolopyridyl optionally substituted isoxazolinonyl, optionally substituted oxazolinonyl, optionally substituted benzoxadinonyl or optionally substituted benzoxyazepinonyl.

Effect of the Invention

[0010]

A compound of the present invention exhibits NPY Y5 receptor antagonistic



CORRECTED SHEET: 22 OCTOBER 2009

activity and are very useful as a medicine especially for preventing and/or treating feeding disorder, obesity, hyperorexia, sexual disorder, impaired fertility, depression, epileptic seizure, hypertension, cerebral hemorrhage, congestive heart failure or sleep disorders.

Best Mode for Carrying Out the Invention

[0011]

Each term used in this description is explained below. The each term has the same meaning in this description both when it is used alone each term and when it is used with the other term.

[0012]

The term "halogen" includes fluorine, chlorine, bromine and iodine. Especially, fluorine or chlorine is preferable.

[0013]

The term "protective group" in "optionally protected hydroxyl" and "optionally protected hydroxy lower alkyl" includes all of hydroxy protecting groups usually used. For example, acyl such as acetyl, trichloroacetyl and benzoyl, lower alkoxycarbonyl such as t-butoxycarbonyl, lower alkylsulfonyl such as methane sulfonyl, lower alkoxy(lower)alkyl such as methoxymethyl and trialkylsilyl such as t-butyldimethylsilyl are included.

[0014]

The term "lower alkyl" includes C1 to C10 straight or branched alkyl. Examples are methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec-buthyl, tert-butyl, n-pentyl, isopentyl, neopentyl, hexyl, isohexyl, n-heptyl, isoheptyl, n-octyl, isooctyl, n-nonyl, n-decyl and the like.

"Lower alkyl" represented by $R^1$ is preferably C2 to C10 , more preferably C2 to C6 alkyl and most preferably ethyl, isopropyl or t-butyl.

[0015]

"Lower alkyl" in other cases is preferably C1 to C6 and more preferably C1 to C4 alkyl.

[0016]

The examples of substituents of "optionally substituted lower alkyl" represented by Z are, (1) halogen; (2) cyano;

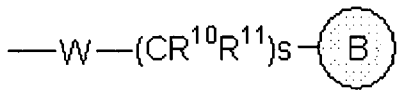
(3) the following groups (i) to (xvi), which are optionally substituted with one or more substituents selected from "a substituents group β" defined below,

(i) hydroxy, (ii) lower alkoxy, (iii) mercapto, (iv) lower alkylthio, (v) acyl, (vi) acyloxy, (vii) carboxy, (viii) lower alkoxycarbonyl, (ix) imino, (x) carbamoyl, (xi) thiocarbamoyl, (xii) lower alkylcarbamoyl, (xiii) lower alkylthiocarbamoyl, (xiv) amino, (xv) lower alkylamino or (xvi) heterocyclylcarbonyl;

or

(4) a group of the formula:

[Formula 29]



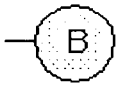
wherein $R^{10}$ and $R^{11}$ are each independently hydrogen or lower alkyl and when this group has two or more of $R^{10}$ and/or two or more of $R^{11}$, each $R^{10}$ and/or each $R^{11}$ may be different,

W is single bond, O, S or $NR^{12}$,

$R^{12}$ is hydrogen, lower alkyl or phenyl,

a group of the formula:

[Formula 30]



is cycloalkyl, bicycloalkyl, cycloalkenyl, aryl or heterocyclyl, each of which is optionally substituted with one or more of substituents selected from "a substituents group α" defined below and

s is an integer of 0 to 4.

[0017]

In the present specification, "a substituents group α" is a group constituting of (1) halogen; (2) oxo; (3) cyano; (4) nitro; (5) imino optionally substituted with lower alkyl or hydroxy;

(6) the following groups (i) to (xxi), which are optionally substituted with one or more of groups selected from the substituents group ß,

(i) hydroxy, (ii) lower alkyl, (iii) lower alkenyl, (iv) lower alkoxy, (v) carboxy, (vi) lower alkoxycarbonyl, (vii) acyl, (viii) acyloxy, (ix) imino, (x) mercapto, (xi) lower alkylthio, (xii) carbamoyl, (xiii) lower alkylcarbamoyl, (xiv) cycloalkylcarbamoyl, (xv) thiocarbamoyl, (xvi) lower alkylthiocarbamoyl, (xvii) lower alkylsulfinyl, (xviii) lower alkylsulfonyl, (xix) sulfamoyl, (xx) lower alkylsulfamoyl and (xxi) cycloalkylsulfamoyl;

(7) the following groups (i) to (v), which are optionally substituted with the substituents group ß, lower alkyl, lower alkoxy(lower)alkyl, optionally protected hydroxy(lower)alkyl,

halogeno(lower)alkyl, lower alkylsulfonyl and/or arylsulfonyl,
(i) cycloalkyl, (ii) cycloalkenyl, (iii)cycloalkyloxy, (iv) amino and (v) alkylenedioxy; and
(8) the following groups (i) to (xii), which are optionally substituted with the substituents group β, lower alkyl, halogeno(lower)alkyl and/or oxo,
(i) phenyl, (ii) naphthyl, (iii) phenoxy, (iv) phenyl(lower)alkoxy, (v) phenylthio, (vi) phenyl(lower)alkylthio, (vii) phenylazo, (viii) heterocyclyl, (ix) heterocyclyloxy, (x) heterocyclylthio, (xi) heterocyclylcarbonyl and (xii) heterocyclylsulfonyl.

[0018]

The preferable examples of the substituents group α as substituents for Ring B are halogen; nitro; hydroxy;
optionally substituted lower alkyl wherein the substituent(s) is halogen, cyano, phenyl, carboxy and/or lower alkoxycarbonyl;
lower alkenyl; lower alkoxycarbonyl(lower)alkenyl;
optionally substituted lower alkoxy wherein the substituent(s) is halogen, hydroxy, lower alkoxy, carboxy, lower alkoxycarbonyl, lower alkylamino and/or cyano;
acyl; hydroxyimino; lower alkylthio; lower alkylsulfinyl; sulfamoyl;
optionally substituted amino wherein the substituent(s) is lower alkyl, optionally protected hydroxy(lower)alkyl, phenyl and/or acyl;
alkylenedioxy; cyanophenyl; heterocyclylphenyl; biphenylyl; phenoxy; phenylazo optionally substituted with lower alkyl; or
optionally substituted heterocyclyl wherein the substituent(s) is optionally protected hydroxy, mercapto, halogen, lower alkyl, cycloalkyl, lower alkoxycarbonyl, amino, lower alkoxycarbonyl amino, carbamoyl, oxo, phenyl, lower alkoxyphenyl or heterocyclyl.
More preferable examples are halogen; lower alkyl optionally substituted with halogen; or lower alkoxy optionally substituted with halogen.

[0019]

"A substituents group β" is a group consisting of halogen, optionally protected hydroxy, mercapto, lower alkoxy, lower alkenyl, amino, lower alkylamino, lower alkoxycarbonylamino, lower alkylthio, acyl, carboxy, lower alkoxycarbonyl, carbamoyl, cyano, cycloalkyl, phenyl, phenoxy, lower alkylphenyl, lower alkoxyphenyl, halogenophenyl, naphthyl and heterocyclyl.

[0020]

Examples of the substituents for "optionally substituted lower alkyl" represented by any other than Z (e.g., $R^1$) are one or more substituents selected from the

substituents group ß. The lower alkyl may be substituted with these substituents at any possible positions.

[0021]

The lower alkyl part in "lower alkoxy", "lower alkoxycarbonyl", "lower alkoxycarbonyl(lower)alkyl", "lower alkylphenyl", "lower alkoxyphenyl", "lower alkylcarbamoyl", "lower alkylthiocarbamoyl", "lower alkylamino", "halogeno(lower)alkyl", "hydroxy(lower)alkyl", "phenyl(lower)alkoxy", "lower alkylthio", "phenyl(lower)alkylthio", "lower alkoxycarbonylamino", "lower alkoxycarbonyl(lower)alkenyl", "lower alkylsulfinyl", "lower alkylsulfonyl", "aryl(lower)alkoxycarbonyl", "lower alkylbenzoyl" and "lower alkoxybenzoyl" is the same as defined in the above "lower alkyl".

[0022]

Examples of the substituent(s) for "optionally substituted lower alkoxy" are one or more substituents selected from the substituents group ß. Preferable examples are phenyl, lower alkylphenyl, lower alkoxyphenyl, naphthyl and heterocyclyl.

[0023]

The term "cycloalkyl" includes C3 to C8 and preferably C5 to C6 cyclic alkyl. Examples are cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl and cyclooctyl.

[0024]

Examples of the substituent(s) for "optionally substituted cycloalkyl" are one or more substituents selected from the substituents group α and the cycloalkyl may be substituted with these substituents at any possible positions.

[0025]

The term "bicycloalkyl" includes a group which is formed by excluding one hydrogen atom from a C5 to C8 aliphatic cycle containing two rings which possess two or more of atoms in common. Examples are bicyclo[2.1.0]pentyl, bicyclo[2.2.1]heptyl, bicyclo[2.2.2]octyl and bicyclo[3.2.1]octyl.

[0026]

The term "lower alkenyl" includes C2 to C10, preferably C2 to C8 and more preferably C3 to C6 straight or branched alkenyl having one or more double bonds at any possible positions. Examples are vinyl, propenyl, isopropenyl, butenyl, isobutenyl, prenyl, butadienyl, pentenyl, isopentenyl, pentadienyl, hexenyl, isohexenyl, hexadienyl, heptenyl, octenyl, nonenyl and decenyl.

[0027]

The "lower alkenyl" part in "lower alkoxycarbonyl(lower)alkenyl" is the same as

the above "lower alkenyl".

[0028]

Examples of the substituent(s) for "optionally substituted lower alkenyl" are halogen, lower alkoxy, lower alkenyl, amino, lower alkylamino, lower alkoxycarbonylamino, lower alkylthio, acyl, carboxy, lower alkoxycarbonyl, carbamoyl, cyano, cycloalkyl, phenyl, lower alkylphenyl, lower alkoxyphenyl, naphthyl and/or heterocyclyl.

[0029]

The term "acyl" includes (1) C1 to C10, preferably C1 to C6 and more preferably C1 to C4 straight or branched alkylcarbonyl or alkenylcarbonyl, (2) C4 to C9 and preferably C4 to C7 cycloalkylcarbonyl and (3) C7 to C11 arylcarbonyl. Examples are formyl, acetyl, propionyl, butyryl, isobutyryl, valeryl, pivaloyl, hexanoyl, acryloyl, propioloyl, methacryloyl, crotonoyl, cyclopropylcarbonyl, cyclohexylcarbonyl, cyclooctylcarbonyl and benzoyl.

[0030]

The "acyl" part in "acyloxy" is the same as the above.

[0031]

The term "cycloalkenyl" includes a group having at least one double bond at any possible positions in the above cycloalkyl. Examples are cyclopropenyl, cyclobutenyl, cyclopentenyl, cyclohexenyl and cyclohexadienyl.

[0032]

Examples of substituents for "optionally substituted cycloalkenyl" are one or more substituents selected from the substituents group β.

[0033]

Examples of the substituent(s) for "optionally substituted amino" are the substituents group β, optionally substituted benzoyl and/or optionally substituted heterocyclylcarbonyl wherein the substituents is hydroxy, lower alkyl, lower alkoxy and/or lower alkylthio.

[0034]

The term "aryl" includes a monocyclic of polycyclic aromatic carbocyclyl group and examples are phenyl, naphthyl, anthryl and phenanthryl. "Aryl" includes aryl fused with other a non-aromatic carbocyclyl group, for example, indanyl, indenyl, biphenylyl, acenaphthyl, tetrahydronaphthyl and fluorenyl. Phenyl is preferable.

[0035]

The aryl part in "aryl (lower) alkoxycarbonyl" is the same as the above.

The term "optionally substituted aryl" and "optionally substituted phenyl" represented by Z include the above "aryl" and "phenyl" respectively, which may be substituted with the substituents group α or lower alkyl which may be substituted with one or more group selected from the substituents group α.

[0036]

Examples of the substituent(s) for "optionally substituted aryl" and "optionally substituted phenyl" represented by any other than Z are one or more groups selected from the substituents group β.

[0037]

The term "carbocyclyl" includes the above "cycloalkyl", "cycloalkenyl", "bicycloalkyl" and "aryl".

[0038]

The term "non-aromatic carbocyclyl" includes the above "cycloalkyl", "cycloalkenyl" and "bicycloalkyl".

[0039]

The term "optionally substituted carbocyclyl" includes the above "optionally substituted cycloalkyl", "optionally substituted cycloalkenyl", "optionally substituted bicycloalkyl" and "optionally substituted aryl".

[0040]

The term "heterocyclyl" includes a heterocyclic group containing at least one heteroatom arbitrarily selected from O, S and N. For example, 5- or 6-membered heteroaryl such as pyrrolyl, imidazolyl, pyrazolyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, triazolyl, triazinyl, tetrazolyl, isoxazolyl, oxazolyl, oxadiazolyl, isothiazolyl, thiazolyl, thiadiazolyl, furyl and thienyl; fused heterocyclyl consisting of two rings such as indolyl, isoindolyl, indazolyl, indolizinyl, indolinyl, isoindolinyl, quinolyl, isoquinolyl, cinnolinyl, phthalazinyl, quinazolinyl, naphthyridinyl, quinoxalinyl, purinyl, pteridinyl, benzopyranyl, benzimidazolyl, benzisoxazolyl, benzoxazolyl, benbzoxadiazolyl, benzisothiazolyl, benzothiazolyl, benzothiadiazolyl, benzofuryl, isobenzofuryl, benzothienyl, benzotriazolyl, imidazopyridyl, triazoropyridyl, imidazothiazolyl, pyrazinopyridazinyl, tetrahydroquinolyl, tetrahydrobenzothienyl, oxazolopyridyl, thiazolopyridyl (e.g., thiazolo[5,4-b]pyridin-2-yl, thiazolo[5,4-c]pyridin-2-yl, thiazolo[4,5-b]pyridin-2-yl and thiazolo[4,5-c]pyridin-2-yl), benzoxazolinonyl, benzisoxazolinonyl, benzoxazinonyl, benzoxyazepinonyl, oxazolopyridinonyl and benzodioxolyl; fused heterocyclyl consisting of three rings such as carbazolyl, acridinyl, xanthenyl, phenothiazinyl, phenoxathiinyl, phenoxazinyl and dibenzofuryl; and non-aromatic

heterocyclyl such as dioxanyl, thiiranyl, oxiranyl, oxathiolanyl, azetidinyl, thianyl, pyrrolidinyl, pyrrolinyl, imidazolidinyl, imidazolinyl, pyrazolidinyl, pyrazolinyl, piperidyl, piperazinyl, morpholinyl, morpholino, thiomorpholinyl, thiomorpholino, dihydropyridyl, tetrahydrofuryl, tetrahydropyranyl, tetrahydrothiazolyl and tetrahydroisothiazolyl.

[0041]

"Fused heterocyclyl" fused with a ring other than a heterocycle (e.g., benzothiazolyl), may connect at any possible position.

[0042]

The substituent(s) for "optionally substituted heterocyclyl" and "optionally substituted fused heterocyclyl consisting of two rings" are the same as those for the above "optionally substituted aryl".

[0043]

Heterocyclyl parts in "heterocyclylcarbonyl", "heterocyclyloxy", "heterocyclylthio" and "heterocyclyl substituted phenyl" are the same as the above "heterocyclyl".

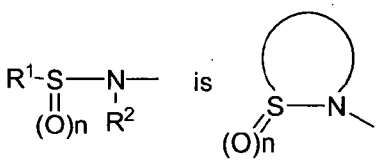
[0044]

The term "lower alkylene" includes a bivalent group comprising 1 to 6 of methylene, preferably 2 to 6 of methylene and more preferably 3 to 6 of methylene. For example, methylene, ethylene, trimethylene, tetramethylene, pentamethylene and hexamethylene are included. Tetramethylene is preferable.

[0045]

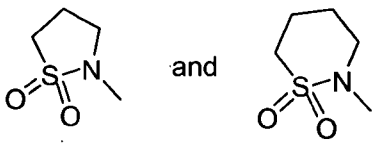
"$R^1$ and $R^2$ taken together may form lower alkylene" includes the case

[Formula 31]



Preferable examples are

[Formula 32]



[0046]

Lower alkylene part in "lower alkylenedioxy" is the same as the above "lower alkylene". Methylenedioxy or ethylenedioxy is preferable.

[0047]

The term "lower alkenylene" includes a bivalent group comprising 2 to 6 of methylene, preferably 3 to 6 of methylene and more preferably 4 to 5 of methylene and including at least one double bond.

[0048]

The term "cycloalkylene" includes a bivalent group which is formed by excluding one hydrogen atom from the above "cycloalkyl". A preferable example of cycloalkylene represented by X is 1, 4-cyclohexanediyl.

[0049]

The term "cycloalkenylene" includes a group containing at least one double bonds in the above cycloalkylene.

[0050]

The term "bicycloalkylene" includes a group which is formed by excluding one hydrogen atom from the above "bicycloalkyl". Examples are bicyclo[2. 1. 0]pentylene, bicyclo[2. 2. 1]heptylene, bicyclo[2. 2. 2]octylene and bicyclo[3. 2. 1]octylene.

[0051]

The term "heterocyclediyl" includes a bivalent group which is formed by excluding one hydrogen atom from the above "heterocyclyl". Piperidinediyl, piperazinediyl, pyridinediyl, pyrimidinediyl, pyrazinediyl, pyrrolidinediyl or pyrrolediyl is preferable. Piperidinediyl is more preferable.

[0052]

The term "arylene" includes a bivalent group which is formed by excluding one hydrogen atom from the above "aryl". Phenylene is preferable.

[0053]

The term "heteroarylene" includes aromatic groups in the above "heterocyclediyl". Examples are pyrrolediyl, imidazolediyl, pyrazolediyl, pyridinediyl, pyridazinediyl, pyrimidinediyl, pyrazinediyl, triazolediyl, triazinediyl, isoxazolediyl, oxazolediyl, oxadiazolediyl, isothiazolediyl, thiazolediyl, thiadiazolediyl, furandiyl and thiophenediyl.

[0054]

One or more groups selected from the substituents group β are examples of substituents for "optionally substituted lower alkylene", "optionally substituted lower alkenylene", "optionally substituted cycloalkylene", "optionally substituted cyclohexylene", "optionally substituted bicycloalkylene", "optionally substituted cycloalkenylene", "optionally substituted phenylene", "optionally substituted heterocyclyldiyl" and "optionally substituted piperidinylene". Halogen, hydroxy, lower alkyl, halogeno(lower)alkyl, lower alkoxy, amino, lower alkylamino, acyl, carboxy or

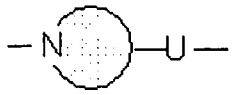


CORRECTED SHEET: 22 OCTOBER 2009

lower alkoxycarbonyl is preferable. These substituents may attach to any possible positions.

When -$NR^2$-X- is a group of the formula:

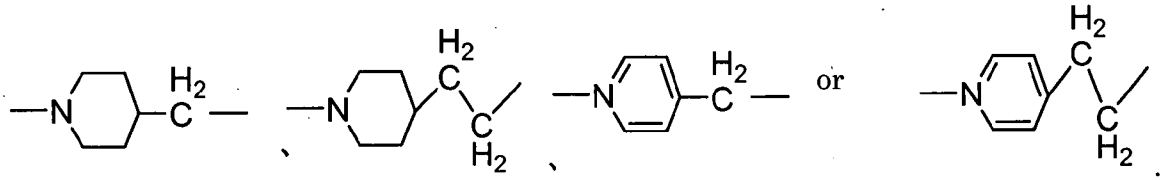
[Formula 33]



,

U is preferably methylene or ethylene. More preferred is a group of the formula:

[Formula 34]



[0055]

The compounds of the present invention include any formable and pharmaceutically acceptable salts thereof. Examples of "the pharmaceutically acceptable salt" are salts with mineral acids such as hydrochloric acid, sulfuric acid, nitric acid and phosphoric acid; salts with organic acids such as para-toluenesulfonic acid, methanesulfonic acid, oxalic acid and citric acid; salts with organic bases such as ammonium, trimethylammonium and triethylammonium; salts with alkaline metals such as sodium and potassium; and salts with alkaline earth metals such as calcium and magnesium.

[0056]

The compounds of the present invention include solvates thereof. Hydrate is preferable and arbitrary numbers of water molecules may coordinate to the compound of the present invention.

[0057]

When Compound (I) of the present invention has an asymmetric carbon atom, it includes racemates, all of enantiomers and all of stereoisomers such as diastereomer, epimer and enantiomer thereof. When Compound (I) of the present invention having one or more double bonds forms an E isomer or Z isomer, Compound (I) includes both isomers. When X is cycloalkylene, Compound (I) includes both of cis isomer and trans isomer.

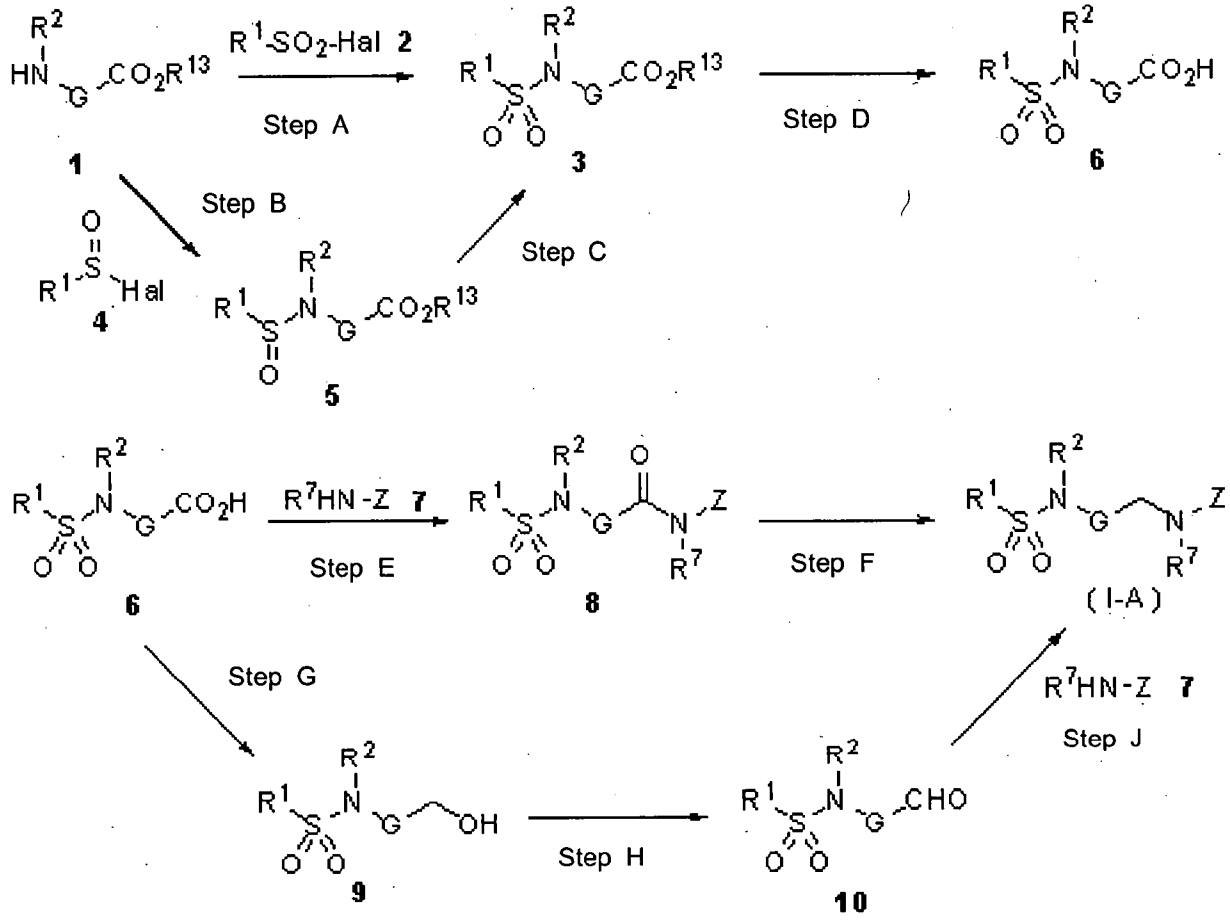
[0058]

For example, Compound (I) of the present invention can be synthesized by the following methods. Hereinafter, X will be described as -$CH_2$-G- or -G-$CH_2$-.

[0059]

[Compounds wherein Y=S(O)n]

[Formula 35]




wherein Hal is halogen, -G-$CH_2$- is the same as -X- in the formula (I), $R^{13}$ is lower alkyl and the other symbols are the same as the above.

Step A

Compound 1 is reacted with Sulfonyl Halide 2 having the desired substituent $R^1$ in a suitable solvent at 0 °C to 50 °C for several minutes to several hours to give Compound 3 wherein n is 2. Examples of the solvent are tetrahydrofuran, dimethylformamide, diethyl ether, dichloromethane, toluene, benzene, xylene, cyclohexane, hexane, chloroform, ethyl acetate, butyl acetate, pentane, heptane, dioxane, acetone, acetonitrile, water and a mixture thereof.

Step B

Compound 5 wherein n is 1 can be synthesized by reacting Compound 1 and Sulfinyl Halide 4 having substituent $R^1$. The conditions for the reaction are the same

as those of the above Step A.

Step C

Compound 5 obtained in Step B is oxidized by the usual method to give Compound 3 wherein n is 2. Examples of an oxidizer are m-Chloroperbenzoic acid, peracetic acid, hydrogen peroxide, trifluoroperacetic acid, sodium periodate, sodium hypochlorite and potassium permanganate. The reaction may be carried out at 0 °C to 50 °C. Examples of solvents are tetrahydrofuran, dimethylformamide, diethyl ether, dichloromethane, toluene, benzene, xylene, cyclohexane, hexane, chloroform, ethyl acetate, butyl acetate, pentane, heptane, dioxane, acetone, acetonitrile, water, methanol, ethanol, isopropanol and mixture thereof.

Step D

Compound 3 obtained from Step A or C is treated in a suitable solvent and base to give Compound 6. Examples of the base are barium hydroxide, sodium hydroxide, potassium hydroxide, hydrazine, lithium salt of propanethiol. Examples of the solvent are tetrahydrofuran, dimethylformamide, dioxane, acetone, acetonitrile, methanol, ethanol, propanol, water and a mixed solvent thereof. The reaction may be carried out at 0 °C to 100 °C for several minutes to tens of hours.

Step E

Compound 6 obtained form Step D is reacted with Amino Compound 7 having the desired substituent Z and $R^7$ in a suitable solvent at 0 °C to 50 °C for several minutes to several hours to give Compound 8. Examples of the solvent are tetrahydrofuran, dimethylformamide, diethyl ether, dichloromethane, toluene, benzene, xylene, cyclohexane, hexane, chloroform, ethyl acetate, butyl acetate, pentane, heptane, dioxane, acetone, acetonitrile, water and a mixed solvent thereof. An activator such as thionyl chloride, acid halide, acid anhydride and activated ester can be used, if necessary.

Step F

The obtained Compound 8 is treated in a suitable solvent with a suitable reducing agent to give Compound (I-A). Examples of the reducing agent are sodium borohydride, lithium boron hydride and lithium aluminum hydride. Examples of the solvent are tetrahydrofuran, dimethylformamide, dioxane, acetonitrile, methanol,

ethanol, propanol, acetic acid and a mixed solvent thereof. The reaction may be carried out at 0 °C to 100 °C for several minutes to tens of hours.

Step G

Compound 6 obtained from Step D is treated in a suitable solvent with a reducing agent to give Compound 9. Examples of reducing agent are sodium borohydride, lithium boron hydride, lithium aluminum hydride and diborane. Examples of the solvent are tetrahydrofuran, dimethylformamide, dioxane, acetonitrile, methanol, ethanol, propanol and a mixed solvent thereof. The reaction may be carried out at 0 °C to 100 °C for several minutes to tens of hours. Compound 9 can be obtained through the intermediate such as acid halide, acid anhydride and activated ester, if necessary.

Step H

Compound 9 obtained from Step G is oxidized by the usual method to give Compound 10. Examples of an oxidizer are m-Chloroperbenzoic acid, peracetic acid, hydrogen peroxide, pertrifluoroacetic acid, sodium periodate, sodium hypochlorite, potassium permanganate, Dess-Martin periodinane, dimethylsulfoxide/oxalyl chloride (Swern oxidation) and ruthenium-catalyst. The reaction may be carried out at -80 °C to 50 °C. Examples of the solvent are tetrahydrofuran, dimethylformamide, diethyl ether, dichloromethane, toluene, benzene, xylene, cyclohexane, hexane, chloroform, ethyl acetate, butyl acetate, pentane, heptane, dioxane, acetone, acetonitrile, water, methanol, ethanol, isopropanol and a mixed solvent thereof.

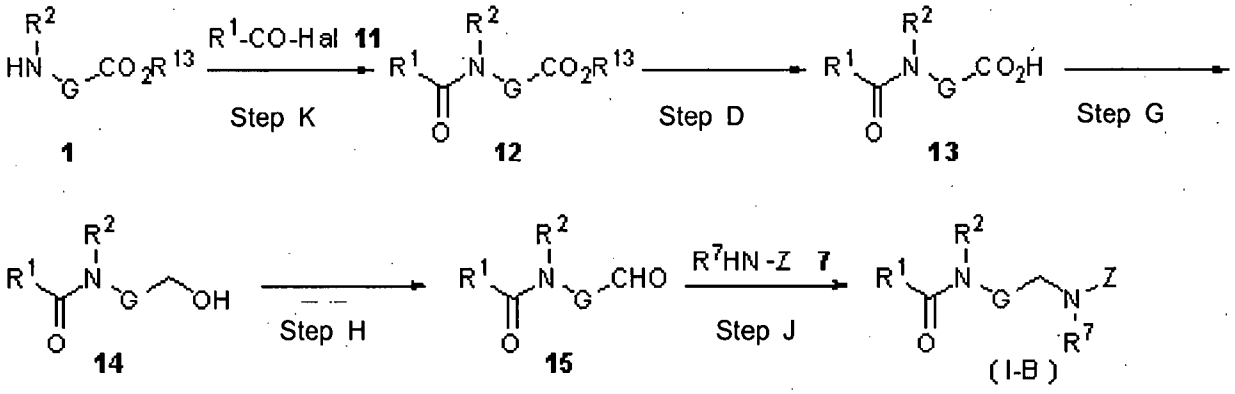
Step J

The obtained Compound 10 and Amino Compound 7 having the desired substituent Z and $R^7$ are subjected to reductive amination reaction by a ordinary method to give Compound (I-A). Examples of the reducing agent are sodium borohydride, triacetoxy sodium borohydride and cyano sodium borohydride. The reaction may be carried out at 0 °C to 50 °C. Examples of the solvent are tetrahydrofuran, dimethylformamide, dioxane, acetonitrile, methanol, ethanol, propanol, acetic acid, hydrochloric acid and a mixed solvent thereof.

[0060]

[Compounds wherein Y=CO]

[Formula 36]




wherein each of the symbols is the same as the above and -G-$CH_2$- is the same as -X- in the formula(I).

Step K

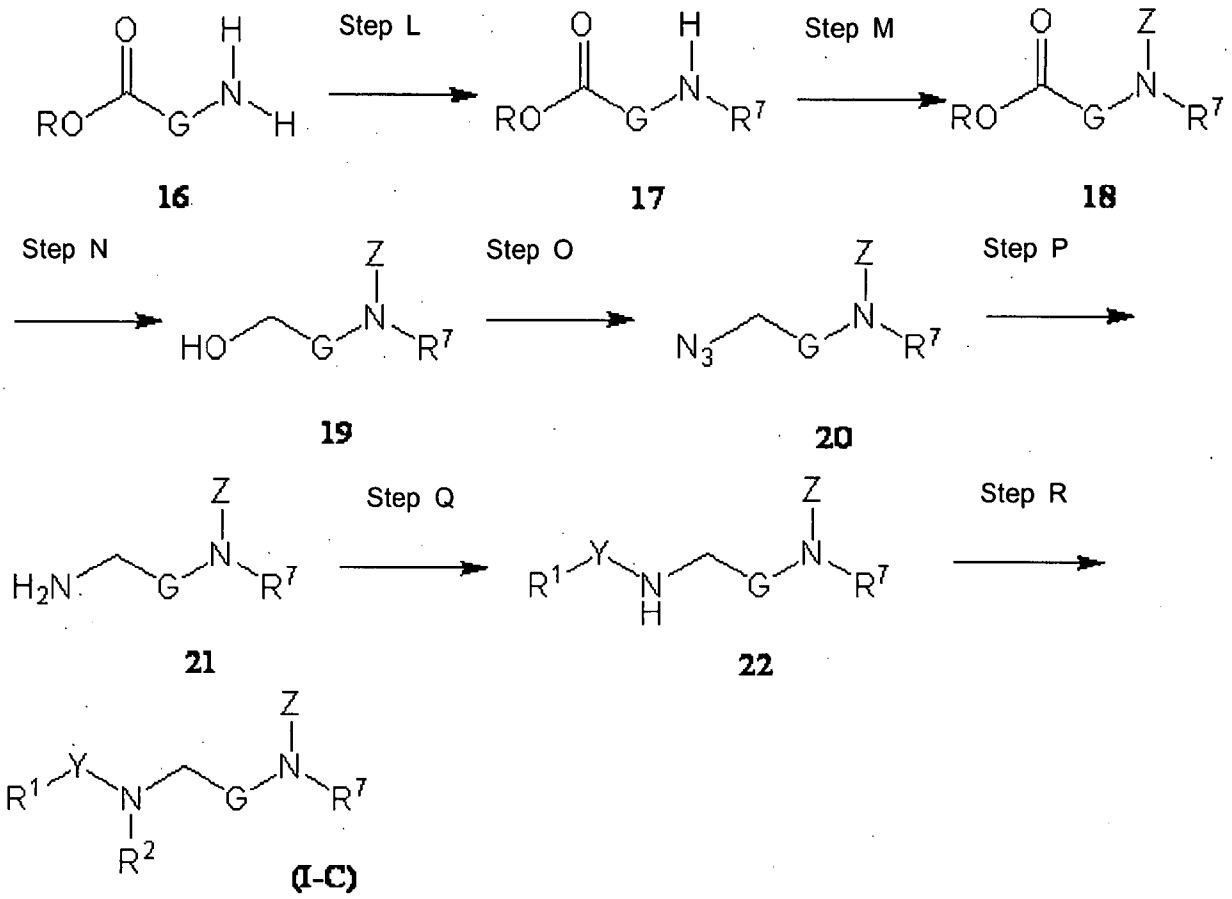
Compound 1 is reacted with Acyl Halide 11 having the desired substituent $R^1$ in a suitable solvent at -20 °C to 50 °C for several minutes to several hours to give Compound 12. Examples of the solvent are tetrahydrofuran, dimethylformamide, diethyl ether, dichloromethane, toluene, benzene, xylene, cyclohexane, hexane, chloroform, ethyl acetate, butyl acetate, pentane, heptane, dioxane, acetone, acetonitrile, water and a mixed solvent thereof.

Step D, G, H and J

The obtained Compound 12 is subjected to the similar method to the above Step D, G, H and J to give Compound (I-B) of the present invention.

[0061]

[Formula 37]




wherein each of the symbols is the same as the above, $-CH_2-G-$ is the same as -X- in the formula (I) and R is alkyl.

Step L

This is the step to introduce substituent $R^7$ into Compound 16. For example, Compound 16 is reacted with $R^7X^1$ wherein $X^1$ is halogen under the presence of a base to give Compound 17. Examples of the solvent are tetrahydrofuran and dimethylformamide. The reaction may be carried out at a room temperature. Examples of the base are triethylamine, pyridin and dimethylamino pyridin. The compound wherein $R^7$ is hydrogen in formula (I-C) do not need this step.

Step M

This is the step to introduce substituent Z into Compound 17. For example, Compound 17 is reacted with $ZX^1$ wherein $X^1$ is halogen under the presence of a base to give Compound 18. Examples of the solvent are methanol, ethanol, isopropanol and dimethylformamide. The reaction may be carried out at a room temperature or under heating. For example, it can be carried out in a sealed tube by a microwave reactor.

An example of the base is N,N-diisopropyl ethyl amine.

Step N

This is the step to reduce Compound 18 to give Compound 19. An example of reducing agent is lithium aluminum hydride. An example of the solvent is tetrahydrofuran. The reaction may be carried out at a room temperature.

Step O

This is the step to give Compound 20 by azidation of Compound 19. For example, methanesulfonyl chloride is reacted with Compound 19 by using triethylamine as a base to give mesylate. Chloroform can be used as the solvent for the mesylation. Sodium azide is reacted with the obtained compound and azidation is carried out in dimethylformamide or the like at room temperature or under warming to give Compound 20.

Step P

This is the step to reduce Compound 20 to give Compound 21. It can be carried out by catalytic reduction. An example of the catalyst is 10 % palladium carbon. An example of the solvent is ethanol.

Step Q

This is the step to a compound of the formula: $R^1$-Y-$X^1$ wherein $X^1$ is halogen or the like, and Y is S, SO, $SO_2$ or CO is reacted with Compound 21 to give Compound 22. Examples of a compound of the formula: $R^1$-Y-$X^1$ are various sulfonyl chloride and acyl chloride. Examples of the solvent are tetrahydrofuran and dimethylamide. The reaction may be carried out at a room temperature or under heating. The reaction is preferably carried out under a base. Examples of the base are pyridin and triethylamine. A compound wherein $R^2$ is hydrogen in the formula (I-C) do not need the subsequent Step R and Compound 22 is a final target compound. This reaction can be carried out with a compound of the formula: $R^1$-Y-$X^1$ wherein Y=S or SO to give Compound 22, and then the oxidation can be carried out to transform to a compound wherein Y is $SO_2$ used for the next step.

Step R

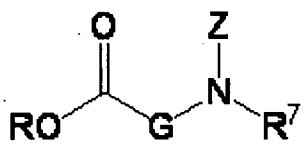
This is the step to introduce substituent $R^2$ into Compound 22. $R^2X^1$ wherein $X^1$

is halogen or the like is reacted with Compound 22 under the presence of a base to give Compound (I-C). An example of base is sodium hydride. An example of the solvent is dimethylformamide.

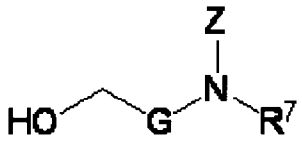
[0062]

The following intermediates are useful in the above steps.

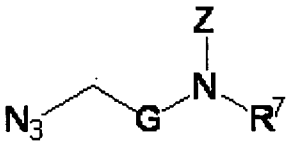
[Formula 38]



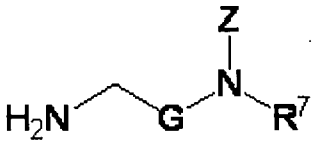
18



19



20



21

wherein

R is optionally substituted lower alkyl,

$R^7$ is hydrogen or optionally substituted lower alkyl,

G is 1,4-cycloalkylene, and

Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl.

R is preferably lower alkyl and more preferably methyl and ethyl. Ethyl is especially preferable.

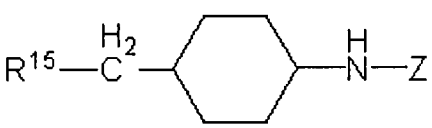
Preferable $R^7$ is hydrogen.

Preferable Z is optionally substituted heterocyclyl.

The following compounds are especially preferable.

A compound of the formula:

[Formula 39]



wherein

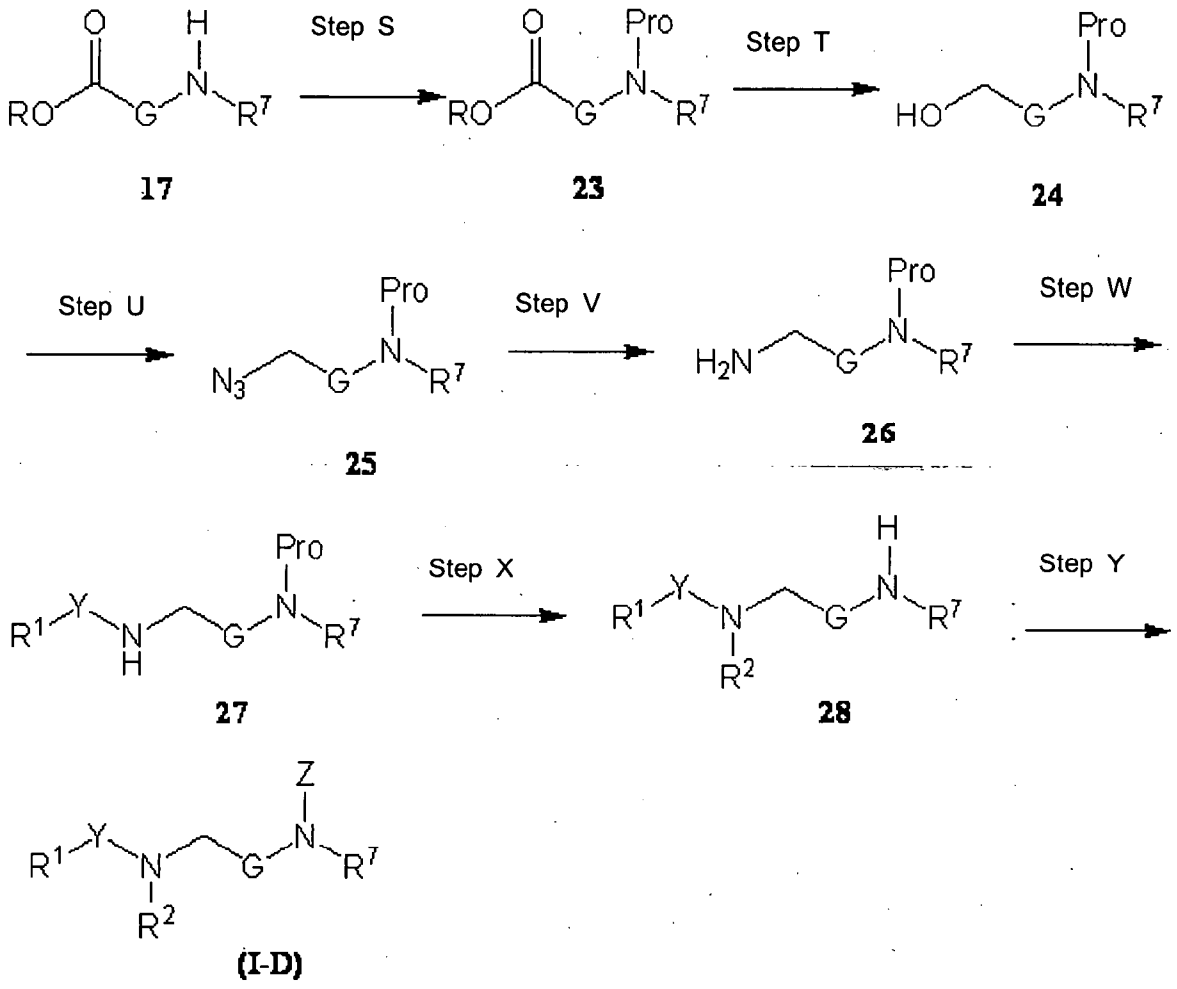
$R^{15}$ is $NH_2$ or OH, and

Z is optionally substituted pyridyl, optionally substituted pyridazinyl, optionally

substituted pyrazinyl, optionally substituted pyrimidinyl, optionally substituted quinolyl, optionally substituted isoquinolyl, optionally substituted benzothiazolyl, optionally substituted benzoxazolyl, optionally substituted benzopyridyl, optionally substituted benzopyridadinyl, optionally substituted benzimidazolyl, optionally substituted benzoxazolyl, optionally substituted thiazolopyridyl optionally substituted isoxazolinonyl, optionally substituted oxazolinonyl, optionally substituted benzoxazinonyl or optionally substituted benzoxyazepinonyl.

[0063]

[Formula 40]




wherein each of the symbols is the same as the above, $-CH_2-G-$ is the same as -X- in the formula (I), R is alkyl and Pro is amino protecting group.

Step S

This is the step to introduce a protecting group into Compound 17. As a protecting group, the protecting group described in Protective Groups in Organic Synthesis (Theodra W. Greene) or the like can be used. The amino protecting groups



CORRECTED SHEET: 22 OCTOBER 2009

which can be removed under the acid condition are preferable. Examples are benzyloxycarbonyl and tert-butyloxycarbonyl. For example, ProX$^1$ wherein X$^1$ is halogen or the like and Pro is benzyloxycarbonyl, tert-butyloxycarbonyl or the like and Pro-O-Pro wherein Pro is benzyloxycarbonyl, tert-butyloxycarbonyl or the like are reacted under the presence of the base to give Compound 23. Examples of the solvent are tetrahydrofuran and dimethylformamide. The reaction may be carried out at a room temperature. Examples of the base are triethylamine, pyridin and dimethyl amino pyridin. The reaction also can be carried out with a compound wherein R$^7$ is hydrogen.

Step T

This is the step to reduce Compound 23 to give Compound 24. Lithium aluminum hydride can be used as the reducing agent. An example of the solvent is tetrahydrofuran. The reaction may be carried out at a room temperature.

Step U

This is the step to give Compound 25 by azidation of Compound 24. For example, methanesulfonyl chloride is reacted with Compound 24 by using triethylamine as a base to give mesylate. Chloroform can be used as the solvent for the mesylation. Sodium azide is reacted with the obtained compound and azidation is carried out in dimethylformamide or the like at room temperature or under warming to give Compound 25.

Step V

This is the step to reduce Compound 25 to give Compound 26. Compound 25 is reduced with triphenylphosphine and water to give Compound 26. The reaction may be carried out under heating. An example of the solvent is tetrahydrofuran. Except for the reduction method with triphenylphosphine, the catalytic reduction can be used. For the catalytic reduction, 10 % palladium carbon or the like can be used as catalyst. An example of the solvent is ethanol. The reduction method can be suitably selected depending on the used protecting group.

Step W

This is the step to react a compound of the formula: R$^1$-Y-X$^1$ wherein X$^1$ is halogen or the like, Y is S, SO, $SO_2$ or CO with Compound 26 to give Compound 27. Examples

of the compound of the formula: $R^1$-Y-$X^1$ wherein $X^1$ is halogen or the like are various sulfonyl chloride and acyl chloride. Examples of the solvent are tetrahydrofuran and dimethylamide. The reaction may carry out at a room temperature or under heating. The reaction is preferably carried out under a base. Examples of the base are pyridin and triethylamine. This reaction can be carried out with a compound of the formula: $R^1$-Y-$X^1$ wherein Y=S or SO to give Compound 27, and then the oxidation can be carried out to transform to a compound wherein Y is $SO_2$ used for the next step.

Step X

This is the step to remove the protecting group of Compound 27. The method for removing the protecting group can be used by selecting various conditions depending on the protecting group. For example, tert-butyloxycarbonyl can be removed with acid. Benzyloxycarbonyl can be removed by catalytic reduction or the like.

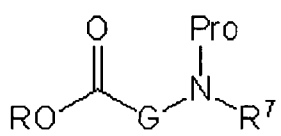
Step Y

This is the step to introduce substituent Z into Compound 28. For example, $ZX^1$ wherein $X^1$ is halogen is reacted under the presence of the base to give Compound (I-D). Examples of the solvent are methanol, ethanol, isopropanol and dimethylformamide. The reaction may carry out at a room temperature or under heating. For example, it can be carried out in a sealed tube by a microwave reactor. An example of the base is N,N-diisopropyl ethyl amine.

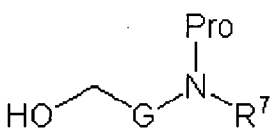
In the above steps, the following intermediates are useful.

A compound of the formula:

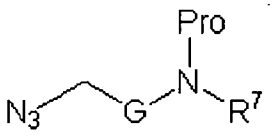
[Formula 41]



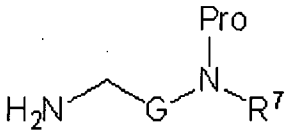

**23**



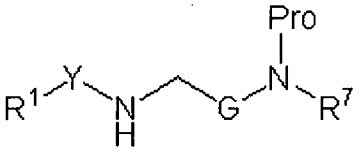

**24**



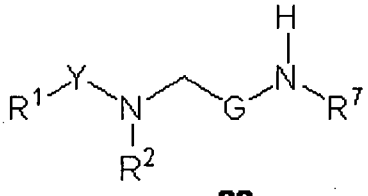

**25**




**26**




**27**




**28**

wherein

R is optionally substituted lower alkyl,

Pro is a protecting group,

$R^7$ is hydrogen or optionally substituted lower alkyl,

G is 1,4-cycloalkylene,

Y is $SO_2$ or SO,

$R^1$ is optionally substituted lower alkyl, and

$R^2$ is hydrogen or optionally substituted lower alkyl.

R is preferably lower alkyl and more preferably methyl and ethyl. Ethyl is especially preferable.

Preferable Pro is amino protecting group which can be removed under the acid condition. Examples of Pro are the formula: -(C=O)-O-R, wherein R is optionally substituted lower alkyl, optionally substituted lower alkenyl. Tert-butyloxycarbonyl is especially preferable.

Preferable $R^7$ is hydrogen.

Preferable Y is $SO_2$.

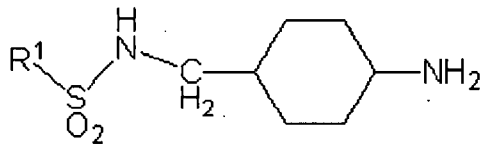
$R^1$ is preferably lower alkyl and more preferably isopropyl and ethyl. Ethyl is especially preferable.

Preferable $R^2$ is hydrogen.

The following compounds are especially preferable.

A compound of the formula:

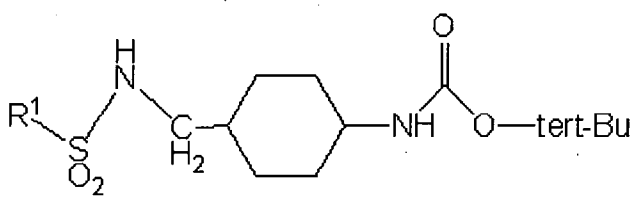
[Formula 42]



wherein $R^1$ is ethyl or tert-butyl.

A compound of the formula:

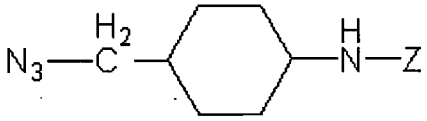
[Formula 43]



wherein $R^1$ is ethyl, isopropyl or tert-butyl.

A compound of the formula :

[Formula 44]



wherein Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl.

[0064]

All of the compounds of the present invention have an NPY Y5 antagonistic activity and the following compounds are especially preferable.

[0065]

In the formula (I),

a compound wherein $R^1$ is optionally substituted lower alkyl (hereinafter referred to as "$R^1$ is R1-1"),

a compound wherein $R^1$ is C1 to C10 alkyl optionally substituted with halogen (hereinafter referred to as "$R^1$ is R1-2"),

a compound wherein $R^1$ is C1 to C10 alkyl optionally substituted with halogen (hereinafter referred to as "$R^1$ is R1-3"),

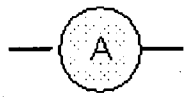
a compound wherein $R^1$ is isopropyl or t-butyl (hereinafter referred to as "$R^1$ is R1-4"),

a compound wherein $R^2$ is hydrogen or C1 to C3 alkyl (hereinafter referred to as "$R^2$ is R2-1"),

a compound wherein $R^2$ is hydrogen (hereinafter referred to as "$R^2$ is R2-2"),

a compound wherein X is optionally substituted lower alkylene, optionally substituted lower alkenylene or a group of the formula:

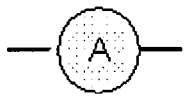
[Formula 45]




,

wherein a group of the formula:

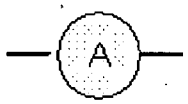
[Formula 46]




is optionally substituted cycloalkylene, optionally substituted cycloalkenylene, optionally substituted bicycloalkylene, optionally substituted phenylene or optionally substituted heterocyclediyl (hereinafter referred to as "X is X-1"),

a compound wherein X is C2 to C6 alkylene, C3 to C6 alkenylene or a group of the formula:

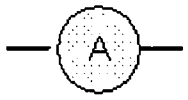
[Formula 47]



,

wherein a group of the formula:

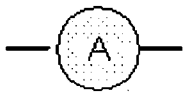
[Formula 48]



is optionally substituted cycloalkylene, optionally substituted cycloalkenylene, optionally substituted bicycloalkylene, optionally substituted phenylene, optionally substituted piperidinylene, optionally substituted thiophenediyl or optionally substituted furandiyl (hereinafter referred to as "X is X-2"),

a compound wherein X is C2 to C6 alkylene or a group of the formula:

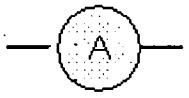
[Formula 49]



,

wherein a group of the formula:

[Formula 50]



wherein is optionally substituted cycloalkylene, optionally substituted phenylene, optionally substituted piperidinylene, optionally substituted thiophenediyl or optionally substituted furandiyl (hereinafter referred to as "X is X-3"),

a compound wherein X is (i) C2 to C6 alkylene or (ii) cycloalkylene or phenylene, each of which is optionally substituted with halogen, hydroxy, lower alkyl or halogeno(lower)alkyl (hereinafter referred to as "X is X-4"),

a compound wherein X is C2 to C6 alkylene or to C5 to C6 cycloalkylene (hereinafter referred to as "X is X-5"),

a compound wherein X is C3 to C6 alkylene or 1,4-cyclohexylene (hereinafter referred to as "X is X-6"),

a compound wherein Y is -SO- (hereinafter referred to as "Y is Y-1"),

a compound wherein Y is $-SO_2-$ (hereinafter referred to as "Y is Y-2"),

a compound wherein Y is -CO- (hereinafter referred to as "Y is Y-3"),

a compound wherein Z is optionally substituted lower alkyl, optionally substituted carbocyclyl or optionally substituted heterocyclyl (hereinafter referred to as "Z is Z-1"),

a compound wherein Z is a group of the formula:-$(CR^8R^9)r$-W-$(CR^{10}R^{11})s$-V
wherein
$R^8$, $R^9$, $R^{10}$ and $R^{11}$ are each independently hydrogen or lower alkyl and when Z has two or more of $R^8$, two or more of $R^9$, two or more of $R^{10}$ and/or two or more of $R^{11}$, each of $R^8$, $R^9$, $R^{10}$ and $R^{11}$ may be different,
W is single bond, O, S or $NR^{12}$,
$R^{12}$ is hydrogen, lower alkyl or phenyl,
V is hydrogen, optionally substituted cycloalkyl, optionally substituted bicycloalkyl, optionally substituted aryl or optionally substituted heterocyclyl,
r is an integer of 1 to 4 and
s is an integer of 0 to 4
(hereinafter referred to as " Z is Z-2"),

a compound wherein Z is a group of the formula:-$(CH_2)r$-W-$(CH_2)s$-V
wherein
W is single bond, O, S or $NR^{12}$,
$R^{12}$ is hydrogen or lower alkyl,
V is optionally substituted aryl or optionally substituted heterocyclyl
wherein the substituent(s) is halogen, hydroxy, lower alkyl, halogeno(lower)alkyl, lower alkoxy, lower alkenyl, amino, lower alkylamino, acyl, carboxy, lower alkoxycarbonyl, phenyl or monocyclic heteroaryl,
r is an integer of 1 to 4 and
s is an integer of 0 to 4
(hereinafter referred to as "Z is Z-3"),

a compound wherein Z is a group of the formula:-$(CH_2)r$-W-$(CH_2)s$-V
wherein
W is single bond, O, S, NH or NMe,
V is optionally substituted phenyl or optionally substituted heteroaryl
wherein the substituents is halogen, lower alkyl, halogeno(lower)alkyl, lower alkoxy, amino or lower alkylamino,

r is an integer of 1 to 3 and

s is an integer of 0 or 1

(hereinafter referred to as "Z is Z-4"),

a compound wherein Z is optionally substituted carbocyclyl,

wherein the substituent is halogen; hydroxy;

optionally substituted lower alkyl wherein the substituent(s) is halogen, hydroxy, carboxy, lower alkoxycarbonyl, cyano and/or phenyl;

lower alkenyl optionally substituted with lower alkoxycarbonyl;

optionally substituted lower alkoxy wherein the substituent(s) is halogen, hydroxy, lower alkoxy, carboxy, lower alkoxycarbonyl, lower alkylamino, cycloalkyl, cyano and /or heterocyclyl;

cycloalkyl; cycloalkyloxy; acyl; lower alkylthio; carbamoyl; lower alkylcarbamoyl; cycloalkylcarbamoyl; hydroxy imino;

optionally substituted amino wherein the substituent(s) is lower alkyl, optionally protected hydroxy(lower)alkyl, lower alkoxy(lower)alkyl, acyl, lower alkylsulfonyl, arylsulfonyl and/or phenyl;

phenyl optionally substituted with halogen, cyano, phenyl and/or heterocyclyl;

lower alkylsulfinyl; lower alkylsulfamoyl; cycloalkylsulfamoyl;

nitro; cyano; alkylenedioxy; phenylazo optionally substituted with lower alkyl; phenoxy; oxo;

optionally substituted heterocyclyl wherein the substituent(s) is optionally protected hydroxy, mercapto, halogen, lower alkyl, cycloalkyl, lower alkoxycarbonyl, acyl, amino, lower alkoxycarbonylamino, carbamoyl, oxo, phenyl, lower alkoxyphenyl, halogenophenyl, heterocyclyl and/or oxo;

heterocyclylsulfonyl optionally substituted with lower alkyl; heterocyclyloxy;

heterocyclylcarbonyl optionally substituted with lower alkyl

(hereinafter referred to as "Z is Z-5"),

a compound wherein Z is optionally substituted phenyl

wherein the substituent(s) is halogen; hydroxy; lower alkyl optionally substituted with halogen, hydroxy, lower alkoxycarbonyl, cyano and/or phenyl; lower alkoxycarbonyl(lower)alkenyl; lower alkoxy optionally substituted with halogen, lower alkoxy, lower alkoxycarbonyl, cycloalkyl and/or heterocyclyl; cycloalkyl; cycloalkyloxy; acyl; lower alkylthio; carbamoyl; lower alkycarbamoyl; amino optionally substituted

with lower alkyl, hydroxy(lower)alkyl, acyl, lower alkylsulfonyl and /or phenyl; phenyl optionally substituted with halogen, cyano, phenyl and /or heterocyclyl;
lower alkyl sulfamoyl; cycloalkylsulfamoyl; nitro; alkylenedioxy; phenylazo optionally substituted with lower alkyl; phenoxy; oxo;
heterocyclyl optionally substituted with hydroxy, halogen, lower alkyl, lower alkoxycarbonyl, amino, carbamoyl, phenyl, halogenophenyl, heterocyclyl and /or oxo; heterocyclyloxy; and/or heterocyclylsulfonyl optionally substituted with lower alkyl
(hereinafter referred to as "Z is Z-6"),

a compound wherein Z is optionally substituted phenyl
wherein the substituent(s) is halogen; lower alkyl optionally substituted with halogen, hydroxy, lower alkoxycarbonyl and/or phenyl; lower alkoxy optionally substituted with halogen and/or cycloalkyl; cycloalkyl; cycloalkyloxy; acyl; lower alkylthio; lower alkylcarbamoyl; amino optionally substituted with lower alkyl, hydroxy(lower)alkyl, acyl and/or phenyl; phenyl optionally substituted with piperidyl; cycloalkylsulfamoyl; alkylenedioxy; phenoxy;
morpholinyl or morpholino, each of which is optionally substituted with lower alkyl;
piperidyl optionally substituted with hydroxy, lower alkyl, lower alkoxycarbonyl, phenyl, halogenophenyl and/or oxo; pyrrolidinyl optionally substituted with hydroxy, carbamoyl and/or oxo; piperazinyl optionally substituted with phenyl or pyrimidinyl; dihydropyridyl; pyrrolyl; pyrrolinyl; imidazolyl optionally substituted with halogen and/or lower alkyl; pyrazolyl; thienyl; thiadiazolyl; furyl; oxazolyl; isoxazolyl; tetrazolyl optionally substituted with lower alkyl and/or phenyl; indolinyl; indolyl; tetrahydroquinolyl; benzothiazolyl optionally substituted with lower alkyl; tetrahydroisothiazolyl optionally substituted with oxo; benzopyranyl optionally substituted with oxo; tetrahydropyranyloxy; tetrahydrofuryloxy; morpholinosulfonyl optionally substituted with lower alkyl; and/or piperidylsulfonyl optionally substituted with lower alkyl
(hereinafter referred to as "Z is Z-7"),

a compound wherein Z is optionally substituted phenyl
wherein the substituent(s) is halogen, lower alkyl, halogeno(lower)alkyl, lower alkoxy, cycloalkyloxy, lower alkylcarbamoyl, phenyl, lower alkyl morpholino and/or tetrahydropyranyloxy
(hereinafter referred to as "Z is Z-8"),

a compound wherein Z is optionally substituted heterocyclyl
wherein the substituent(s) is halogen, hydroxy, lower alkyl, halogeno(lower)alkyl, lower alkoxy, mercapto, lower alkylthio, acyl, carboxy, lower alkoxycarbonyl, amino, lower alkylamino, phenyl, naphthyl, phenylthio optionally substituted with halogen, phenoxy optionally substituted with halogen, oxo, and/or heterocyclyl optionally substituted with lower alkyl
(hereinafter referred to as "Z is Z-9"),

a compound wherein Z is thienyl, pyrazolyl, thiazolyl, thiadiazolyl, pyridyl, pyrimidinyl, pyrazinyl, pyridazinyl, triazinyl, indolyl, isoindolyl, indolinyl, isoindolinyl, indazolyl, benzopyranyl, benzoxazolyl, benzothienyl, benzothiazolyl, benzothiazolinyl, benzothiadiazolyl, benzimidazolyl, quinolyl, isoquinolyl, dihydrobenzofuryl, carbazolyl, acridinyl, dibenzofuryl or thiazolopyridyl, each of which is optionally substituted with substituents selected from the group of lower alkyl; halogeno(lower)alkyl; lower alkoxy; lower alkoxycarbonyl; acyl; lower alkoxycarbonyl(lower)alkyl; mercapto; phenyl, naphthyl, phenylthio or phenoxy, each of which is optionally substituted with halogen; furyl; nitro; oxo; and morpholino optionally substituted with lower alkyl) (hereinafter referred to as "Z is Z-10"),

a compound wherein Z is thienyl, thiazolyl, thiadiazolyl, pyridyl, pyrazinyl, indolyl, isoindolinyl, benzopyranyl, quinolyl, carbazolyl, dibenzofuryl, benzopyranyl, benzothienyl or benzothiazolyl, each of which is optionally substituted with one or more substituent(s) selected from the group of lower alkyl, halogeno(lower)alkyl, lower alkoxy, lower alkoxycarbonyl, acyl, phenyl, naphthyl, phenylthio, lower alkyl morpholino and oxo) (hereinafter referred to as "Z is Z-11"),

a compound wherein $R^1$ is R1-2, $R^2$ is R2-2, n is 2 and a combination of X, Y and Z, i.e., (X, Y, Z), is any one of the followings.
(X,Y,Z)=(X-3,Y-2,Z-1),(X-3,Y-2,Z-2),(X-3,Y-2,Z-3),(X-3,Y-2,Z-4),(X-3,Y-2,Z-5),(X-3,Y-2,Z-6),(X-3,Y-2,Z-7),(X-3,Y-2,Z-8),(X-3,Y-2,Z-9),(X-3,Y-2,Z-10),(X-3,Y-2,Z-11),
(X-3,Y-3,Z-1),(X-3,Y-3,Z-2),(X-3,Y-3,Z-3),(X-3,Y-3,Z-4),(X-3,Y-3,Z-5),(X-3,Y-3,Z-6),(X-3,Y-3,Z-7),(X-3,Y-3,Z-8),(X-3,Y-3,Z-9),(X-3,Y-3,Z-10),(X-3,Y-3,Z-11),
(X-4,Y-2,Z-1),(X-4,Y-2,Z-2),(X-4,Y-2,Z-3),(X-4,Y-2,Z-4),(X-4,Y-2,Z-5),(X-4,Y-2,Z-6),(X-4,Y-2,Z-7),(X-4,Y-2,Z-8),(X-4,Y-2,Z-9),(X-4,Y-2,Z-10),(X-4,Y-2,Z-11),

(X-4,Y-3,Z-1),(X-4,Y-3,Z-2),(X-4,Y-3,Z-3),(X-4,Y-3,Z-4),(X-4,Y-3,Z-5),(X-4,Y-3,Z-6),(X-4,Y-3,Z-7),(X-4,Y-3,Z-8),(X-4,Y-3,Z-9),(X-4,Y-3,Z-10),(X-4,Y-3,Z-11),
(X-5,Y-2,Z-1),(X-5,Y-2,Z-2),(X-5,Y-2,Z-3),(X-5,Y-2,Z-4),(X-5,Y-2,Z-5),(X-5,Y-2,Z-6),(X-5,Y-2,Z-7),(X-5,Y-2,Z-8),(X-5,Y-2,Z-9),(X-5,Y-2,Z-10),(X-5,Y-2,Z-11),
(X-5,Y-3,Z-1),(X-5,Y-3,Z-2),(X-5,Y-3,Z-3),(X-5,Y-3,Z-4),(X-5,Y-3,Z-5),(X-5,Y-3,Z-6),(X-5,Y-3,Z-7),(X-5,Y-3,Z-8),(X-5,Y-3,Z-9),(X-5,Y-3,Z-10)or (X-5,Y-3,Z-11)
the pharmaceutically acceptable salt or solvate thereof.

[0066]

The NPY Y5 receptor antagonist of the present invention is effective for all of the diseases in which NPY Y5 is involved and it is especially useful for preventing and/or treating obesity and suppressing food intake. Moreover, the antagonist is effective for preventing and/or treating the diseases in which obesity acts as a risk factor, for example, diabetes, hypertension, hyperlipemia, atherosclerosis and acute coronary syndrome.

Furthermore, a compound of the present invention has not only NPY Y5 receptor antagonistic activity but also any or all good characters as a medicine selected from the followings.

a) weak CYP enzyme inhibition

b) less induction of a drug-metabolizing enzyme.

c) good drug disposition such as high bioavailability.

d) low toxicity of anemia-inducing activity or the like.

e) high metabolic stability.

f) high selectivity for Y5 receptor.

g) high water solubility.

h) high transportability through the blood-brain barrier.

[0067]

In addition, the NPY Y5 receptor antagonist of the present invention has a low affinity for NPY Y1 and Y2 receptors, and has a high selectivity for NPY Y5 receptor. NPY causes a sustained vasoconstrictive action in the periphery and this action is mainly via Y1 receptor. Since Y5 receptor is not involved in this action at all, the NPY Y5 receptor antagonist has a low risk of inducing side effects based on the peripheral vasoconstriction, and is expected to be suitably used as a safe medicine.

[0068]

The NPY Y5 receptor antagonist shows an anti-obesity effect by suppressing food intake. Therefore, it is one of the features of the present antagonist not to induce side

effects such as dyspepsia caused by an anti-obesity agent which inhibits digestion and absorption, or central nervous system side-effects such as antidepressant effect due to a serotonin transporter inhibitor that shows an anti-obesity effect.

[0069]

A compound of the present invention can be administered orally or parenterally as an anti-obesity agent or anorectic agent. In the case of oral administration, it may be in any usual form such as tablets, granules, powders, capsules, pills, solutions, syrups, buccal tablets and sublingual tablets. When the compound is parenterally administered, any usual form is preferable, for example, injections (e.g., intravenous, intramuscular), suppositories, endermic agents and inhalations. Oral administration is especially preferable because the compounds of the present invention show a high oral absorbability.

[0070]

A pharmaceutical composition may be manufactured by mixing an effective amount of a compound of the present invention with various pharmaceutical additives suitable for the administration form, such as excipients, binders, moistening agents, disintegrants, lubricants and diluents. When the composition is of an injection, an active ingredient together with a suitable carrier can be sterilized to give a pharmaceutical composition.

[0071]

Examples of the excipients include lactose, saccharose, glucose, starch, calcium carbonate and crystalline cellulose. Examples of the binders include methylcellulose, carboxymethylcellulose, hydroxypropylcellulose, gelatin and polyvinylpyrrolidone. Examples of the disintegrants include carboxymethylcellulose, sodium carboxymethylcellulose, starch, sodium alginate, agar and sodium lauryl sulfate. Examples of the lubricants include talc, magnesium stearate and macrogol. Cacao oil, macrogol, methylcellulose or the like may be used as base materials of suppositories. When the composition is manufactured as solutions, emulsified injections or suspended injections, solubilizing agent, suspending agents, emulsifiers, stabilizers, preservatives, isotonic agents and the like which are usually used may be added. For oral administration, sweetening agents, flavors and the like which are usually used may be added.

[0072]

Although the dosage of a compound of the present invention as an anti-obesity agent or anorectic agent should be determined in consideration of the patient's age and

body weight, the type and degree of diseases, the administration route and the like, a usual oral dosage for an adult is 0.05 to 100 mg/kg/day and preferable is 0.1 to 10 mg/kg/day. For parenteral administration, although the dosage highly varies with administration routes, a usual dosage is 0.005 to 10 mg/kg/day and preferably 0.01 to 1 mg/kg/day. The dosage may be administered in one to several divisions per day.

[0073]

The present invention is further explained by the following Examples, which are not intended to limit the scope of the present invention.

The abbreviations used in the present description stand for the following meanings.

Me: methyl

Et: ethyl

i-Pr: isopropyl

DMSO: dimethylsulfoxide

Pd-C: palladium carbon

THF: tetrahydrofuran

DMF: N,N-dimethylformamide

mCPBA: meta-Chloroperoxybenzoic acid

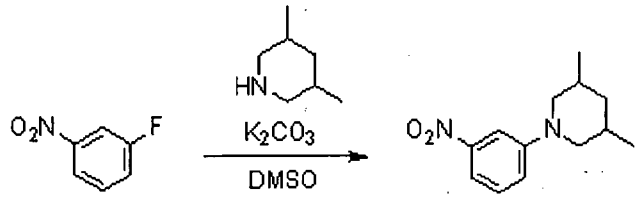
Example

[0074]

Example 1 Synthesis of Compound (Ii-1)

Step 1

[Formula 51]




$C_6H_4FNO_2$
Mol. Wt. : 141.1

$C_{13}H_{18}N_2O_2$
Mol. Wt. : 234.29

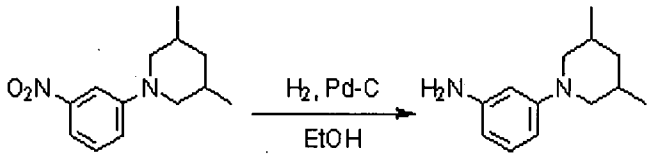
3-fluoronitrobenzene (2.00 g, 14.2 mmol) was dissolved in dimethylsulfoxide (15 ml). 3,5-dimethylpiperidine (3.21 g, 28.4 mmol) and potassium carbonate (3.92 g, 28.4 mmol) were added thereto and the mixture was stirred for 3 hours at 150 °C. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure. Ethyl acetate and hexane were added to the residue.

The precipitated crystals were collected with filtration to give the desired substituted nitrobenzene (2.05 g, 62 % yield).

1H-NMR (CDCl3) δppm: 0.76 (q, 1H, J = 12.0 Hz), 0.96 (d, 6H, J = 6.3 Hz), 1.70-1.91 (m, 3H), 2.32 (t, 2H, J = 12.0 Hz), 3.62-3.72 (m, 2H), 7.17-7.25 (m, 1H), 7.34 (t, 1H, J = 8.1 Hz), 7.59 (d, 1H, J = 8.1 Hz), 7.71 (s, 1H).

Step 2

[Formula 52]




$C_{13}H_{18}N_2O_2$
Mol. Wt. : 234.29

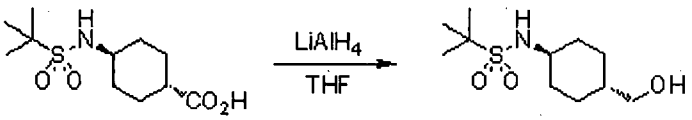
$C_{13}H_{20}N_2$
Mol. Wt. : 204.31

The compound obtained in Step 1 (2.05 g, 8.75 mmol) was dissolved in ethanol (25 ml) and 10 % Pd-C (0.20 g) was added thereto to carry the hydrogenation reaction for 12 hours. Pd-C was removed by celite filtration and the filtrate was condensed under reduced pressure. The residue was purified by silica gel chromatography to give the desired aniline (1.62 g, 90 % yield).

1H-NMR (CDCl3) δppm: 0.69 (q, 1H, J = 12.0 Hz), 0.92 (d, 6H, J = 6.3 Hz), 1.75-1.98 (m, 3H), 2.22 (t, 2H, J = 12.0 Hz), 3.53-3.62 (m, 2H), 6.21 (d, 1H, J = 7.5 Hz), 6.38 (s, 1H), 6.42 (d, 1H, J = 8.1 Hz), 7.04 (t, 1H, J = 8.1 Hz).

Step 3

[Formula 53]




$C_{11}H_{21}NO_4S$
Mol. Wt. : 263.35

$C_{11}H_{23}NO_3S$
Mol. Wt. : 249.37

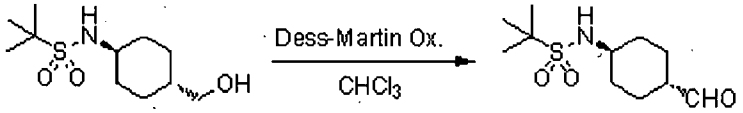
Carboxylic acid (the synthesis method was described in WO01/037826) (5.04 g, 19.1 mmol) was suspended in tetrahydrofuran (50 ml) and lithium aluminum hydride (0.726 g, 19.1 mmol) was added thereto under ice-cooling. The mixture was stirred at room temperature for 1 hour and under ice-cooling and water (1.5 mL) was carefully added dropwise. After that, the mixture was stirred at room temperature for 5 minutes

and the generated deposit was removed by filtration. The filtrate was condensed under reduced pressure. Ethyl acetate and hexane were added to the residue. The precipitated crystals were collected with filtration to give the desired alcohol (3.15 g, 66 % yield).

1H-NMR (DMSO-d6) δppm: 0.88 (q, 2H, J = 11.6 Hz), 1.25 (s, 9H), 1.15-1.30 (m, 3H), 1.67-1.76 (m, 2H), 1.83-1.92 (m, 2H), 2.97 (m, 1H), 3.13-3.20 (m, 2H), 4.35 (t, 1H, J = 5.2 Hz), 6.71 (d, 1H, J = 8.8 Hz).

Step 4

[Formula 54]




$C_{11}H_{23}NO_3S$
Mol. Wt.: 249.37

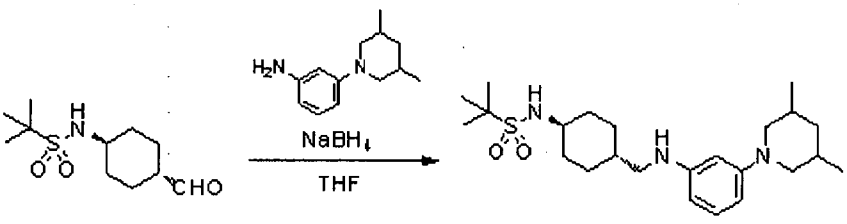
$C_{11}H_{21}NO_3S$
Mol. Wt.: 247.35

The compound obtained in Step 3 (500 mg, 2.01 mmol) was dissolved in chloroform (5 ml) and Dess-Martin periodinane (893 mg, 2.11 mmol) was added thereto. The mixture was stirred at room temperature for 1 hour. The deposit was removed by filtration, the filtrate was condensed under reduced pressure. The residue was purified by silica gel chromatography to give the desired aldehyde (385 mg, 77 % yield).

1H-NMR (DMSO-d6) δppm: 1.26 (s, 9H), 1.13-1.38 (m, 4H), 1.85-1.98 (m, 4H), 2.16 (m, 1H), 3.01 (m, 1H), 6.80 (d, 1H, J = 8.0 Hz), 9.54 (s, 1H).

Step 5

[Formula 55]




$C_{11}H_{21}NO_3S$
Mol. Wt.: 247.35

$C_{24}H_{41}N_3O_2S$
Mol. Wt.: 435.67

Aniline obtained in Step 2 (107 mg, 0.523 mmol) was dissolved in tetrahydrofuran (3 ml). Aldehyde obtained in Step 4 (130 mg, 0.523 mmol) was added thereto and the mixture was stirred at room temperature for 1 hour. To the reactant,

was added sodium borohydride (23.7mg, 0.628 mmol) and the mixture was stirred at room temperature for 3 hours. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure and the residue was purified by silica gel chromatography to give the desired compound (99.3 mg, yield 43 %).

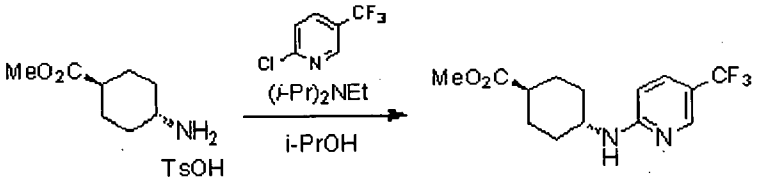
1H-NMR (DMSO-d6) δppm: 0.64 (q, 1H, J = 11.6 Hz), 0.87 (d, 6H, J = 6.0 Hz), 0.92-1.08 (m, 2H), 1.25 (s, 9H), 1.15-1.32 (m, 2H), 1.41 (m, 1H), 1.58-1.95 (m, 7H), 2.08 (t, 2H, J = 11.6 Hz), 2.75-2.82 (m, 2H), 3.00 (m, 1H), 3.48-3.55 (m, 2H), 5.31 (m, 1H), 5.94 (d, 1H, J = 8.5 Hz), 6.08-6.13 (m, 2H), 6.71 (d, 1H, J = 8.5 Hz), 6.85 (t, 1H, J = 8.5 Hz). Melting point: 161 to 162 °C

[0075]

Example 2 Synthesis of Compound (Ij-1)

Step 1

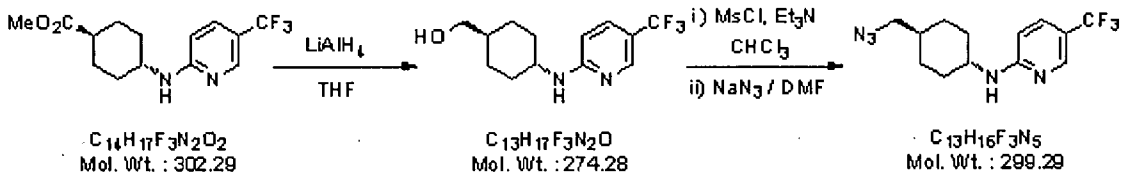
[Formula 56]




Amine (1.20 g, 3.64 mmol) and 2-chloro-5-trifluoromethylpyridin (727 mg, 4.01 mmol) was suspended in isopropanol (4 ml) and N, N-diisopropyl ethyl amine (1.87 ml, 10.9 mmol) was added thereto. After the mixture was in sealed tubes and the reaction was carried out by a microwave reactor for 1 hour at 160 °C. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure and the residue was purified by silica gel chromatography to give the desired ester (222 mg, 20 % yield).

Step 2

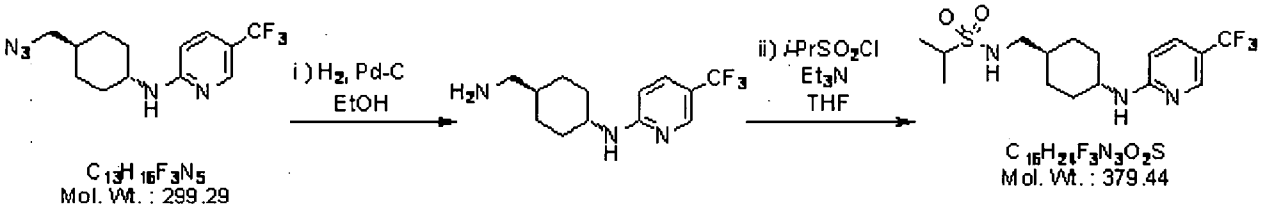
[Formula 57]




Ester obtained in Step 1 (207 mg, 0.685 mmol) was dissolved in tetrahydrofuran (3 ml). Lithium aluminum hydride (31.1 mg, 0.822 mmol) was added thereto under ice-cooling and the mixture was stirred at room temperature for 0.5 hour. The reactant was poured into iced water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure to give alcohol. The obtained alcohol was dissolved in chloroform (3 ml). Triethylamine (0.28 ml, 2.04 mmol) was added thereto and methanesulfonyl chloride (0.12 ml, 1.64 mmol) was added dropwise under ice-cooling. The mixture was stirred at room temperature for 1 hour. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure to give mesylate. The obtained mesylate was dissolved in dimethylformamide (3 ml) and sodium azide (221 mg, 3.40 mmol) was added thereto. The mixture was stirred for 3 hours at 100 °C. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure. The residue was purified by silica gel chromatography to give the desired azide (178 mg, 87 % yield).

Step 3

[Formula 58]




Azide (178 mg, 0.595 mmol) obtained in Step 2 was dissolved in ethanol (3 ml) and 10 % Pd-C (30 mg) was added thereto to carry the hydrogenation reaction for 4 hours. Pd-C was removed by sellite filtration and the filtrate was condensed under reduced pressure to give amine.

The obtained amine was dissolved in tetrahydrofuran (3 ml) and triethylamine (0.28 ml, 0.714 mmol) was added thereto. Isopropyl sulfonyl chloride (0.10 ml, 1.64 mmol) was added dropwise under ice-cooling and the mixture was stirred for 1 hour. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure. The residue was purified by silica gel chromatography to give the desired compound (64.8 mg, 29 % yield).

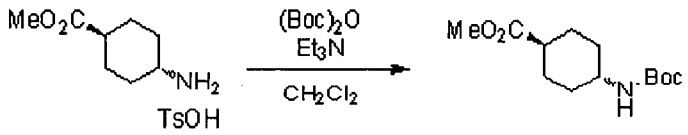
1H-NMR (DMSO-d6) δ: 0.92-1.06 (m, 2 H), 1.10-1.25 (m, 2H,), 1.22 (d, 6H, J = 6.4 Hz), 1.38 (m, 1H), 1.76-1.84 (m, 2H), 1.93-2.02 (m, 2H), 2.81 (t, 2H, J = 6.0 Hz), 3.08-3.19 (m, 1H), 3.69 (m, 1H), 6.53 (d, 1H, J = 8.8 Hz), 6.95 (t, 1H, J = 5.6 Hz), 7.16 (d, 1H, J = 7.6 Hz), 7.58 (d, 1H, J = 8.8 Hz), 8.26 (s, 1H) Melting point: 155 to 156 °C

[0076]

Example 3 Synthesis of Compound (Ij-1)

Step 1

[Formula 59]




$C_{15}H_{23}NO_5S$
Mol. Wt. : 329.41

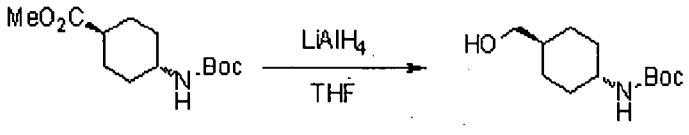
$C_{13}H_{23}NO_4$
Mol. Wt. : 257.33

Amine (132 g, 401 mmol) was suspended in dichloromethane (1000 ml) under ice-cooling. Triethylamine (123 ml, 882 mmol) and (Boc)2O (101 ml, 440 mmol) were sequentially added thereto and stirred for 10 minutes. After that, the mixture was stirred at room temperature for 2 hours and the solvent was removed. The residue was poured into aqueous citric acid (citric acid monohydrate 50 g in water 400 ml) to become pH4 and extracted with ethyl acetate. The organic layer was washed with water and dried over magnesium sulfate anhydrous. The solvent was removed under reduced pressure to quantitatively give the target compound.

1H-NMR (DMSO-d6) δppm: 1.06-1.25 (m, 2H), 1.25-1.43 (m, 2H), 1.37 (s, 9H), 1.75-1.94 (m, 4H), 2.19 (tt, 1H, J = 11.7, 3.9 Hz), 3.07-3.24 (m, 1H), 3.58 (s, 3H), 6.74 (d, 1H, J = 6.6 Hz).

Step 2

[Formula 60]



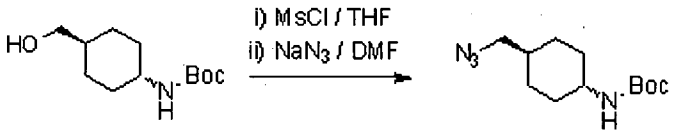

$C_{13}H_{23}NO_4$
Mol. Wt. : 257.33

$C_{12}H_{23}NO_3$
Mol. Wt. : 229.32

Lithium aluminum hydride (18.3 g, 483 mmol) was suspended in tetrahydrofuran (800 ml) and ester in tetrahydrofuran (300 ml) obtained in Step 1 was slowly added thereto under ice-cooling with stirring over 1 hour. The mixture was stirred under ice-cooling for 10 minutes and at room temperature for 2.5 hours. The reactant was ice-cooled and the mixture of water and tetrahydrofuran (1:1, 36 ml), 2N aqueous sodium hydroxide (18 ml) and water (18 ml) were sequentially added thereto. The mixture was stirred for 20 minutes and at room temperature for 1.5 hours. The deposit was removed by filtration, the filtrate was condensed under reduced pressure. Ethyl acetate and hexane was added to the residue. The precipitated crystals were collected with filtration to give the desired alcohol (79.5 g, 87 % yield)(through Step 1 to 2).
1H-NMR (DMSO-d6) δppm: 0.78-1.00 (m, 2H), 1.00-1.32 (m, 3H), 1.37 (s, 9H), 1.65-1.84 (m, 4H), 3.04-3.24 (m, 3H), 4.32-4.42 (m, 1H), 6.66 (d, 1H, J = 7.8 Hz).

Step 3

[Formula 61]




$C_{12}H_{23}NO_3$
Mol. Wt. : 229.32

$C_{12}H_{22}N_4O_2$
Mol. Wt. : 254.33

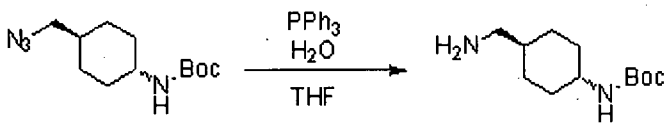
Alcohol (79.5 g, 347 mmol) was dissolved in tetrahydrofuran (800 ml). Triethylamine (72.5 ml, 520 mmol) and methanesulfonyl chloride (32.2 ml, 416 mmol) were sequentially added thereto under ice-cooling with stirring and the mixture was stirred for 1.5 hours. The reactant was poured into aqueous citric acid (citric acid monohydrate 30 g in water 500 ml) to become pH4 and extracted with ethyl acetate. The organic layer was washed with water and dried over magnesium sulfate anhydrous. The solvent was removed under reduced pressure. The crystal deposited in the removal process was collected by filtration and washed with hexane to give mesylate (100 g). The obtained mesylate was dissolved in dimethylformamide (100 ml) and sodium azide (63.7 g, 980 mmol) was added thereto and reacted at 80 °C for 2 hours.

The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over magnesium sulfate anhydrous and the solvent was removed under reduced pressure to quantitatively give the desired azide (the crude weight is 85.4 g).

1H-NMR (DMSO-d6) δppm: 0.90-1.21 (m, 4H), 1.32-1.50 (m, 1H), 1.37 (s, 9H), 1.65-1.84 (m, 4H), 3.06-3.24 (m, 3H), 6.71 (d, 1H, J = 8.1 Hz).

Step 4

[Formula 62]




$C_{12}H_{22}N_4O_2$
Mol. Wt. : 254.33

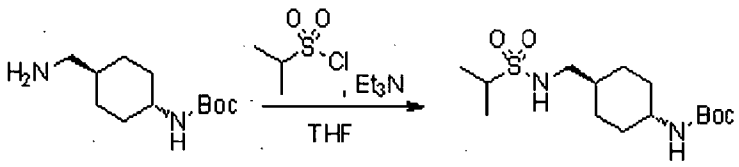
$C_{12}H_{24}N_2O_2$
Mol. Wt. : 228.33

Azide obtained in Step 3 was dissolved in tetrahydrofuran (900 ml) at room temperature. Triphenylphosphine (103 g, 392 mmol) and water (90 ml) were sequentially added thereto and stirred at 80 °C for 1.5 hours. The solvent (770 ml) was removed and water (300 ml), ethyl acetate (400 ml) and 2N hydrochloric acid (150 ml) were sequentially added to become pH 2.5 and liquid-liquid extraction was carried out. The organic layer was extracted with 2N hydrochloric acid and the water layer was added thereto. The mixture was washed with ethyl acetate and 2N sodium hydroxide was added to alkalinize and repeatedly extracted with ethyl acetate and chloroform. The organic layer was added thereto and dried over magnesium sulfate anhydrous. The solvent was removed under reduced pressure and hexane was added to the residue. The precipitated crystals were collected with filtration and washed with hexane to give the desired amine (41.7 g, 53 % yield) (through Step 3 to 4 ).

1H-NMR (DMSO-d6) δppm: 0.77-0.96 (m, 2H), 1.00-1.18 (m, 3H), 1.37 (s, 9H), 1.67-1.82 (m, 4H), 2.30-2.38 (m, 2H), 2.90-3.60 (m, 2H), 3.05-3.22 (m, 1H), 6.66 (d, 1H, J = 7.2 Hz).

Step 5

[Formula 63]




$C_{12}H_{24}N_2O_2$
Mol. Wt. : 228.33

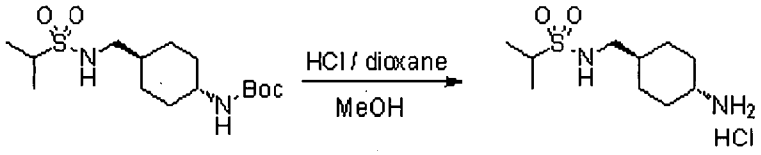
$C_{15}H_{30}N_2O_4S$
Mol. Wt. : 334.47

Amine (37.5 g, 164 mmol) was suspended in tetrahydrofuran (400 ml). Triethylamine (91.7 ml, 656 mmol) and isopropyl sulfonyl chloride (32.2 ml, 416 mmol) were slowly and sequentially added thereto at -55 to -40 °C with stirring. The mixture was stirred for 6 hours with gradually warming to 0 °C. The reactant was poured into the ice-cooled dilute aqueous acid and extracted with ethyl acetate. The organic layer was washed with water and dried over magnesium sulfate anhydrous. The solvent was removed under reduced pressure and isopropyl ether was added to the residue. The precipitated crystals were collected with filtration and washed with isopropyl ether to give the desired sulfonamide (43.1 g, 79 % yield).

1H-NMR (DMSO-d6) δppm: 0.79-0.98 (m, 2H), 1.00-1.36 (m, 3H), 1.20 (d, 6H, J = 6.6 Hz), 1.37 (s, 9H), 1.70-1.84 (m, 4H), 2.72-2.80 (m, 2H), 3.04-3.22 (m, 2H), 6.68 (d, 1H, J = 8.1 Hz), 6.94 (t, 1H, J = 6.0 Hz).

Step 6

[Formula 64]




$C_{15}H_{30}N_2O_4S$
Mol. Wt. : 334.47

$C_{10}H_{23}ClN_2O_2S$
Mol. Wt. : 270.82

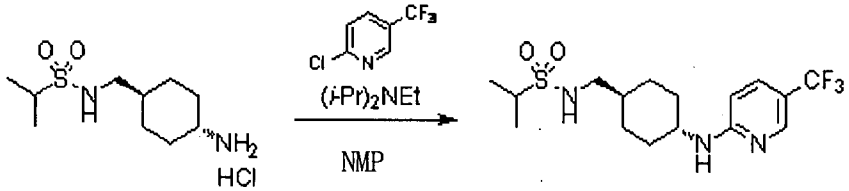
Boc-protected amine (43.0 g, 128 mmol) was suspended in methanol (200 ml) and 4N hydrochloric acid in dioxane (96 ml, 384 mmol) was added thereto under ice-cooling with stirring for 20 minutes and at room temperature for 3 hours. The reactant was ice-cooled and isopropyl ether (220 ml) was added thereto. After stirring for 30 minutes, the precipitated crystals were collected with filtration and washed with isopropyl ether to give the desired amine hydrochloride (30.8 g, 89 % yield).

1H-NMR (DMSO-d6) δppm: 0.85-1.02 (m, 2H), 1.20 (d, 6H, J = 6.6 Hz), 1.20-1.40 (m, 3H), 1.75-1.84 (m, 2H), 1.90-2.00 (m, 2H), 2.73-2.82 (m, 2H), 2.83-2.97 (m, 1H), 3.08-3.20

(m, 1H), 7.01 (t, 1H, J = 5.7 Hz), 8.01 (s, 3H).

Step 7

[Formula 65]




$C_{10}H_{23}ClN_2O_2S$
Mol. Wt. : 270.82

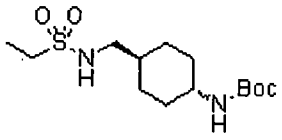
$C_{16}H_{24}F_3N_3O_2S$
Mol. Wt. : 379.44

Amine (190 mg, 0.700 mmol) and 2-chloro-5-trifuluoromethyl pyridin (1.27 g, 7.00 mmol) were suspended in N-methyl pyrrolidone (4 ml) and N,N-diisopropyl ethyl amine (1.25 ml, 7.00 mmol) was added thereto. After the mixture was in sealed tubes and the reaction was carried out by a microwave reactor for 20 minutes at 210 °C. The reactant was poured into water and extracted with ethyl acetate. The organic layer was washed with water and dried over sodium sulphate anhydrous. The solvent was removed under reduced pressure and the residue was purified by silica gel chromatography to give the desired Compound (Ij-1) (158 mg, 60 % yield).

[0077]

In Step 5, ethanesulfonyl chloride instead of isopropyl sulfonyl chloride was reacted to give the following compound wherein $R^1$ is ethyl.

[Formula 66]



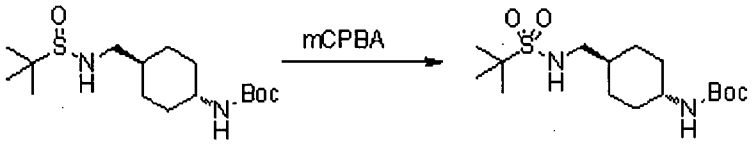

$C_{14}H_{28}N_2O_4S$
Mol. Wt. : 320.45

1H-NMR (DMSO-d6) δppm: 0.80-0.98 (m, 2H), 1.02-1.18 (m, 2H), 1.17 (t, 3H, J = 7.2 Hz), 1.22-1.34 (m, 1H), 1.37 (s, 9H), 1.68-1.82 (m, 4H), 2.68-2.78 (m, 2H), 2.96 (q, 2H, J = 7.2 Hz), 3.04-3.22 (m, 1H), 6.68 (d, 1H, J = 8.1 Hz), 6.94 (t, 1H, J = 6.0 Hz).

[0078]

In Step 5, tert-butyl sulfinylchloride instead of isopropyl sulfonyl chloride was reacted and the oxidation with mCPBA was carried out to give the following compound wherein $R^1$ is tert-butyl (WO2001037826, Example 3).

[Formula 67]




$C_{16}H_{32}N_2O_4S$
Mol. Wt. : 348.5

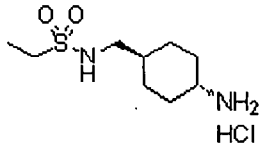
1H-NMR (DMSO-d6) δppm: 0.79-1.00 (m, 2H), 1.01-1.20 (m, 2H), 1.22-1.34 (m, 1H), 1.25 (s, 9H), 1.37 (s, 9H), 1.70-1.86 (m, 4H), 2.81-2.90 (m, 2H), 3.04-3.22 (m, 1H), 6.68 (d, 1H, J = 8.1 Hz), 6.83 (t, 1H, J = 6.0 Hz).

[0079]

The following compounds wherein $R^1$ is ethyl or tert-butyl was obtained in Step 6 by using the above compound.

A compound wherein $R^1$ is ethyl.

[Formula 68]

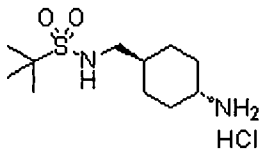



$C_9H_{21}ClN_2O_2S$
Mol. Wt. : 256.79

H-NMR (DMSO-d6) δppm: 0.84-1.02 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.20-1.40 (m, 3H), 1.74-1.82 (m, 2H), 1.90-2.00 (m, 2H), 2.72-2.80 (m, 2H), 2.83-2.96 (m, 1H), 2.97 (q, 2H, J = 7.5 Hz), 7.04 (t, 1H, J = 6.0 Hz), 8.03 (s, 3H).

A compound wherein $R^1$ is tert-butyl

[Formula 69]




$C_{11}H_{25}ClN_2O_2S$
Mol. Wt. : 284.85

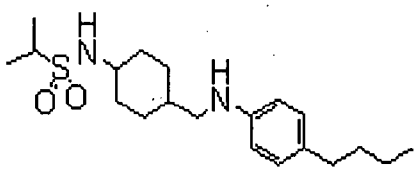
H-NMR (DMSO-d6) δppm: 0.84-1.04 (m, 2H), 1.16-1.38 (m, 3H), 1.26 (s, 9H), 1.74-1.84 (m, 2H), 1.92-2.02 (m, 2H), 2.82-2.98 (m, 3H), 6.90 (d, 1H, J = 6.0 Hz), 8.01 (s, 3H).

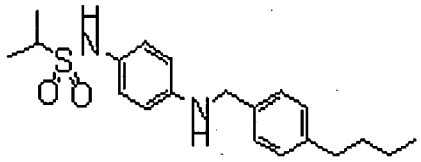
[0080]

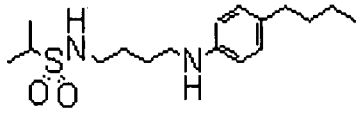
The following compounds synthesized in similar methods also include the present invention.

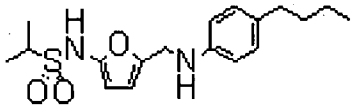
[0081]

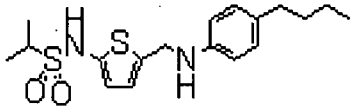
[Formula 70]

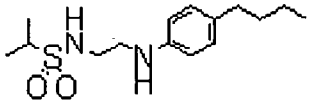
I-1 

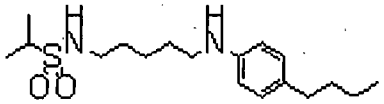
I-2 

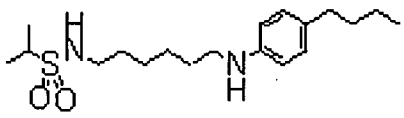
I-3 

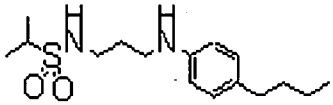
I-4 

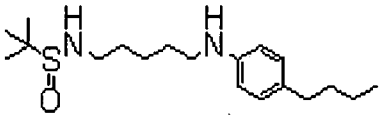
I-5 

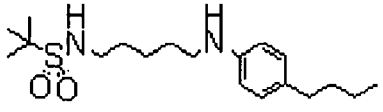
I-6 

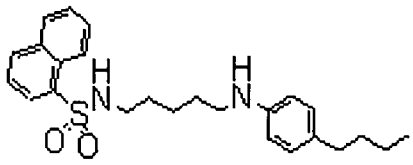
I-7 

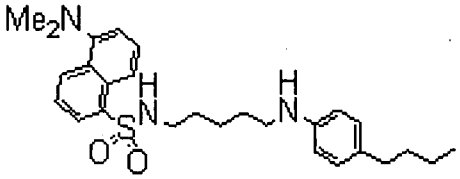
I-8 

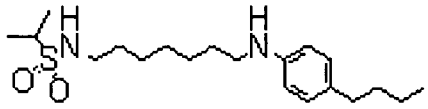
I-9 

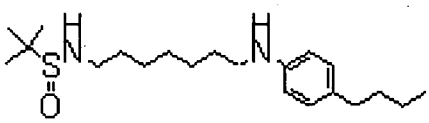
I-10 

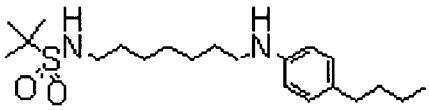
I-11 

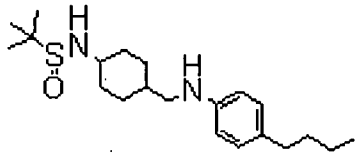
I-12 

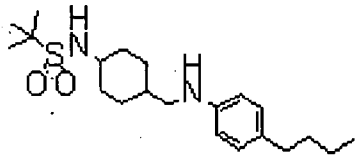
I-13 

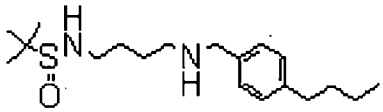
I-14 

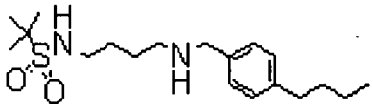
I-15 

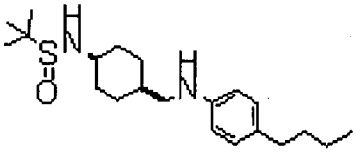
I-16 

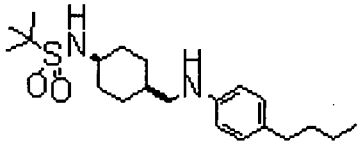
I-17 

I-18 

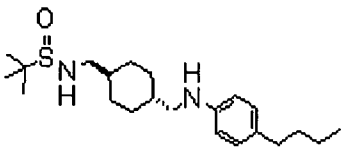
I-19 

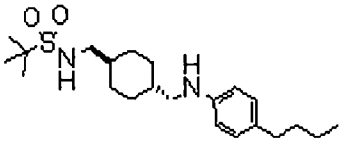
I-20 

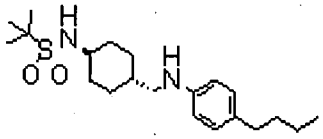
I-21 

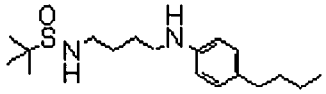
I-22 

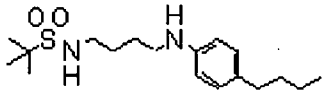
[Formula 71]

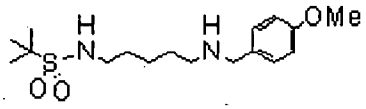
I-23 

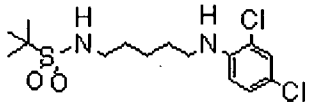
I-24 

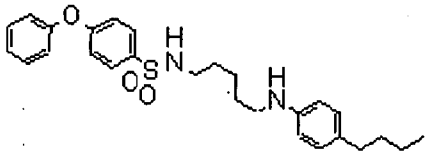
I-25 

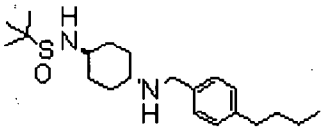
I-26 

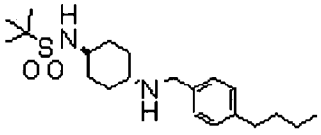
I-27 

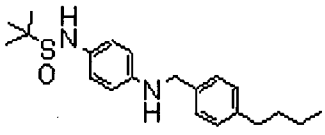
I-28 

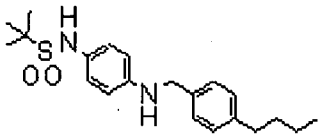
I-29 

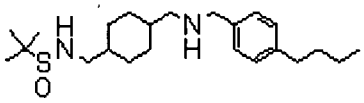
I-30 

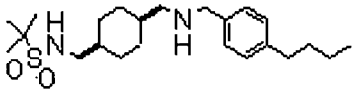
I-31 

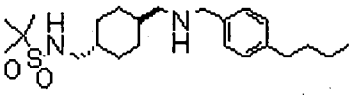
I-32 

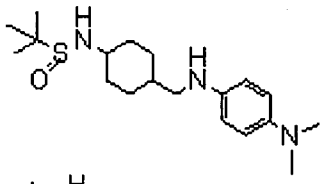
I-33 

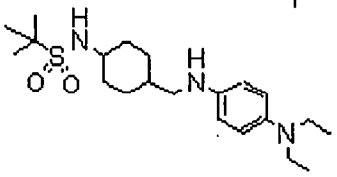
I-34 

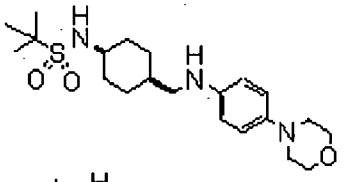
I-35 

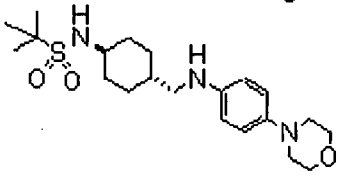
I-36 

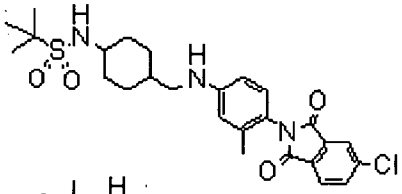
I-37 

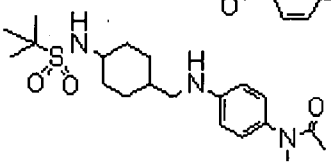
I-38 

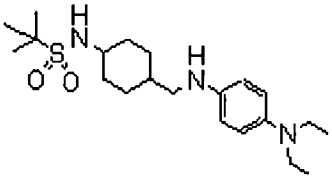
I-39 

I-40 

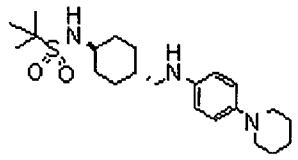
I-41 

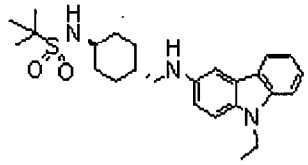
I-42 

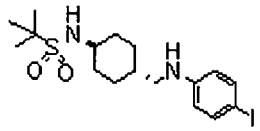
I-43 

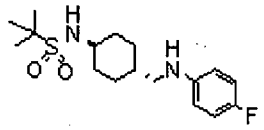
I-44 

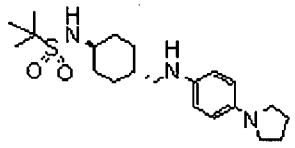
[Formula 72]

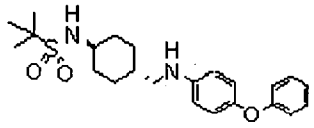
I-45 

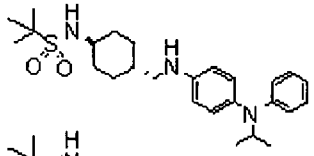
I-46 

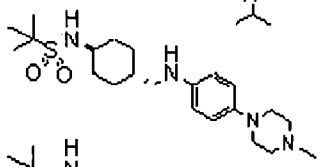
I-47 

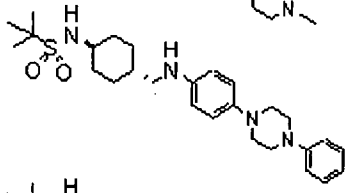
I-48 

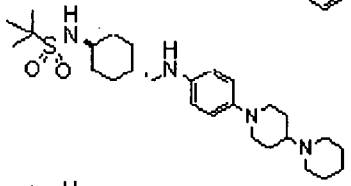
I-49 

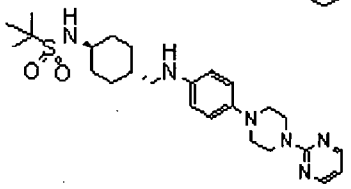
I-50 

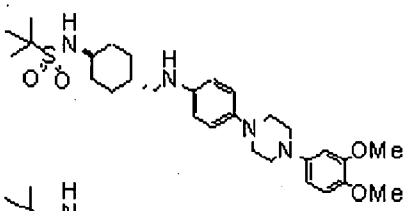
I-51 

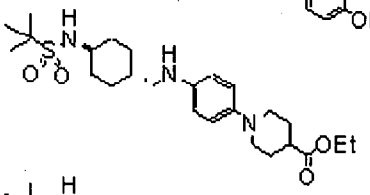
I-52 

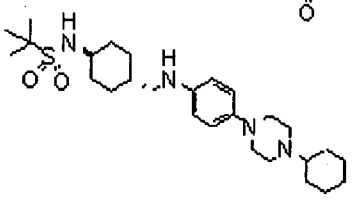
I-53 

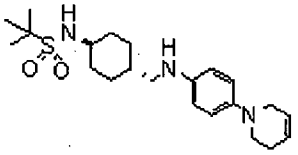
I-54 

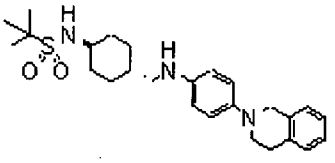
I-55 

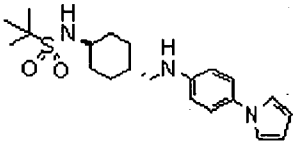
I-56 

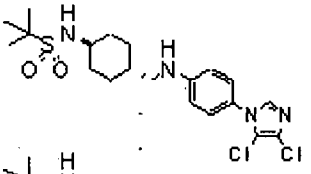
I-57 

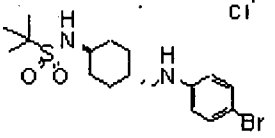
I-58 

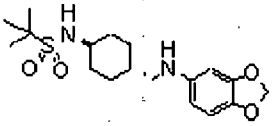
I-59 

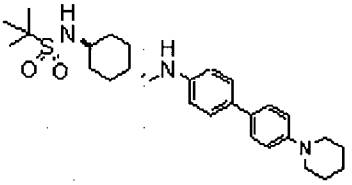
I-60 

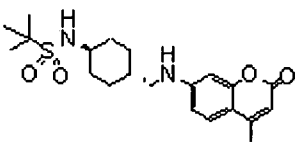
I-61 

I-62 

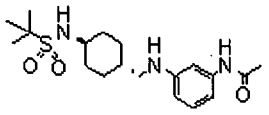
I-63 

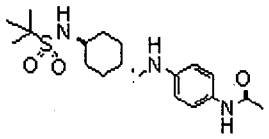
I-64 

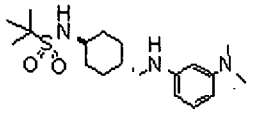
I-65 

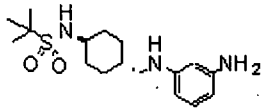
I-66 

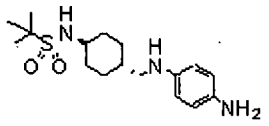
[Formula 73]

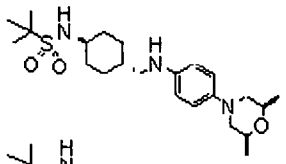
I-67 

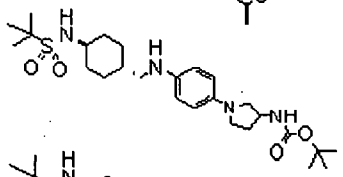
I-68 

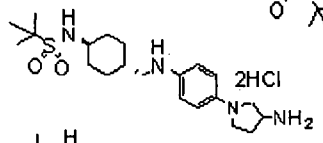
I-69 

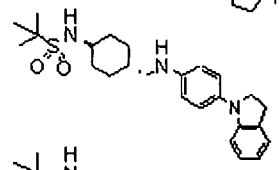
I-70 

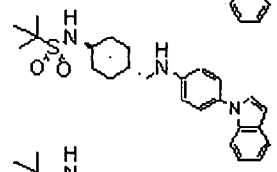
I-71 

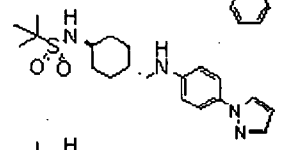
I-72 

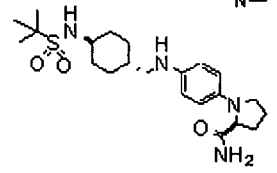
I-73 

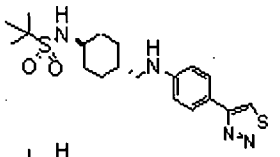
I-74 

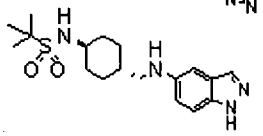
I-75 

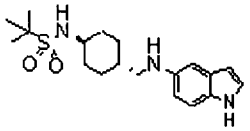
I-76 

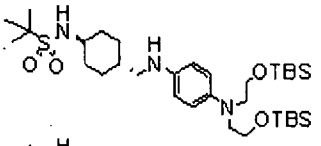
I-77 

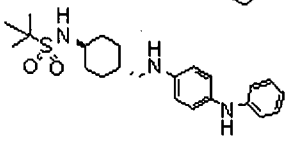
I-78 

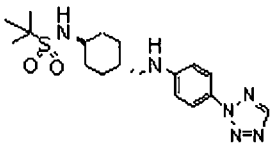
I-79 

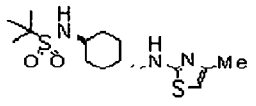
I-80 

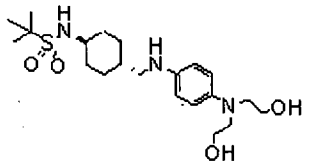
I-81 

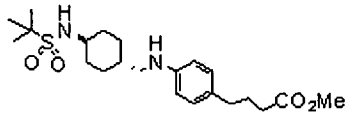
I-82 

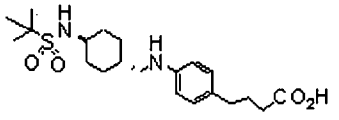
I-83 

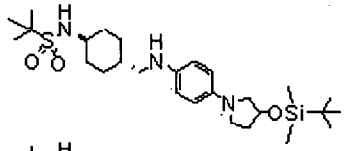
I-84 

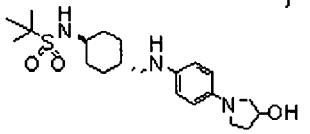
I-85 

I-86 

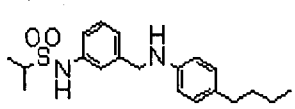
I-87 

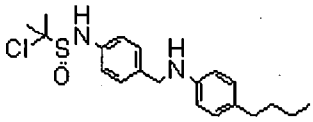
I-88 

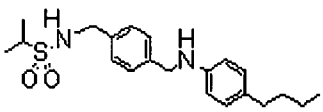
I-89 

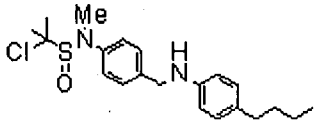
I-90 

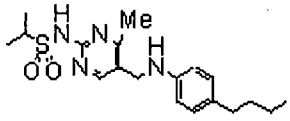
[Formula 74]

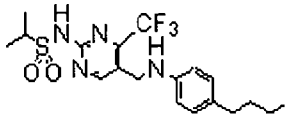
I-91 

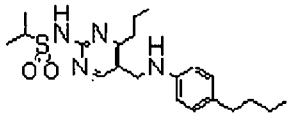
I-92 

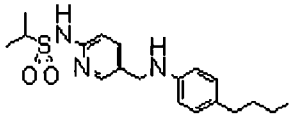
I-93 

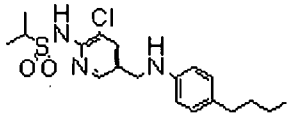
I-94 

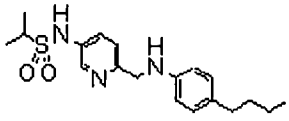
I-95 

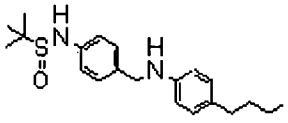
I-96 

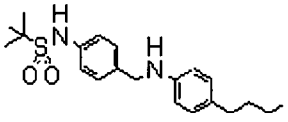
I-97 

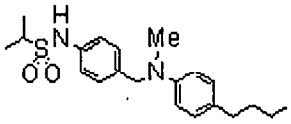
I-98 

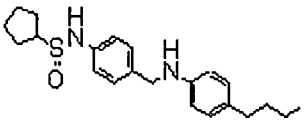
I-99 

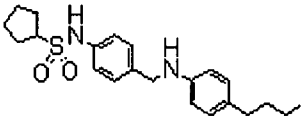
I-100 

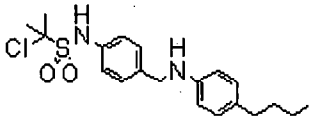
I-101 

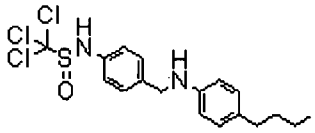
I-102 

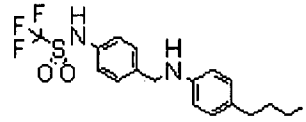
I-103 

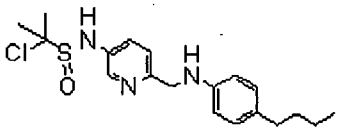
I-104 

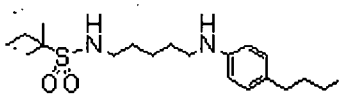
I-105 

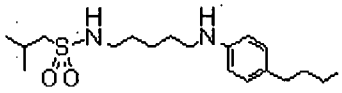
I-106 

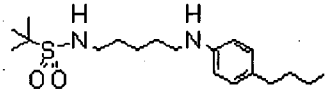
I-107 

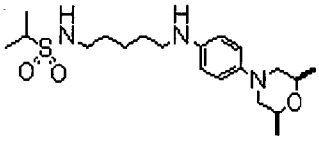
I-108 

I-109 

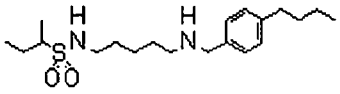
I-110 

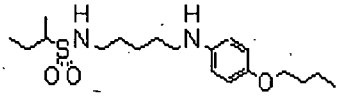
I-111 

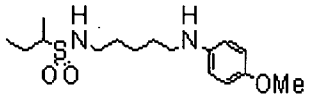
I-112 

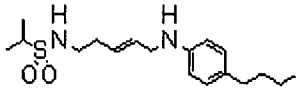
I-113 

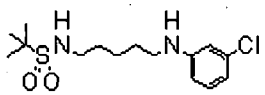
[Formula 75]

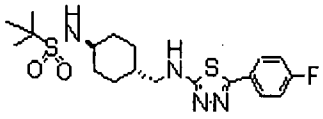
I-115 

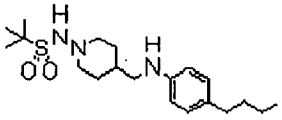
I-116 

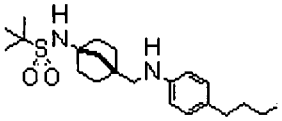
I-117 

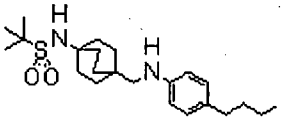
I-118 

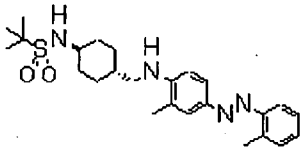
I-119 

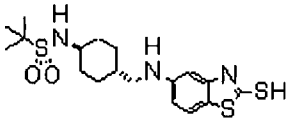
I-120 

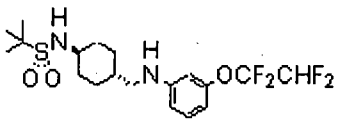
I-121 

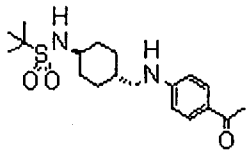
I-122 

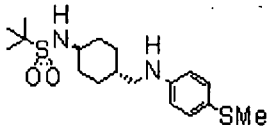
I-123 

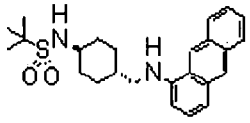
I-124 

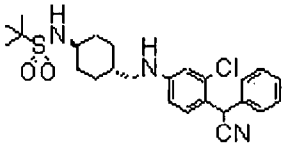
I-125 

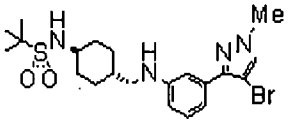
I-126 

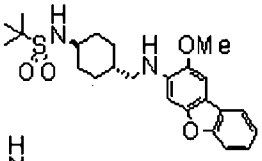
I-127 

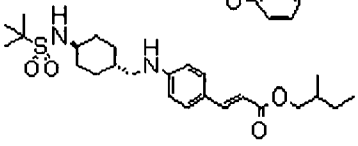
I-128 

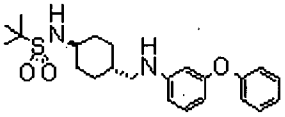
I-129 

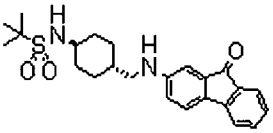
I-130 

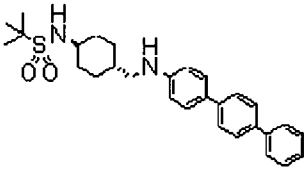
I-131 

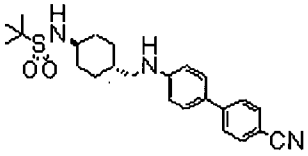
I-132 

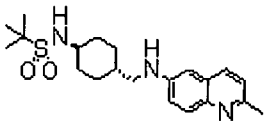
I-133 

I-134 

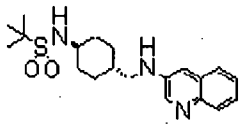
I-135 

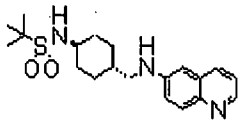
I-136 

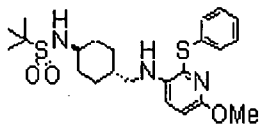
I-137 

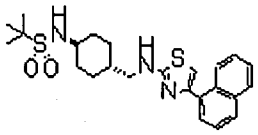
I-138 

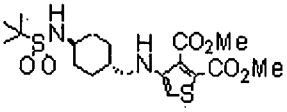
[Formula 76]

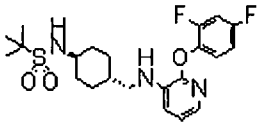
I-139 

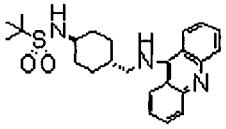
I-140 

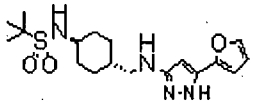
I-141 

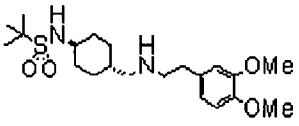
I-142 

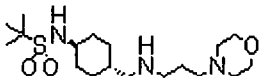
I-143 

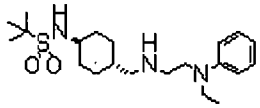
I-144 

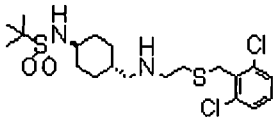
I-145 

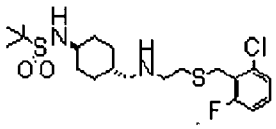
I-146 

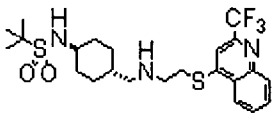
I-147 

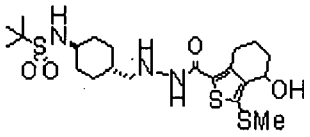
I-148 

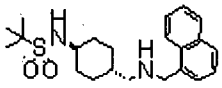
I-149 

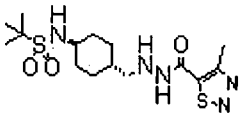
I-150 

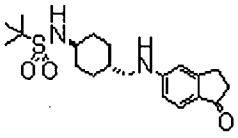
I-151 

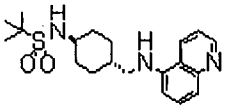
I-152 

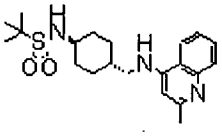
I-153 

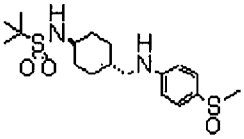
I-154 

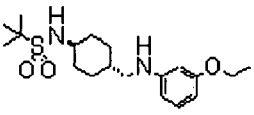
I-155 

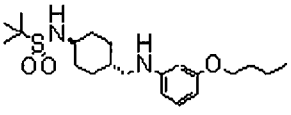
I-156 

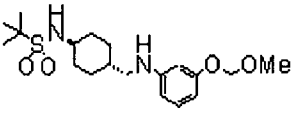
I-157 

I-158 

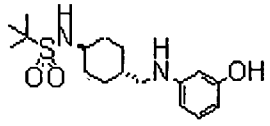
I-159 

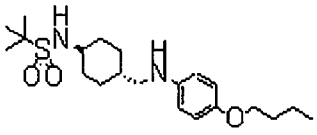
I-160 

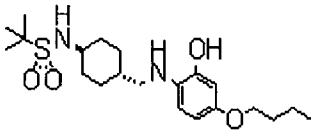
I-161 

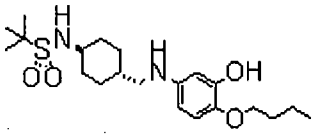
I-162 

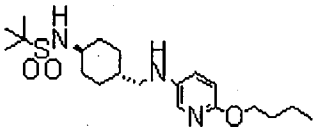
[Formula 77]

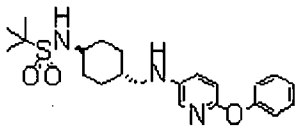
I-163 

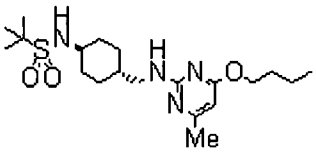
I-164 

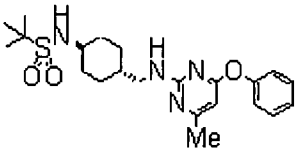
I-165 

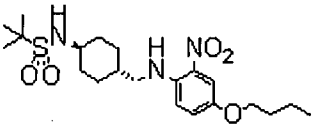
I-166 

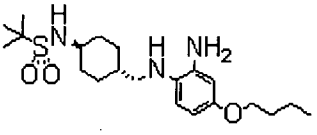
I-167 

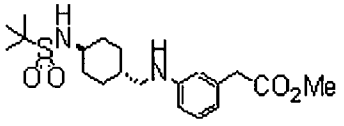
I-168 

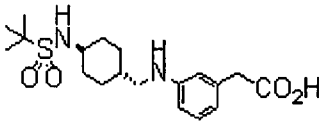
I-169 

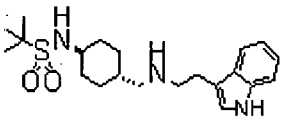
I-170 

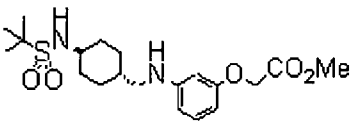
I-171 

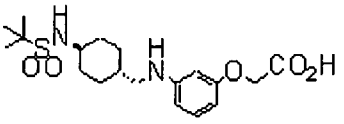
I-172 

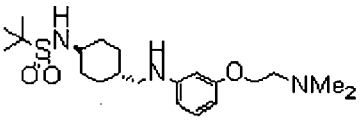
I-173 

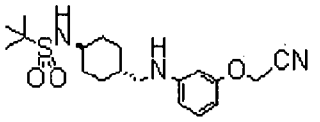
I-174 

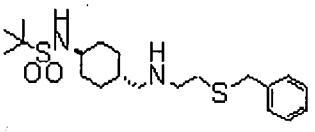
I-175 

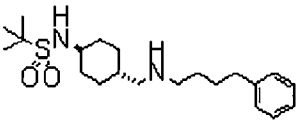
I-176 

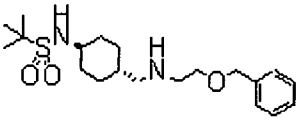
I-177 

I-178 

I-179 

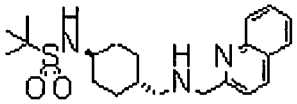
I-180 

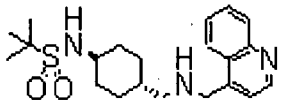
I-181 

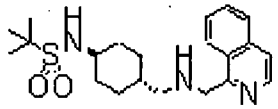
I-182 

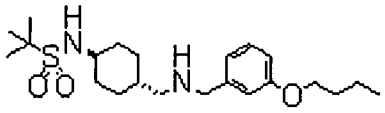
[Formula 78]

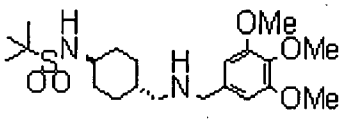
I-183 

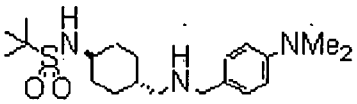
I-184 

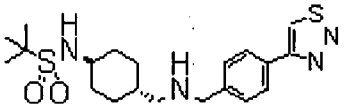
I-185 

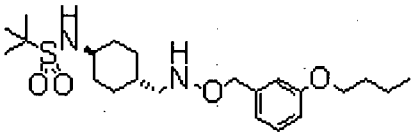
I-186 

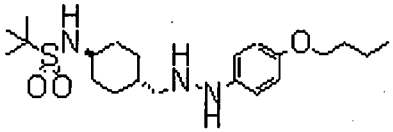
I-187 

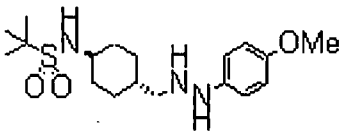
I-188 

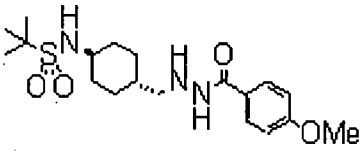
I-189 

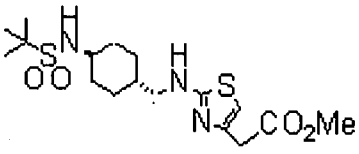
I-190 

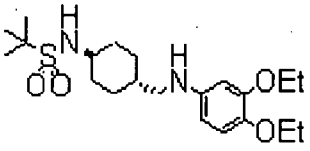
I-191 

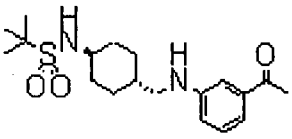
I-192 

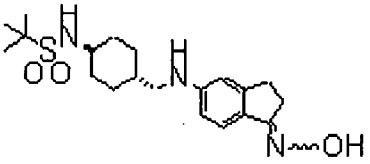
I-193 

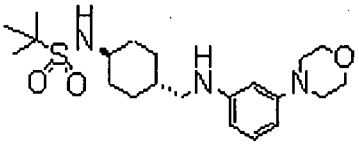
I-194 

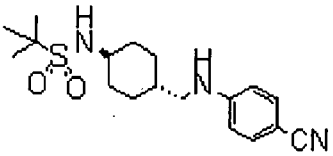
I-195 

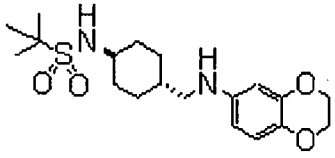
I-196 

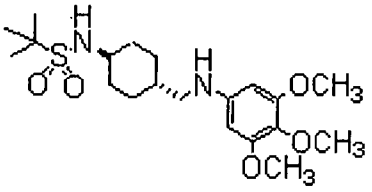
I-197 

I-198 

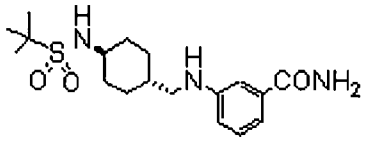
I-199 

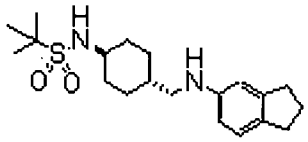
I-200 

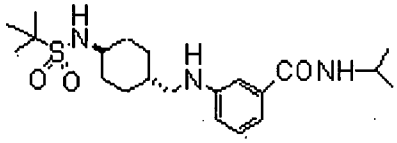
I-201 

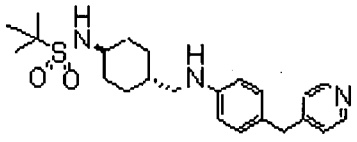
I-202 

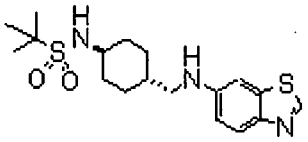
[Formula 79]

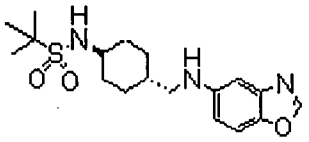
I-203 

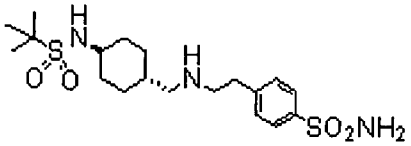
I-204 

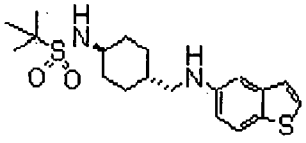
I-205 

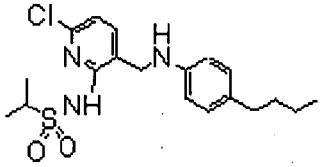
I-206 

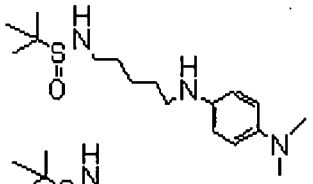
I-207 

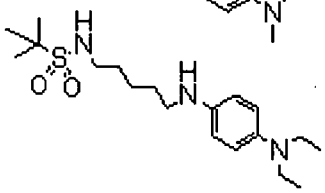
I-208 

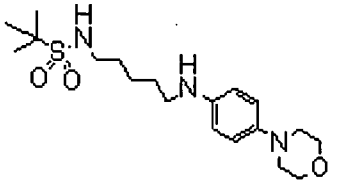
I-209 

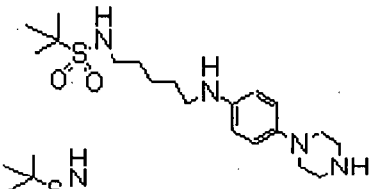
I-210 

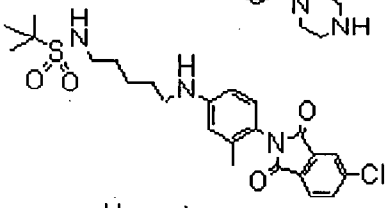
I-211 

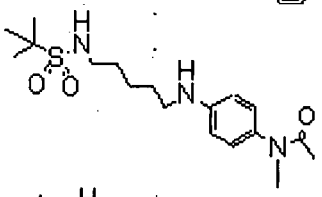
I-212 

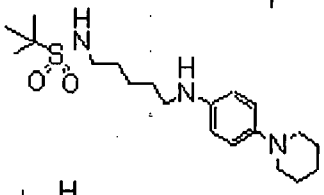
I-213 

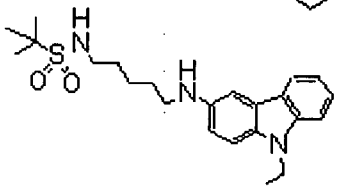
I-214 

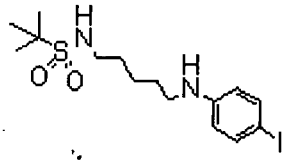
I-215 

I-216 

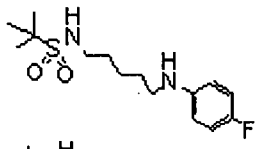
I-217 

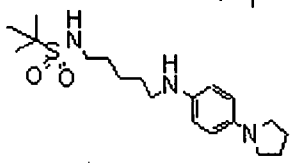
I-218 

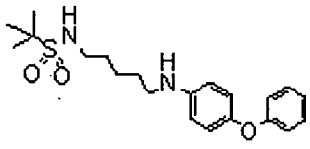
I-219 

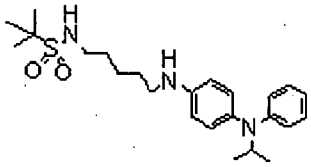
I-220 

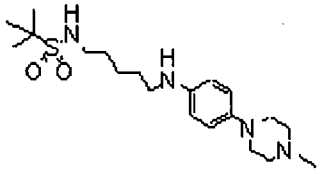
[Formula 80]

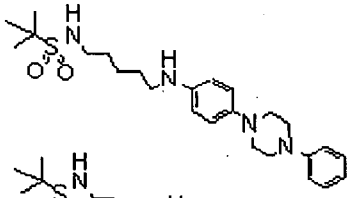
I-227 

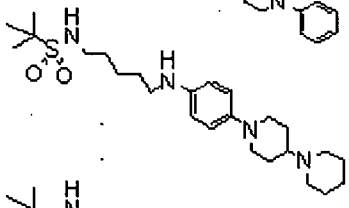
I-228 

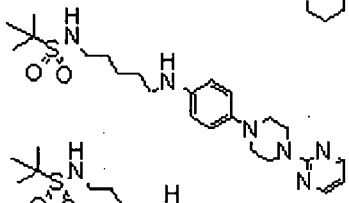
I-229 

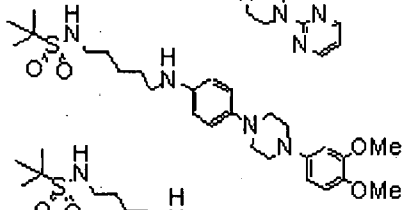
I-230 

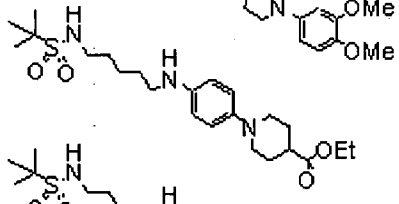
I-231 

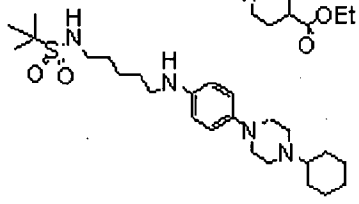
I-232 

I-233 

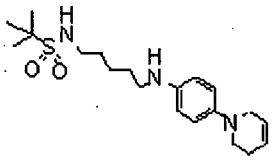
I-234 

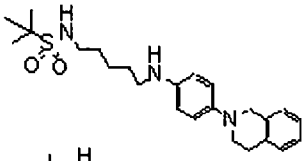
I-235 

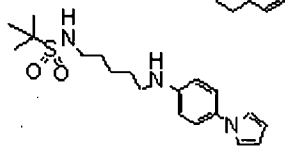
I-236 

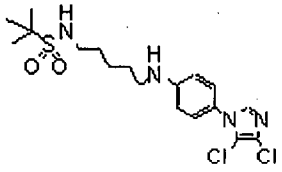
I-237 

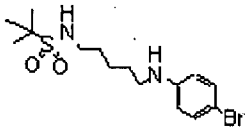
[Formula 81]

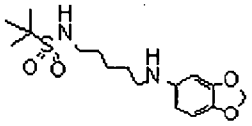
I-238 

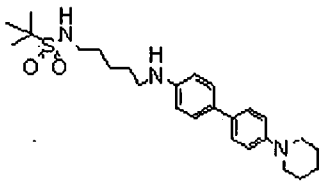
I-239 

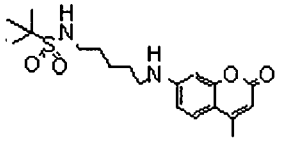
I-240 

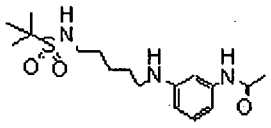
I-241 

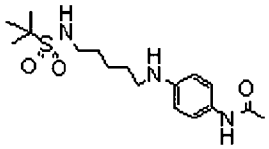
I-242 

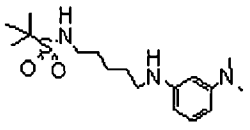
I-243 

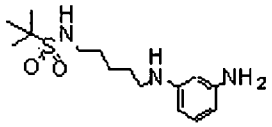
I-244 

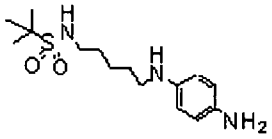
I-245 

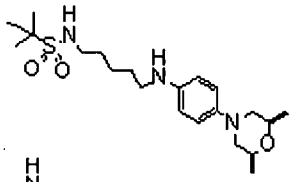
I-246 

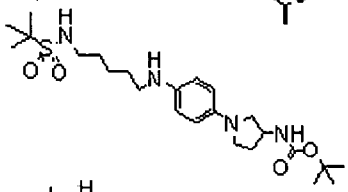
I-247 

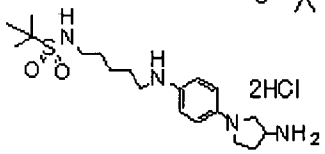
I-248 

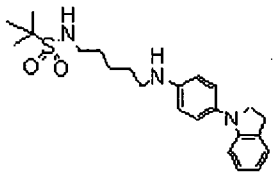
I-249 

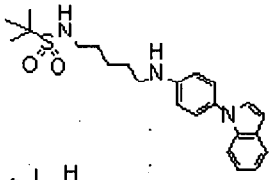
I-250 

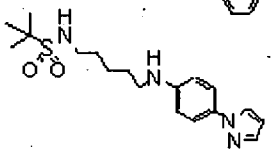
I-251 

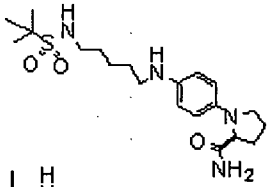
I-252 

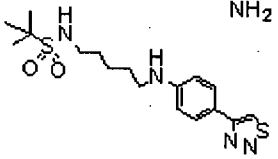
I-253 

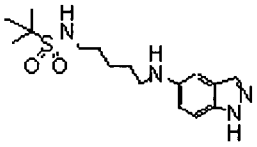

I-254 

I-25 

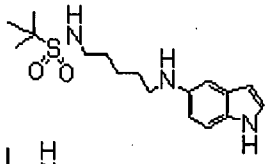
I-256 

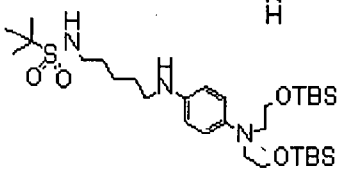
I-257 

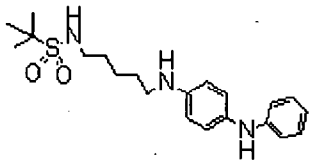
I-258 

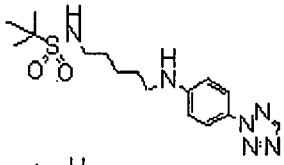
I-259 

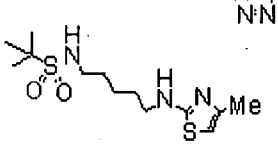
[Formula 82]

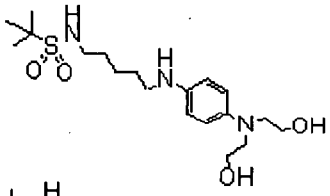
I-260 

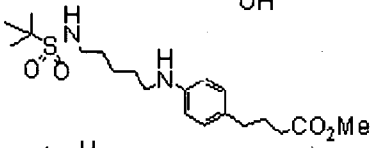
I-261 

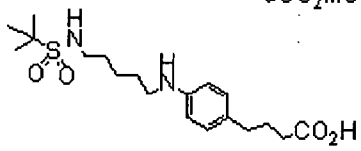

I-262 

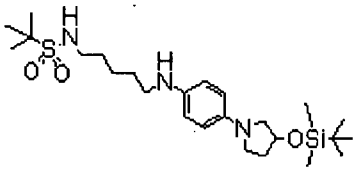
I-263 

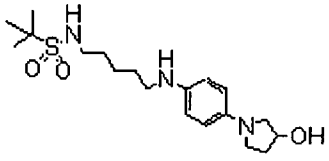
I-264 

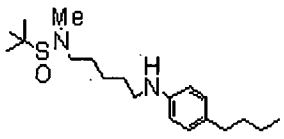

I-265 

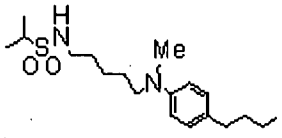

I-266 

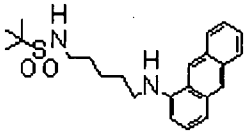

I-267 

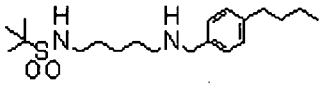

I-268 

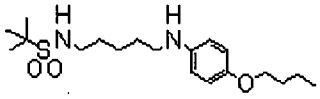
I-269 

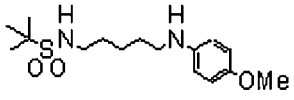

I-270 

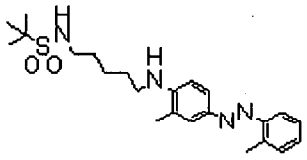

I-271 

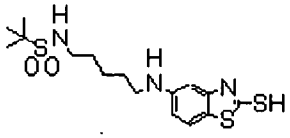

I-272 

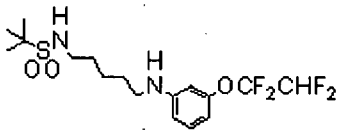
I-273 

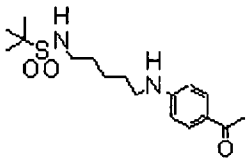
I-274 

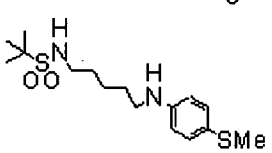
I-275 


I-276 

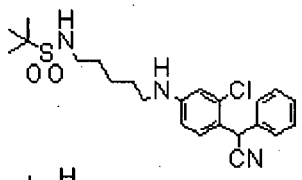
I-277 

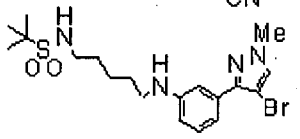

I-278 

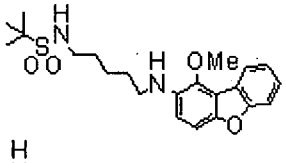

I-279 

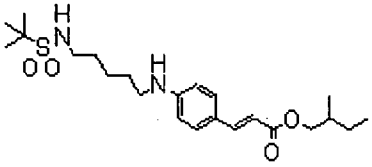
I-280 

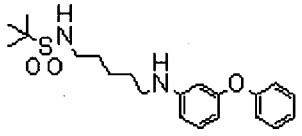

[Formula 83]

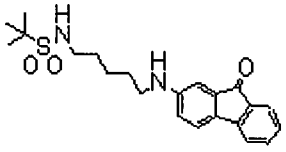
I-282 

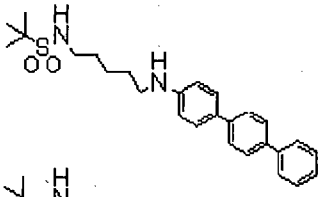
I-283 

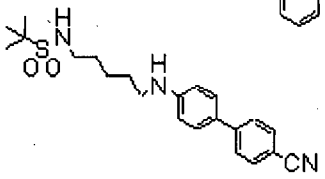
I-284 

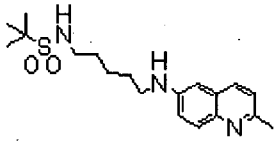
I-285 

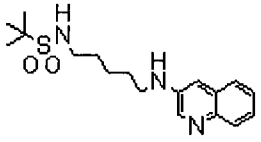
I-286 

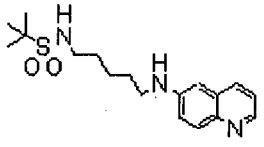
I-287 

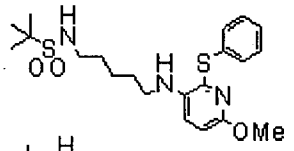
I-288 

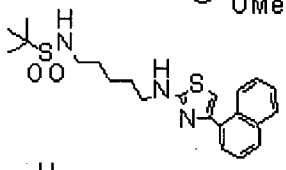
I-289 

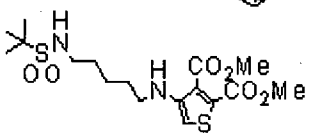
I-290 

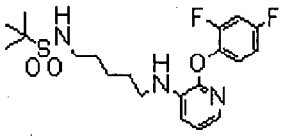
I-291 

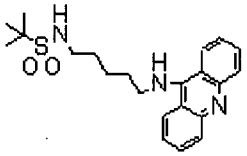
I-292 

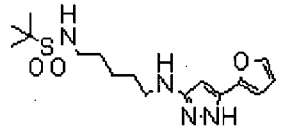
I-293 

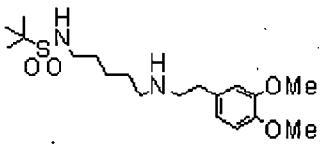
I-294 

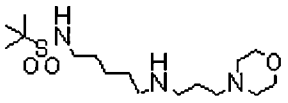
I-295 

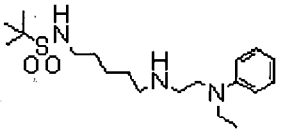
I-296 

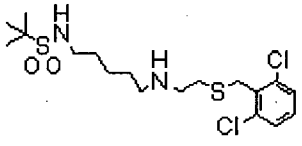
I-297 

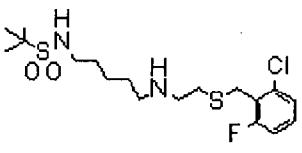
I-298 

I-299 

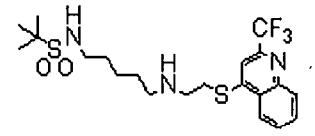
I-300 

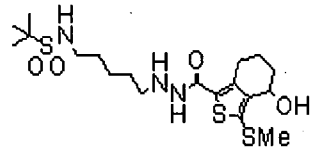
I-301 

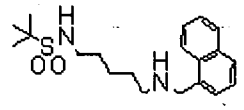
I-302 

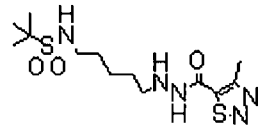
I-303 

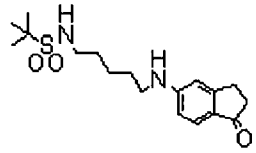
[Formula 84]

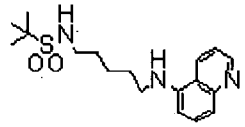
I-304 

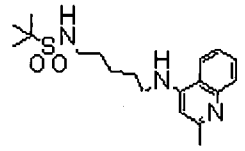
I-305 

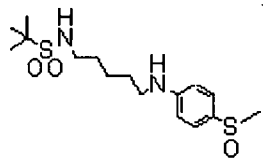
I-306 

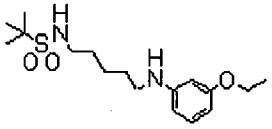
I-307 

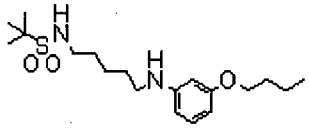
I-308 

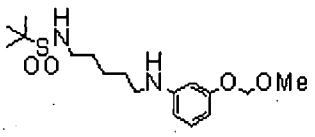
I-309 

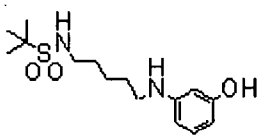
I-310 

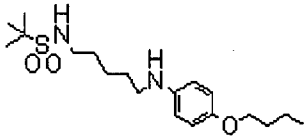
I-311 

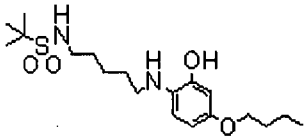
I-312 

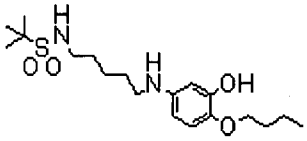
I-313 

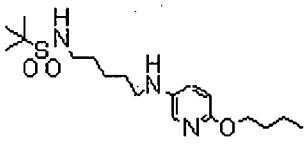
I-314 

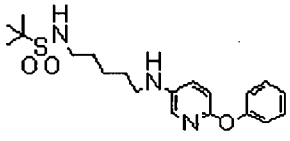
I-315 

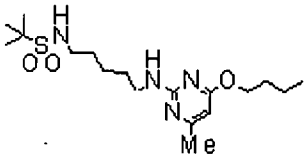
I-316 

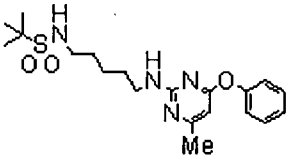
I-317 

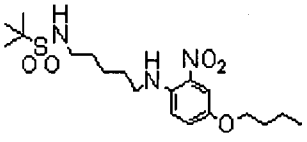
I-318 

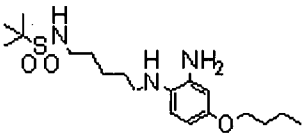
I-319 

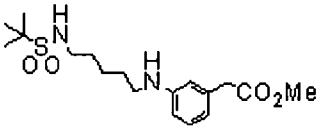
I-320 

I-321 

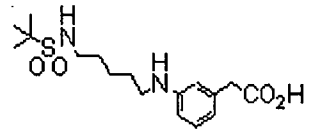
I-322 

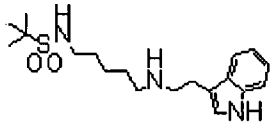
I-323 

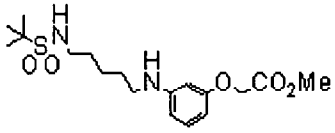
I-324 

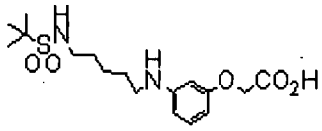
I-325 

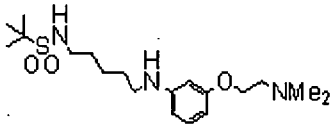
[Formula 85]

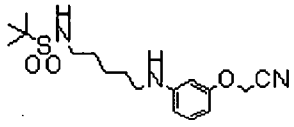
I-326 

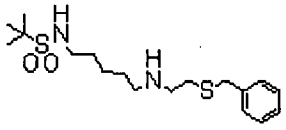
I-327 

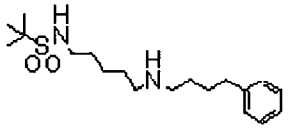
I-328 

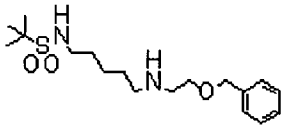
I-329 

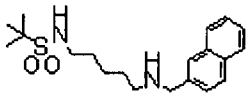
I-330 

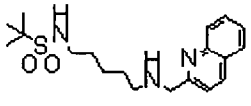
I-331 

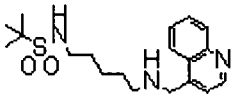
I-332 

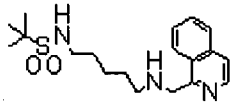
I-333 

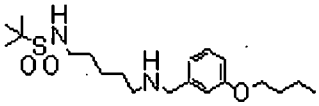
I-334 

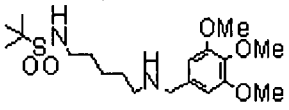
I-335 

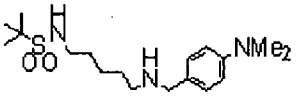
I-336 

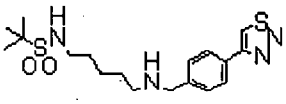
I-337 

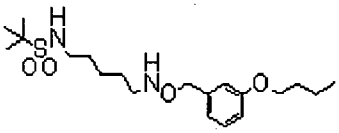
I-338 

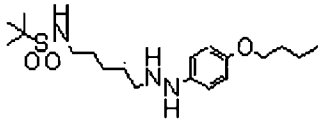
I-339 

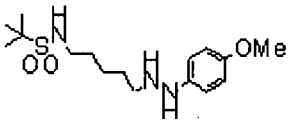
I-340 

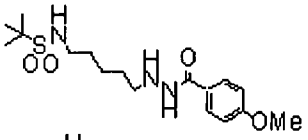
I-341 

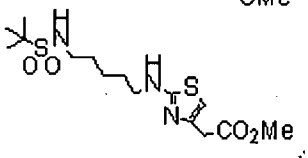
I-342 

I-343 

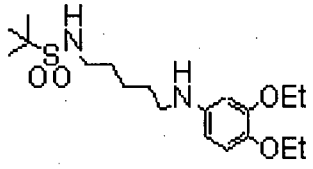
I-344 

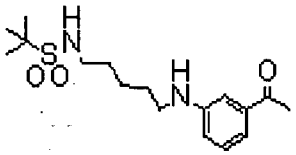
I-345 

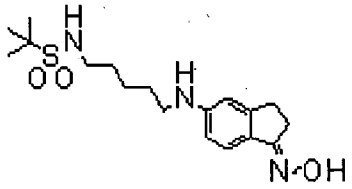
I-346 

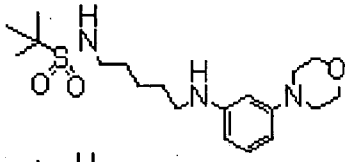
I-347 

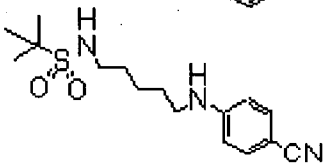
[Formula 86]

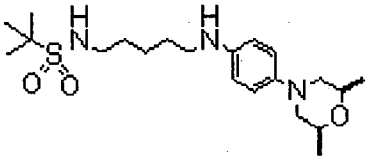
I-348 

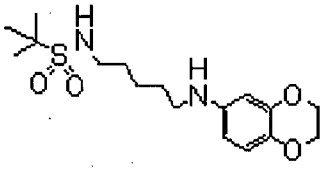
I-349 

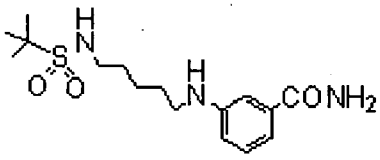
I-350 

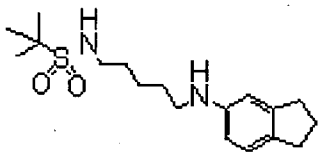
I-351 

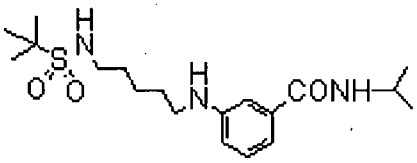
I-352 

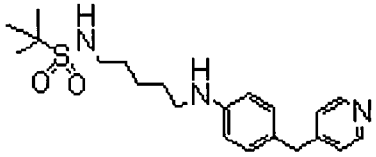
I-353 

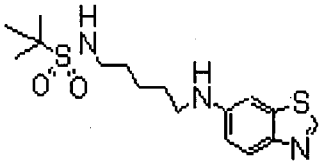
I-354 

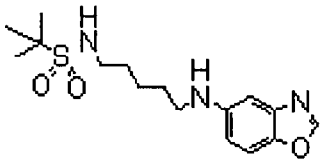
I-355 

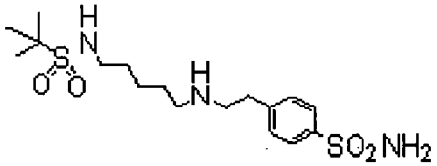
I-356 

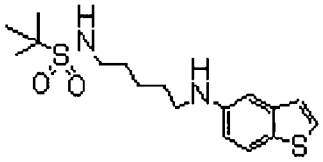
I-357 

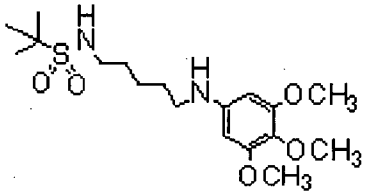
I-358 

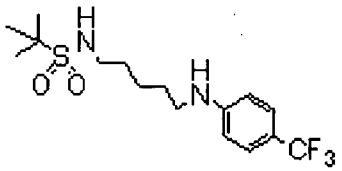
I-359 

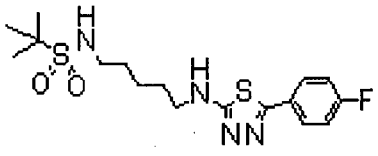
I-360 

I-361 

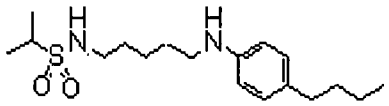
I-362 

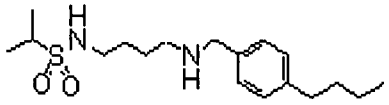
I-363 

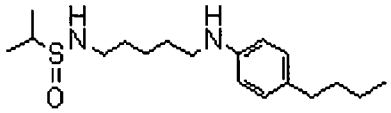
I-364 

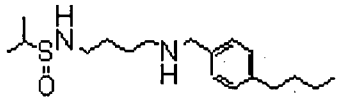
I-365 

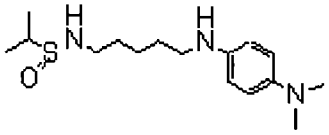
[Formula 87]

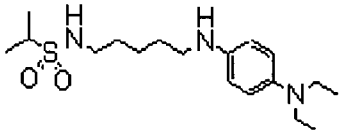
I-366 

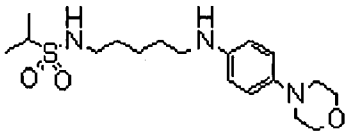
I-367 

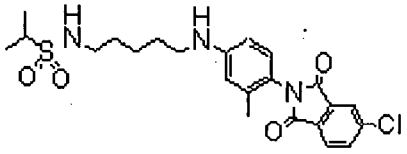
I-368 

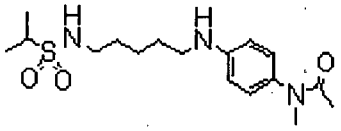
I-369 

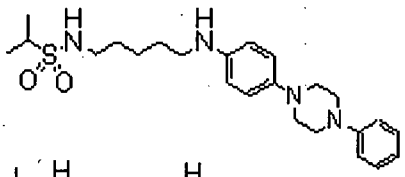
I-370 

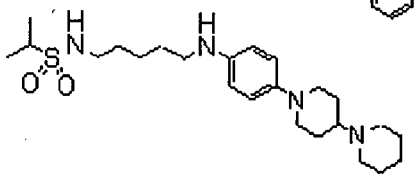
I-371 

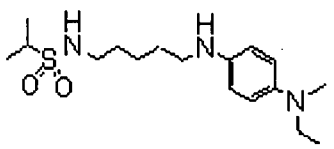
I-372 

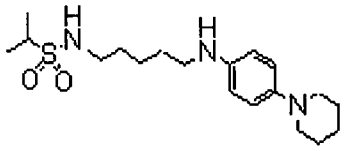
I-373 

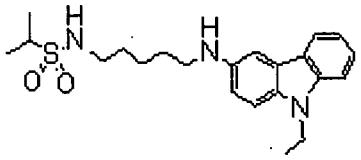
I-374 

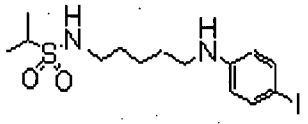
I-375 

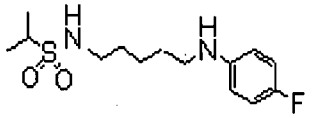
I-376 

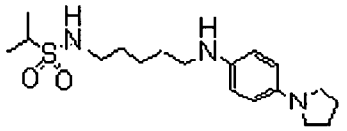
I-377 

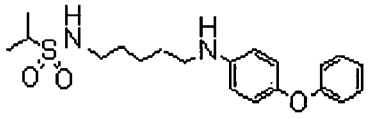
I-378 

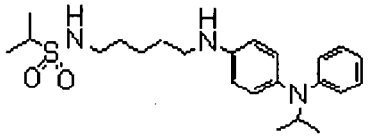
I-379 

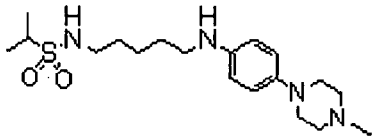
I-380 

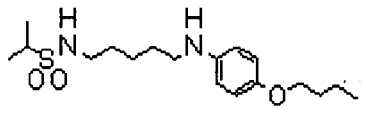
I-381 

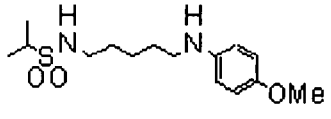
I-382 

I-383 

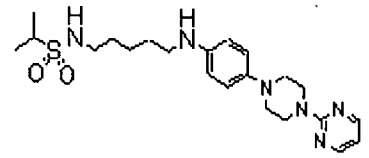
I-384 

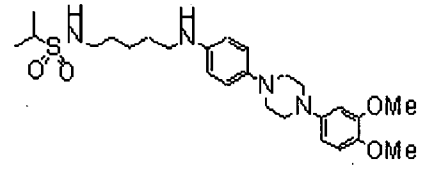
I-385 

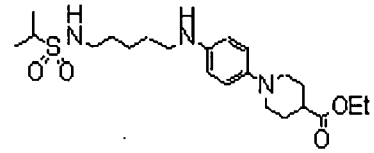
I-386 

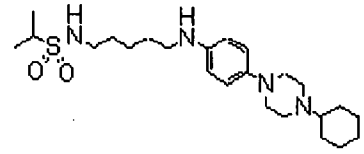
I-387 

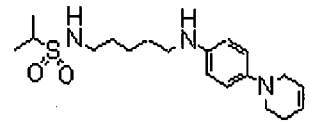
[Formula 88]

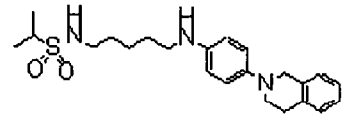
I-388 

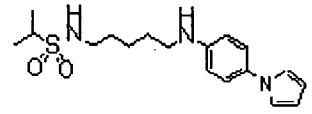
I-389 

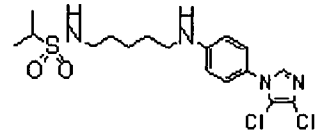
I-390 

I-391 

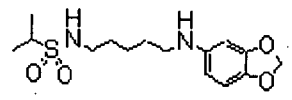
I-392 

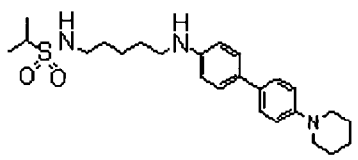
I-393 

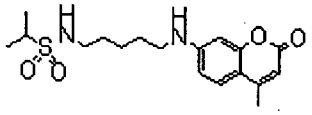
I-394 

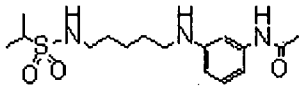
I-395 

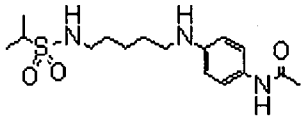
I-396 

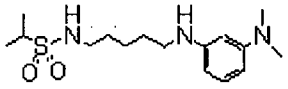
I-397 

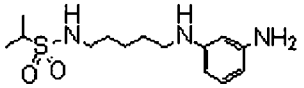
I-398 

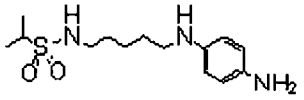
I-399 

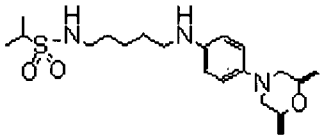
I-400 

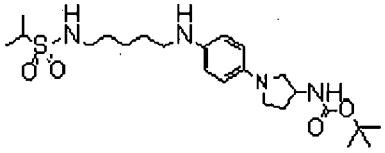
I-401 

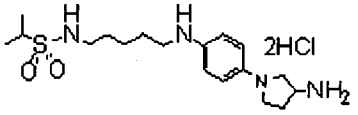
I-402 

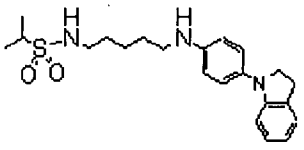
I-403 

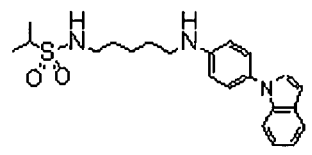
I-404 

I-405 

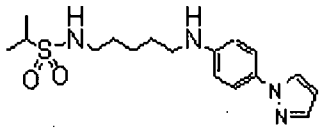
I-406 

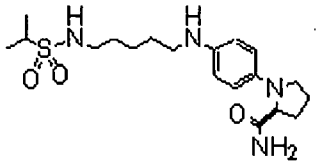
I-407 

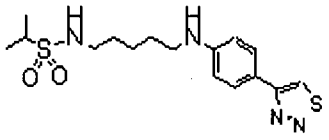
I-408 

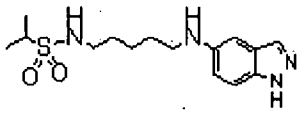
I-409 

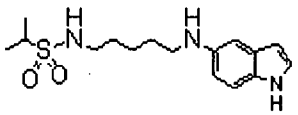
[Formula 89]

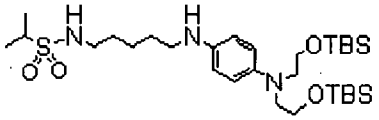
I-410 

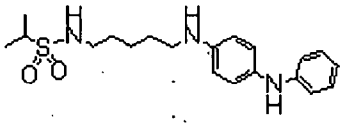
I-411 

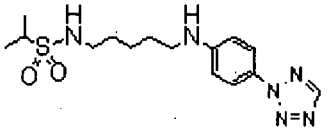
I-412 

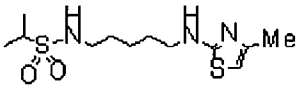
I-413 

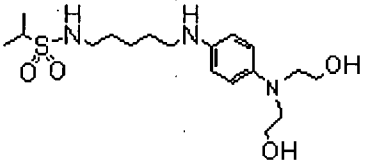
I-414 

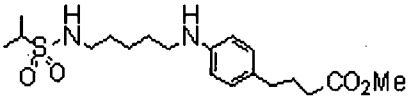
I-415 

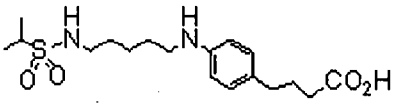
I-416 

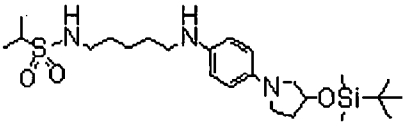
I-417 

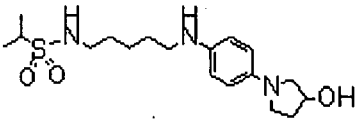
I-418 

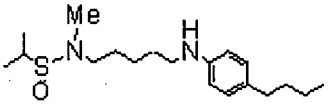
I-419 

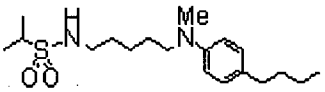
I-420 

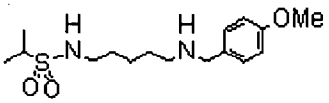
I-421 

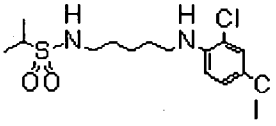
I-422 

I-423 

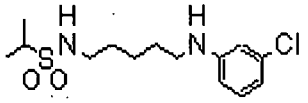
I-424 

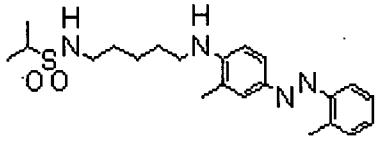
I-425 

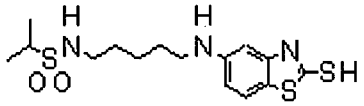
I-426 

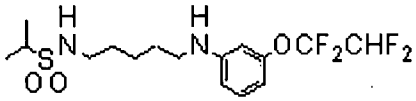
I-427 

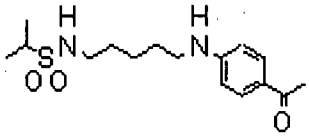
[Formula 90]

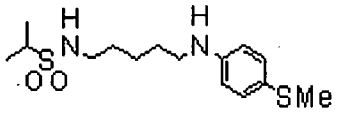
I-432 

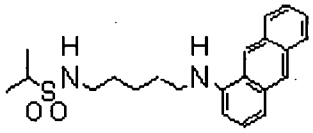
I-433 

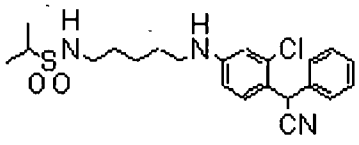
I-434 

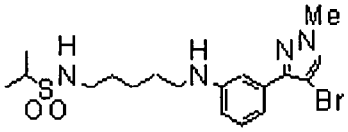
I-435 

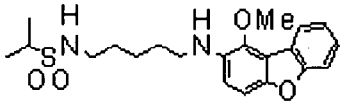
I-436 

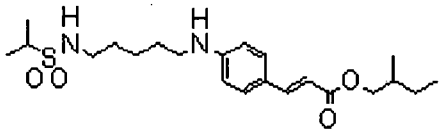
I-437 

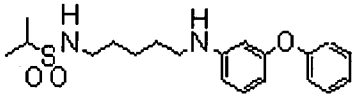
I-438 

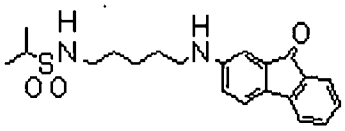
I-439 

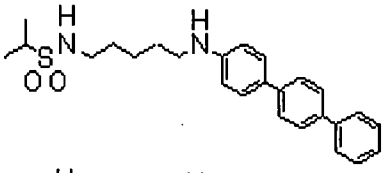
I-440 

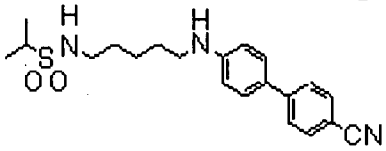
I-441 

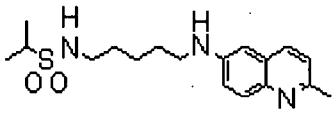
I-442 

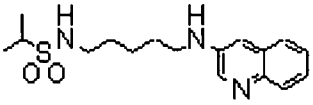
I-443 

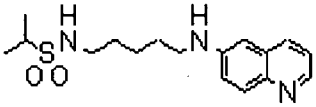
I-444 

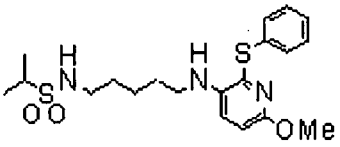
I-445 

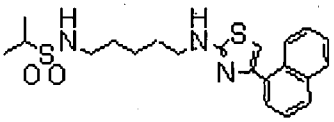
I-446 

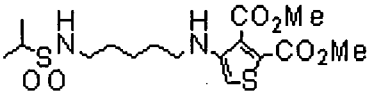
I-447 

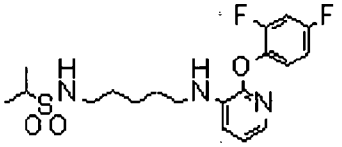
I-448 

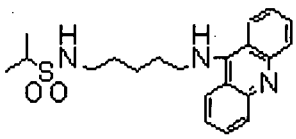
I-449 

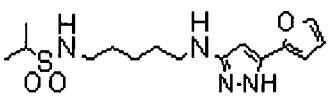
I-450 

I-451 

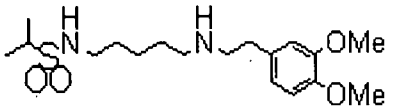
I-452 

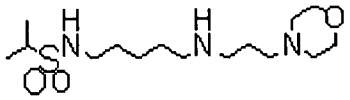
I-453 

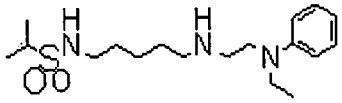
I-454 

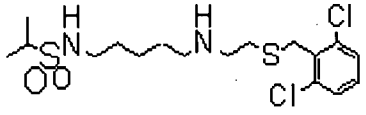
I-455 

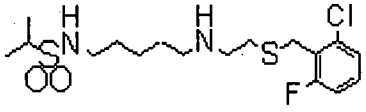
[Formula 91]

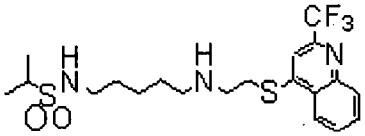
I-456 

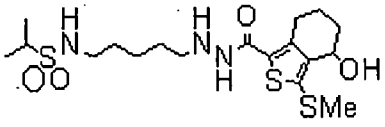
I-457 

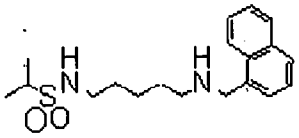
I-458 

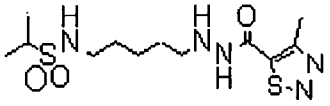
I-459 

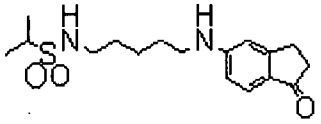
I-460 

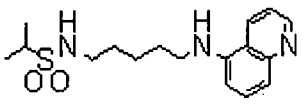
I-461 

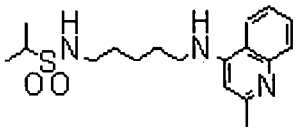
I-462 

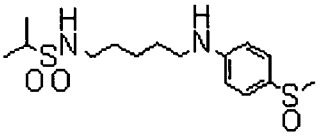
I-463 

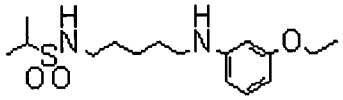
I-464 

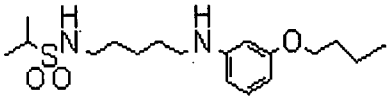
I-465 

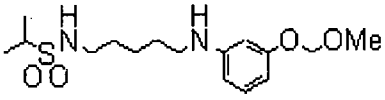
I-466 

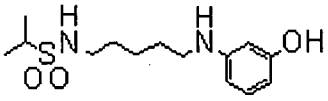
I-467 

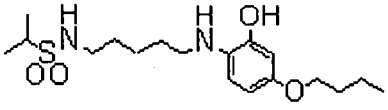
I-468 

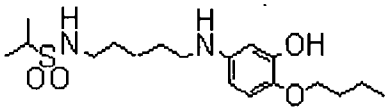
I-469 

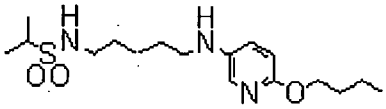
I-470 

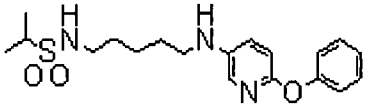
I-471 

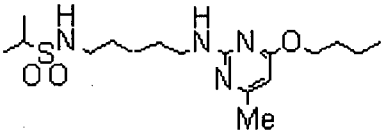
I-472 

I-473 

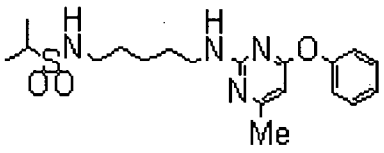
I-474 

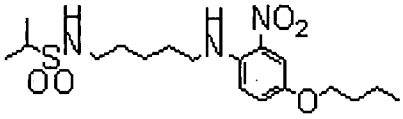
I-475 

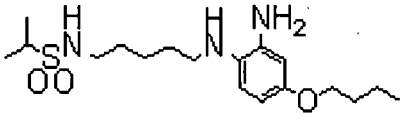
I-476 

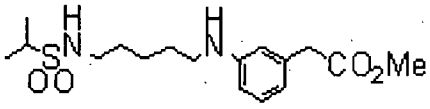
I-477 

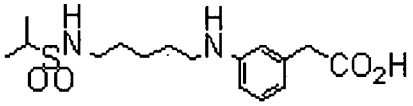
[Formula 92]

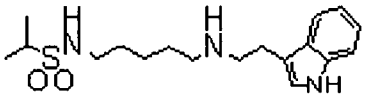
I-478 

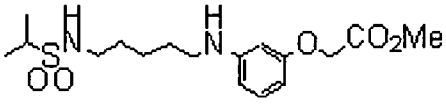
I-479 

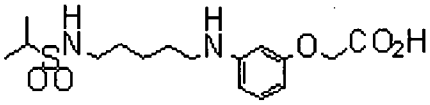
I-480 

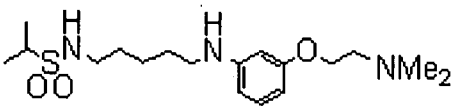
I-481 

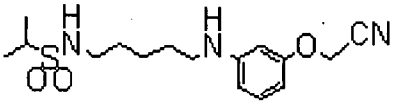
I-482 

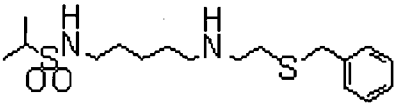
I-483 

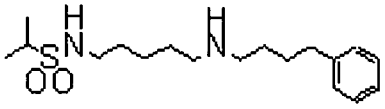
I-484 

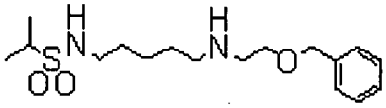
I-485 

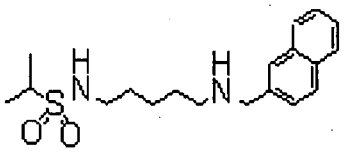
I-486 

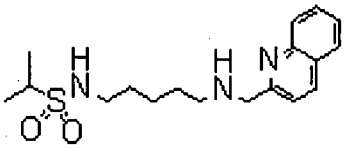
I-487 

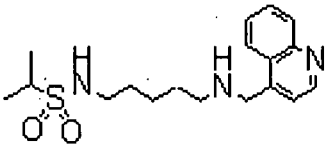
I-488 

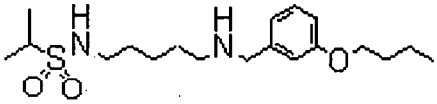
I-489 

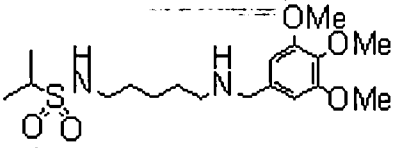
I-490 

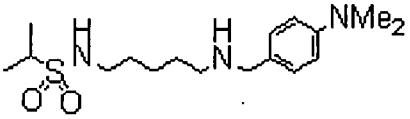
I-491 

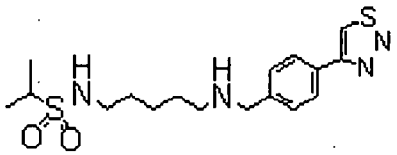
I-492 

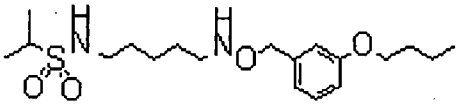
I-493 

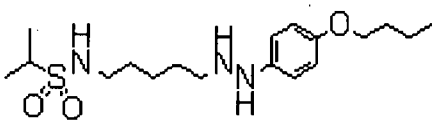
I-494 

I-495 

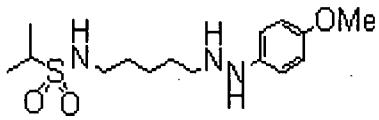
I-496 

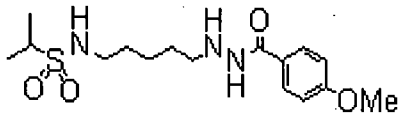
I-497 

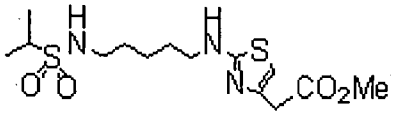
I-498 

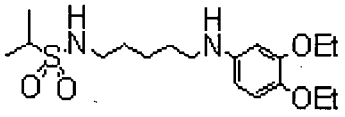
I-499 

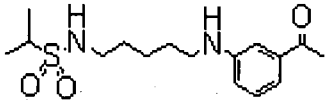
[Formula 93]

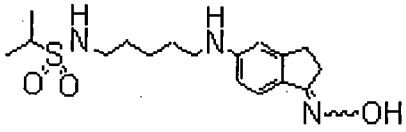
I-500 

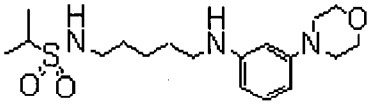
I-501 

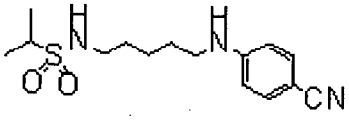
I-502 

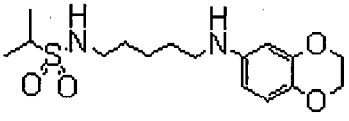
I-503 

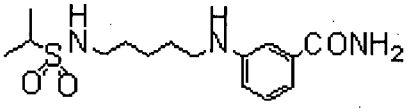
I-504 

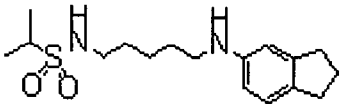
I-505 

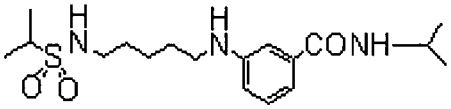
I-506 

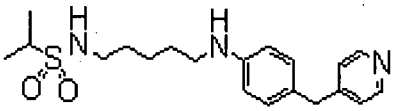
I-507 

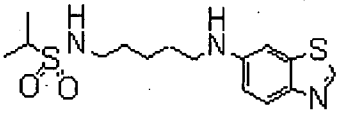
I-508 

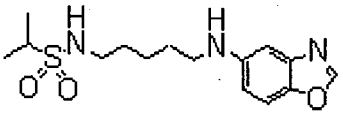
I-509 

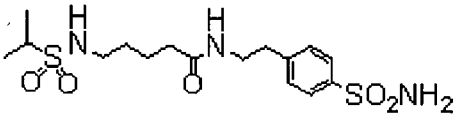
I-510 

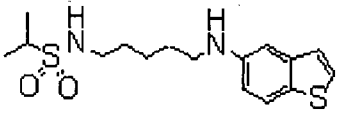
I-511 

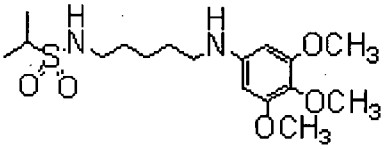
I-512 

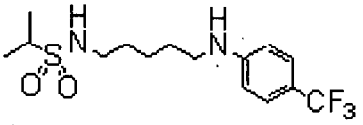
I-513 

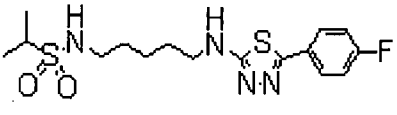
I-514 

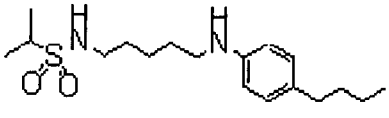
I-515 

I-516 

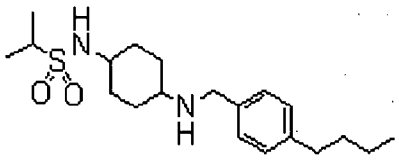
I-517 

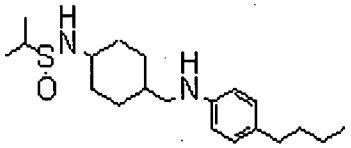
I-518 

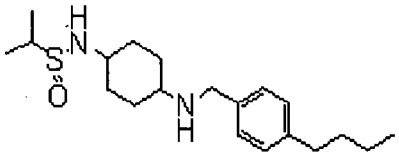
I-519 

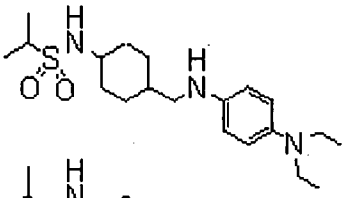
I-520 

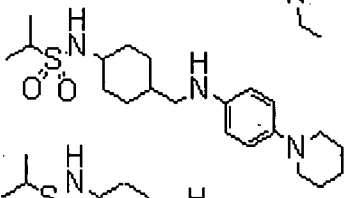
[Formula 94]

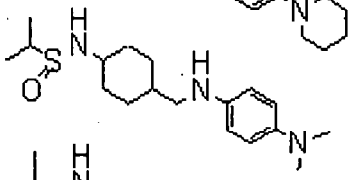
I-521 

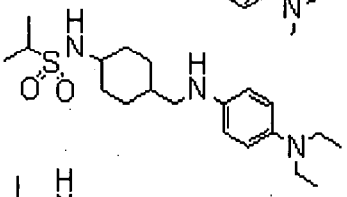
I-522 

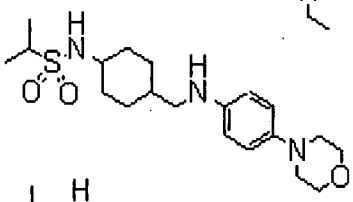
I-523 

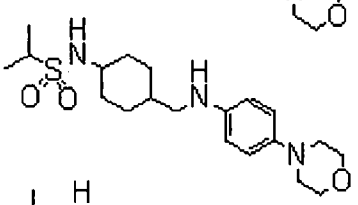
I-524 

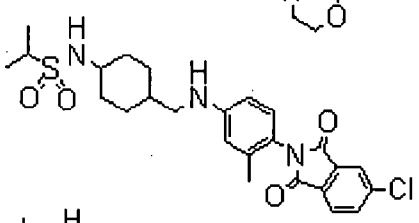
I-525 

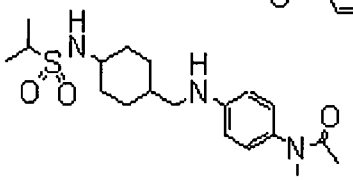
I-526 

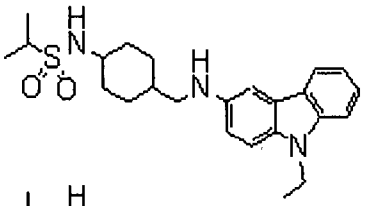
I-527 

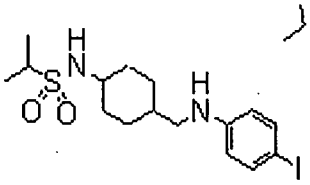
I-528 

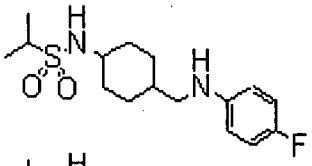
I-529 

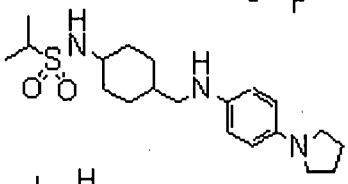
I-530 

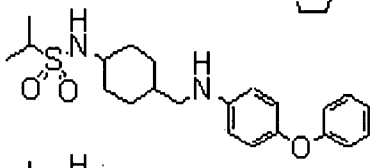
I-531 

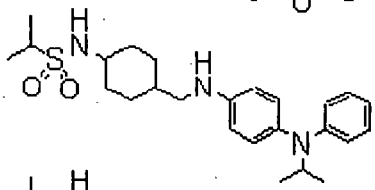
I-532 

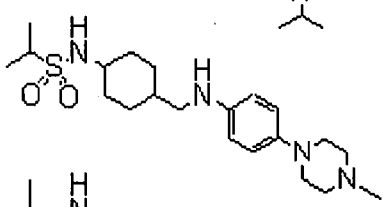
I-533 

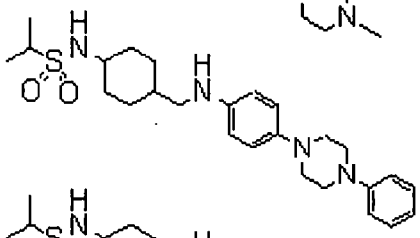
I-534 

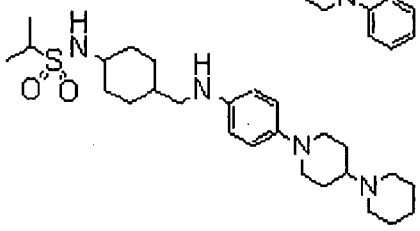
I-535 

I-536 

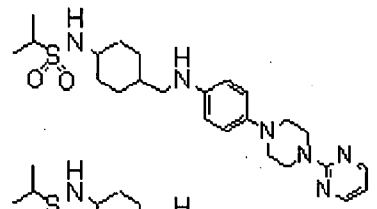
I-537 

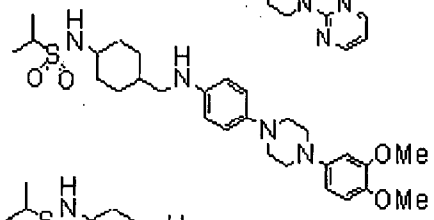
I-538 

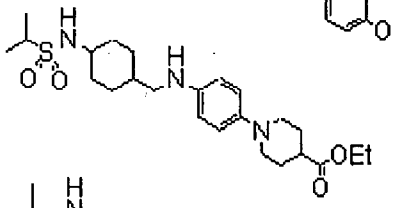
I-539 

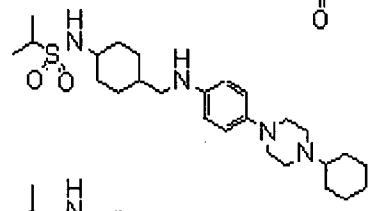
I-540 

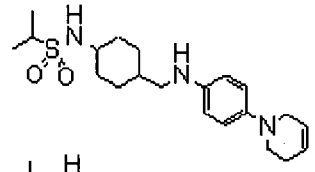
[Formula 95]

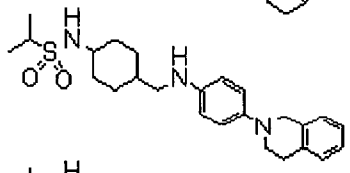
I-543 

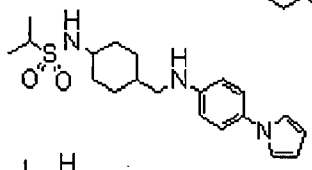
I-544 

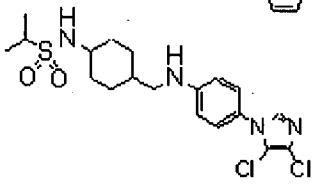
I-545 

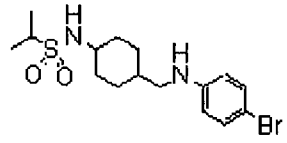
I-546 

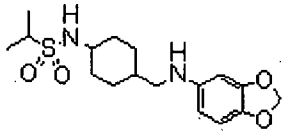
I-547 

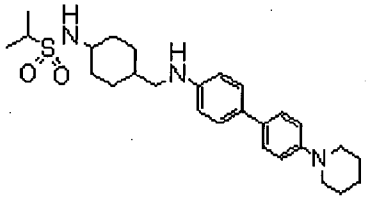
I-548 

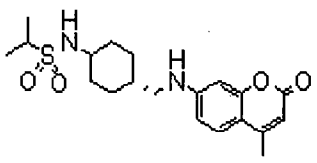
I-549 

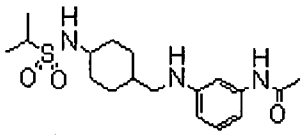
I-550 

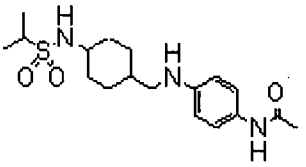
I-551 

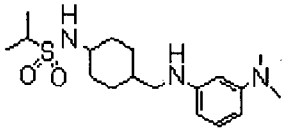
I-552 

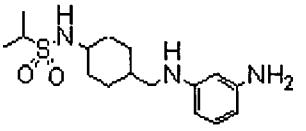
I-553 

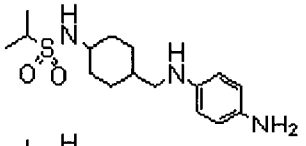
I-554 

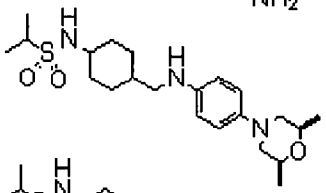
I-555 

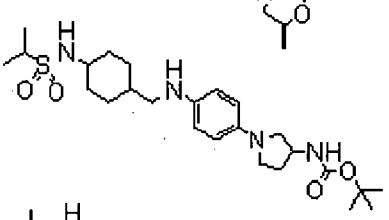
I-556 

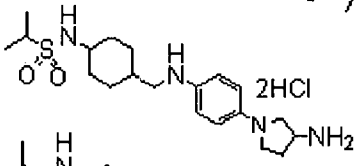
I-557 

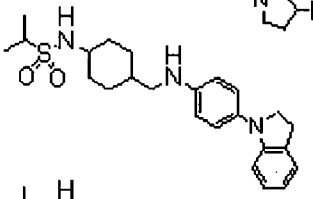
I-558 

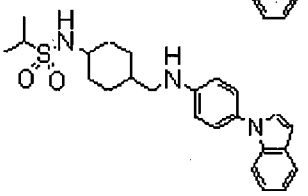
I-559 

I-560 

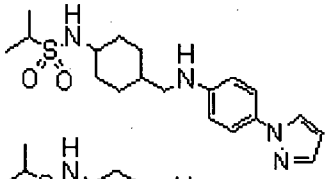
I-561 

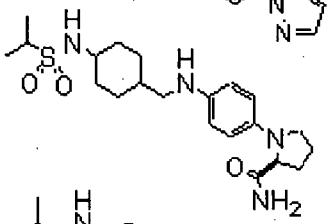
I-562 

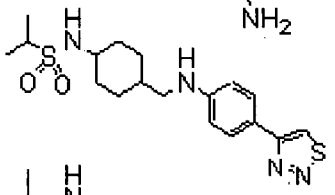
I-563 

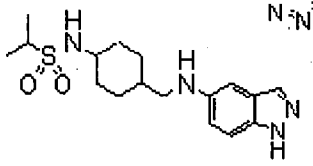
I-564 

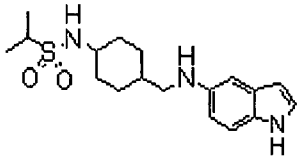
[Formula 96]

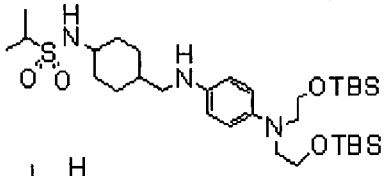
I-565 

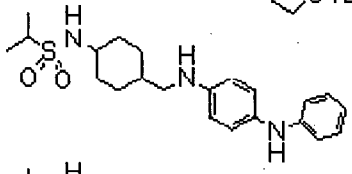
I-566 

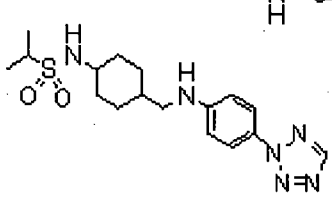
I-567 

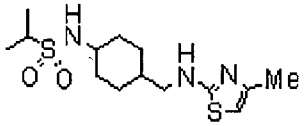
I-568 

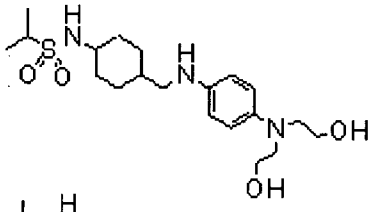
I-569 

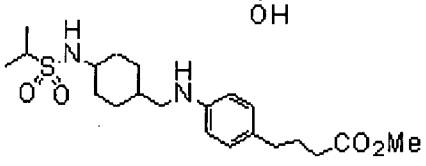
I-570 

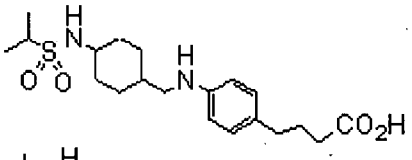
I-571 

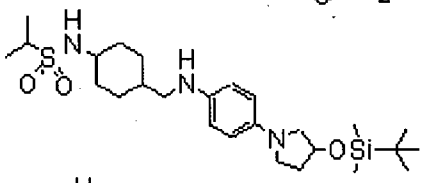
I-572 

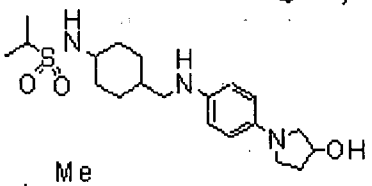
I-573 

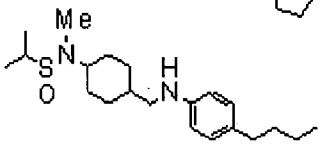
I-574 

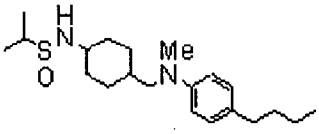
I-575 

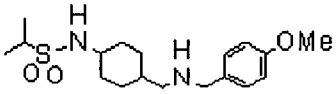
I-576 

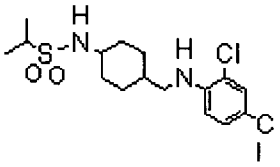
I-577 

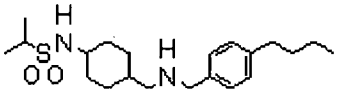
I-578 

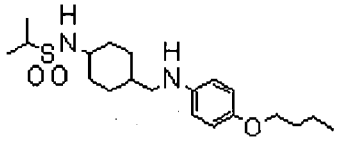
I-579 

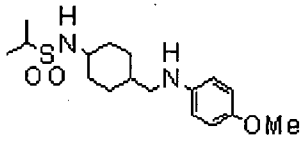
I-580 

I-581 

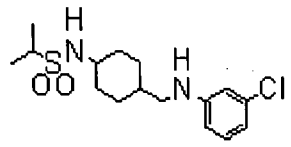
I-582 

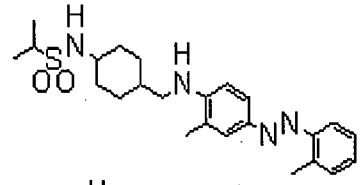
I-583 

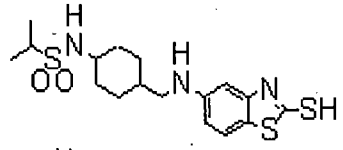
I-584 

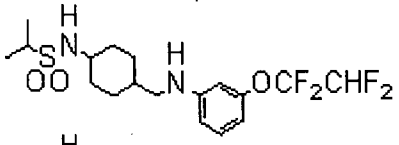
I-585 

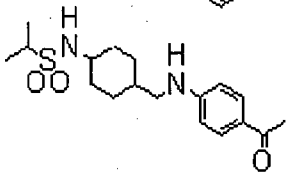
[Formula 97]

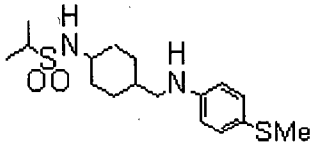
I-587 

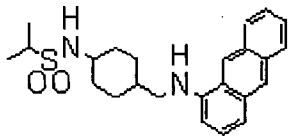
I-589 

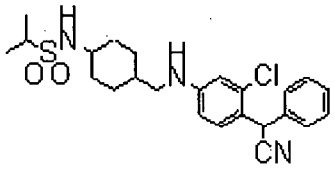
I-590 

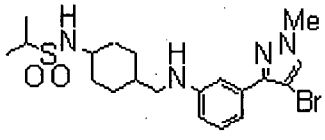
I-591 

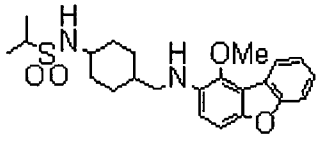
I-592 

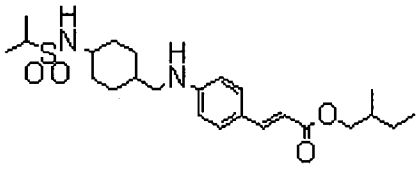
I-593 

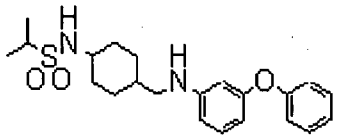
I-594 

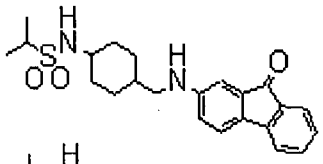
I-595 

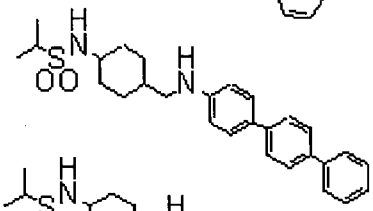
I-596 

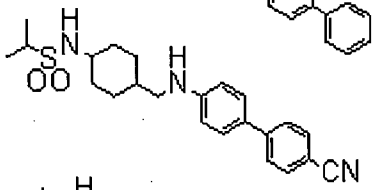
I-597 

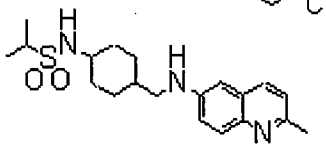
I-598 

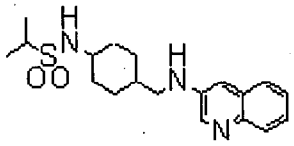
I-599 

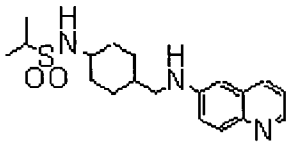
I-600 

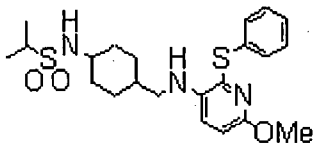
I-601 

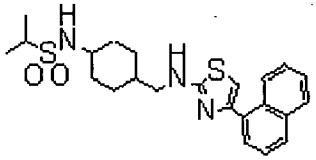
I-602 

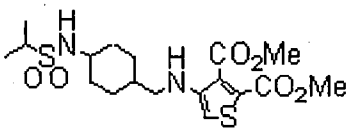
I-603 

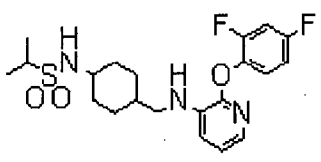
I-604 

I-605 

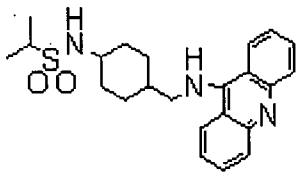
I-606 

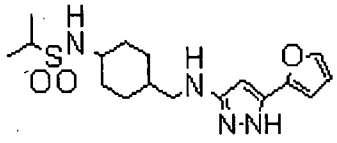
I-607 

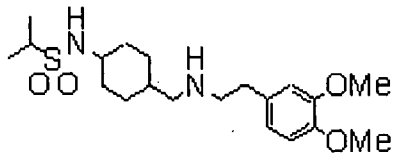
I-608 

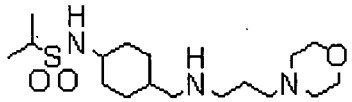
I-609 

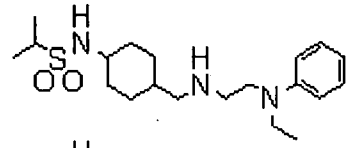
[Formula 98]

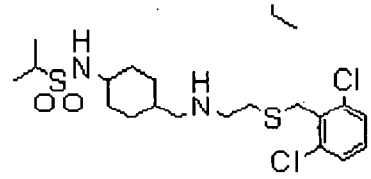
I-610 

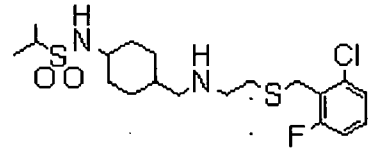
I-611 

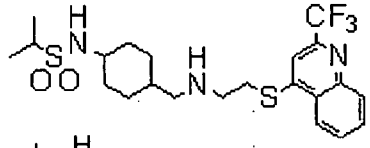
I-612 

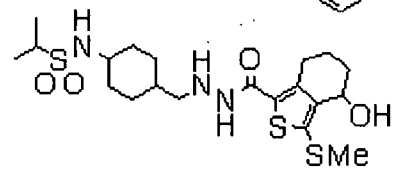
I-613 

I-614 

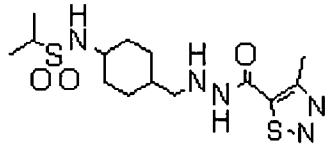
I-615 

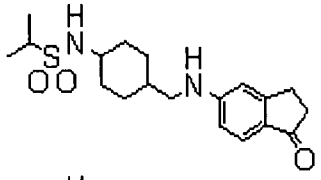
I-616 

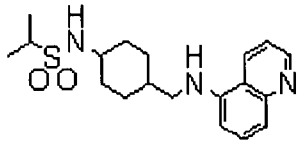
I-617 

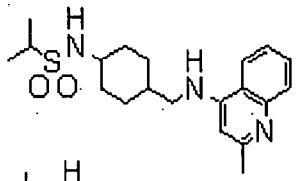
I-618 

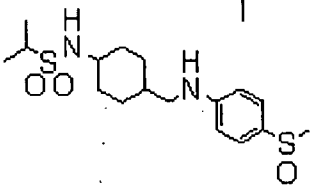
I-619 

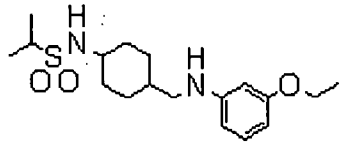
I-620 

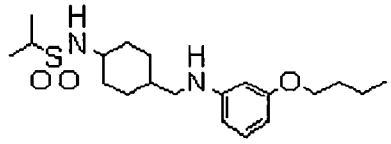
I-621 

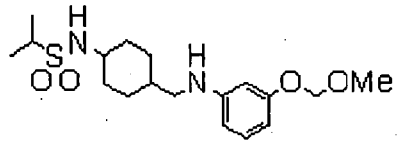
I-622 

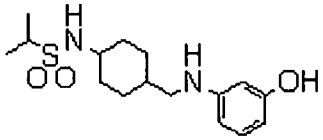
I-623 

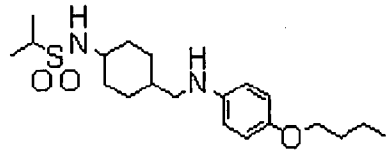
I-624 

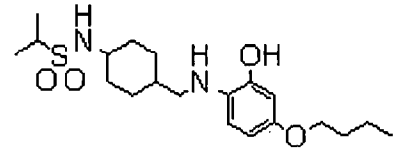
I-625 

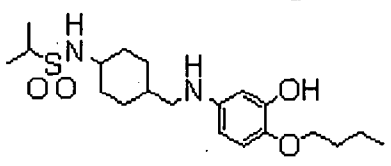
I-626 

I-627 

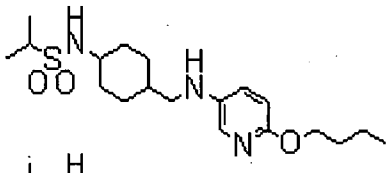
I-628 

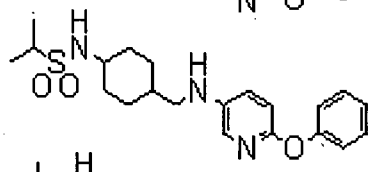
I-629 

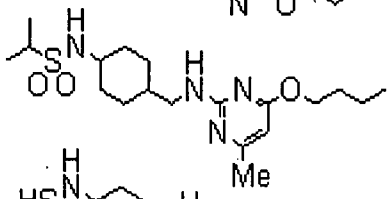
I-630 

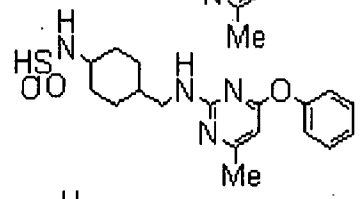
I-631 

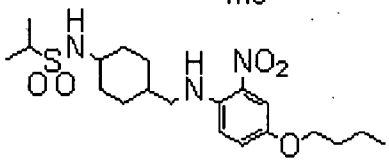
[Formula 99]

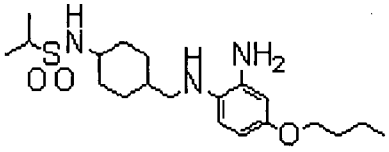
I-632 

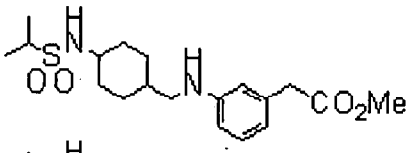
I-633 

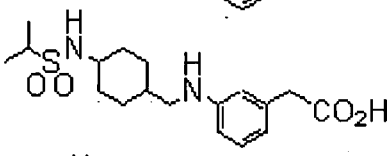
I-634 

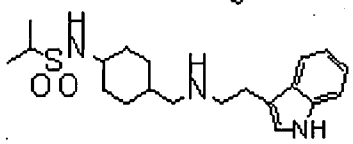
I-635 

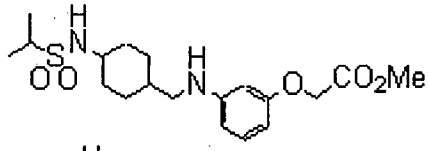
I-636 

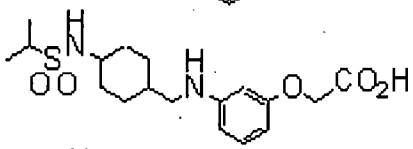
I-637 

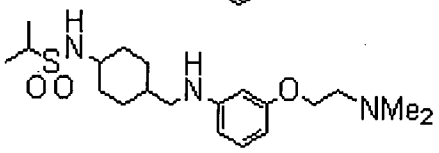
I-638 

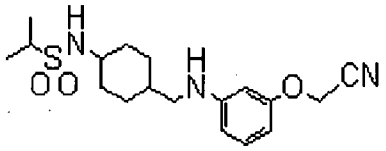
I-639 

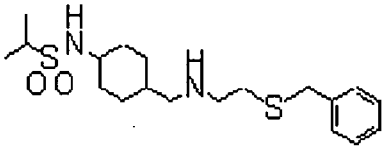
I-640 

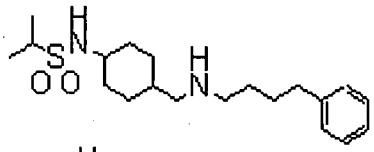
I-641 

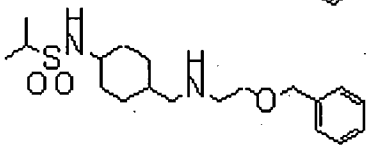
I-642 

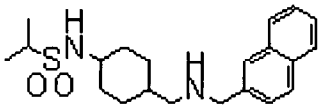
I-643 

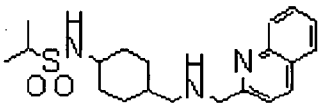
I-644 

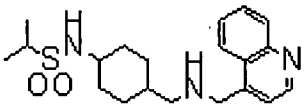
I-645 

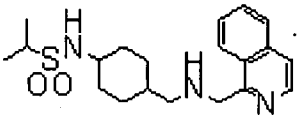
I-646 

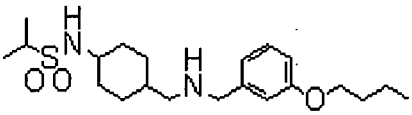
I-647 

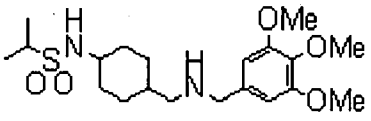
I-648 

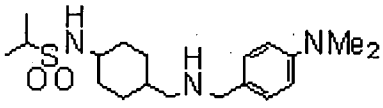
I-649 

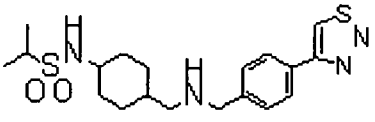
I-650 

I-651 

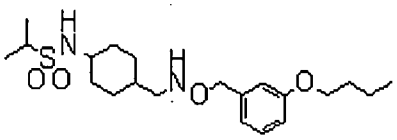
I-652 

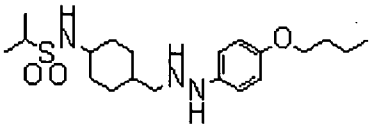
I-653 

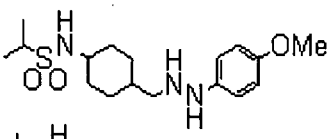
I-654 

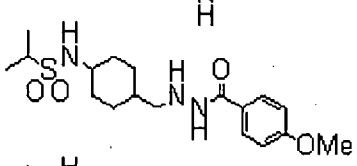
I-655 

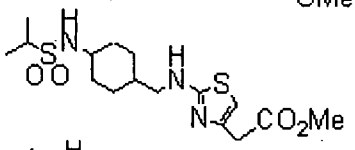
[Formula 100]

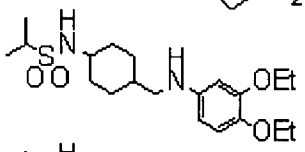
I-656 

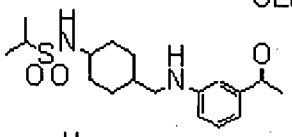
I-657 

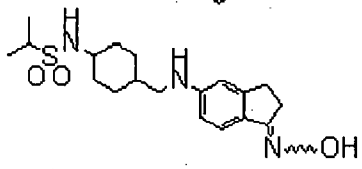
I-658 

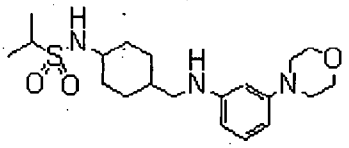
I-659 

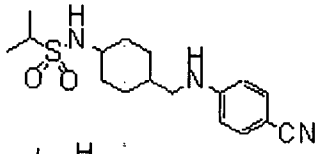
I-660 

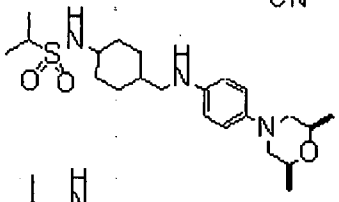
I-661 

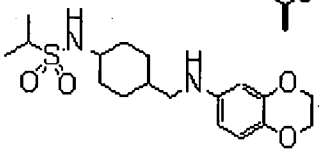
I-662 

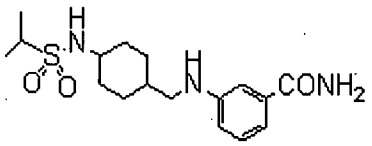
I-663 

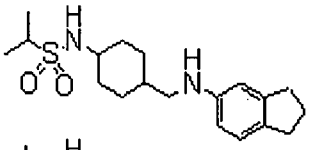
I-664 

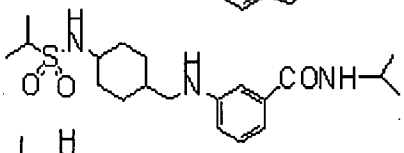
I-665 

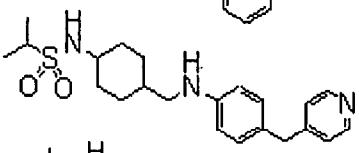
I-666 

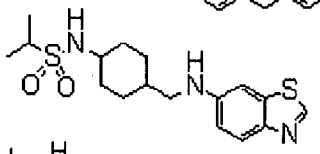
I-667 

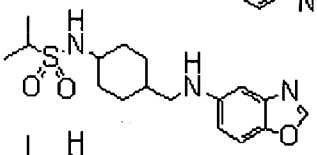
I-668 

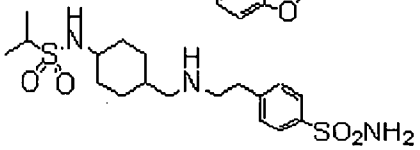
I-669 

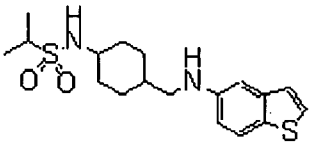
I-670 

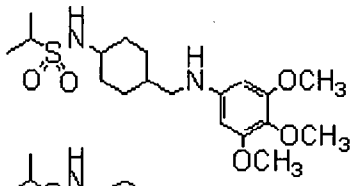
I-671 

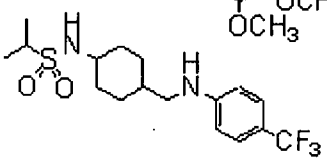
I-672 

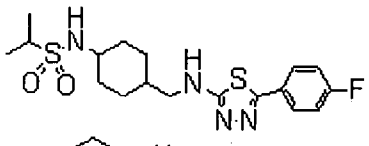
I-673 

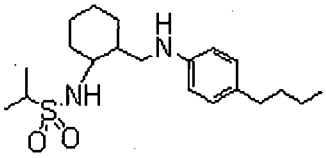
I-674 

I-675 

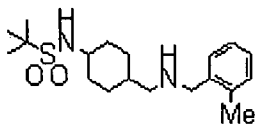
I-676 

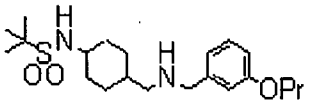
I-677 

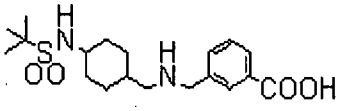
I-678 

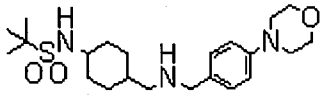
I-679 

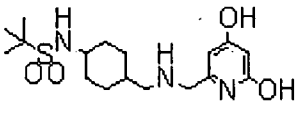
[Formula 101]

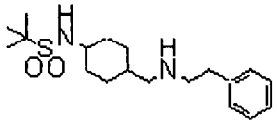
I-680 

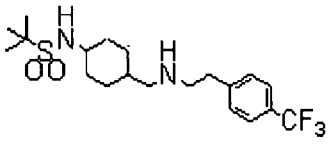
I-681 

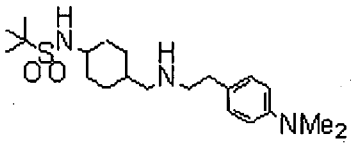
I-682 

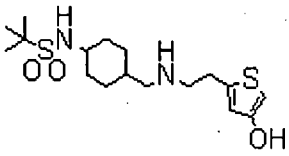
I-683 

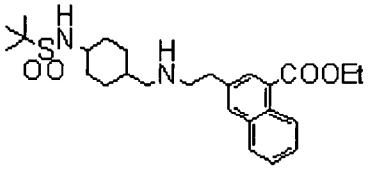
I-684 

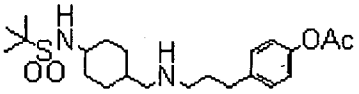
I-685 

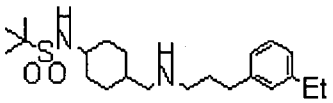
I-686 

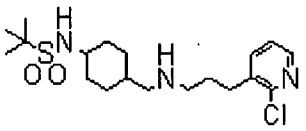
I-687 

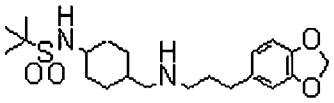
I-688 

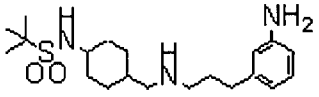
I-689 

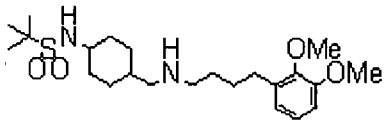
I-690 

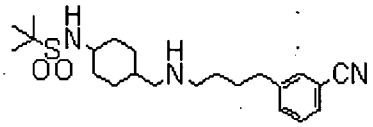
I-691 

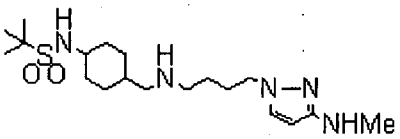
I-692 

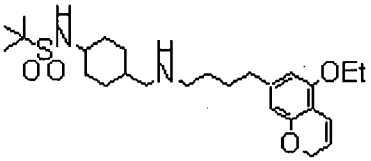
I-693 

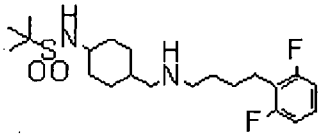
I-694 

I-695 

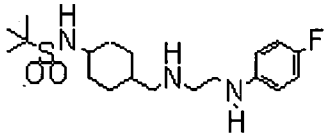
I-696 

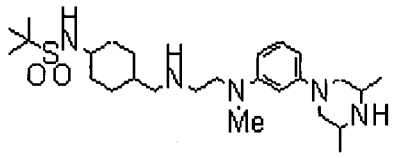
I-697 

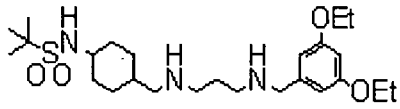
I-698 

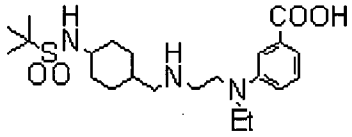
I-699 

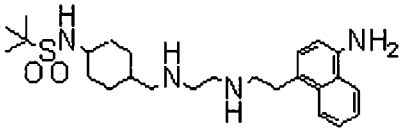
[Formula 102]

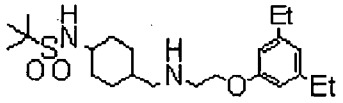
I-700 

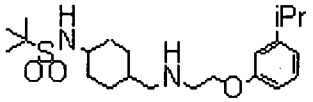
I-701 

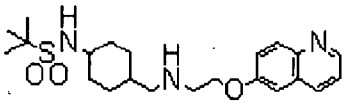
I-702 

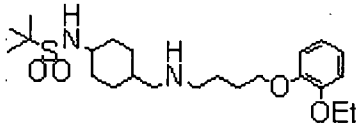
I-703 

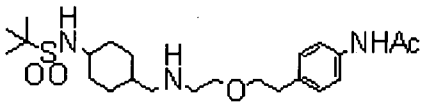
I-704 

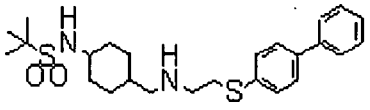
I-705 

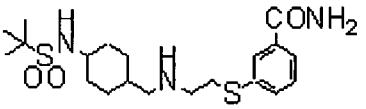
I-706 

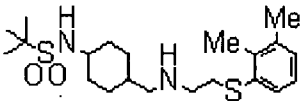
I-707 

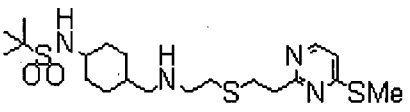
I-708 

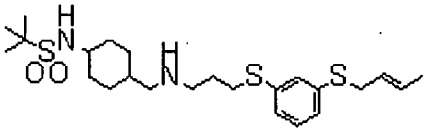
I-709 

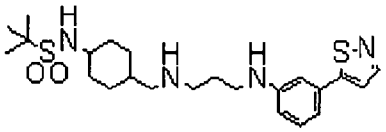
I-710 

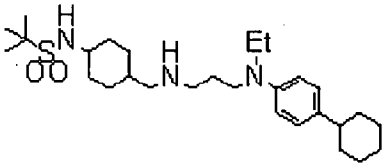
I-711 

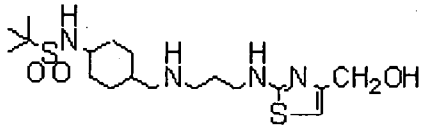
I-712 

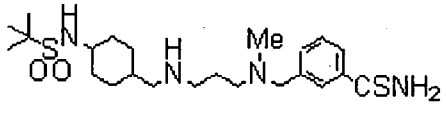
I-713 

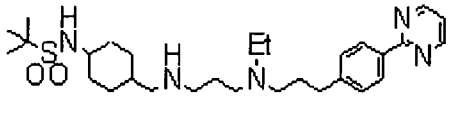
I-714 

I-715 

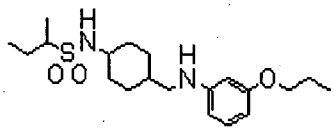
I-716 

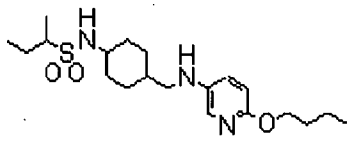
I-717 

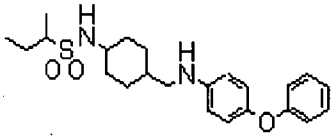
I-718 

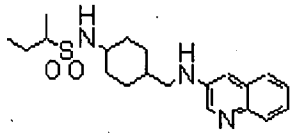
I-719 

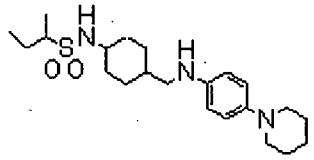
[Formula 103]

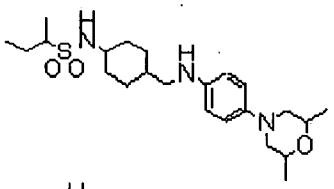
I-720 

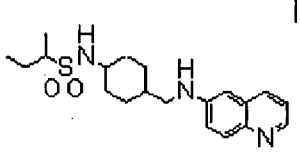
I-721 

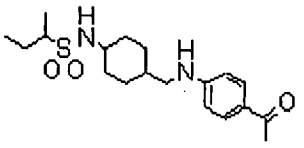
I-722 

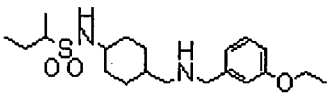
I-723 

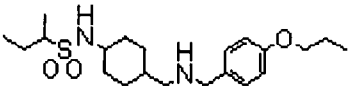
I-724 

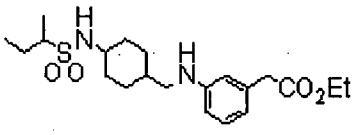
I-725 

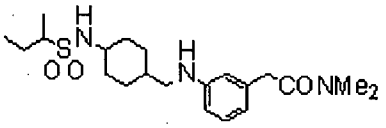
I-726 

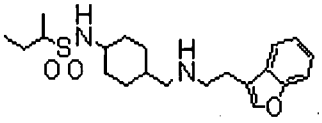
I-727 

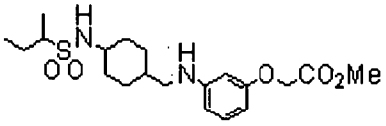
I-728 

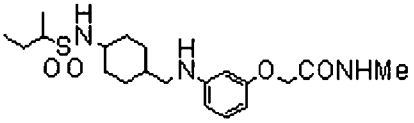
I-729 

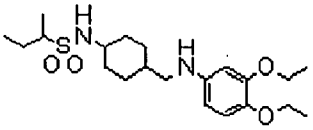
I-730 

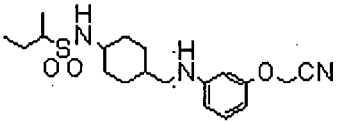
I-731 

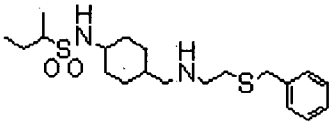
I-732 

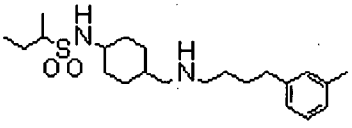
I-733 

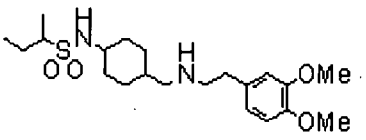
I-734 

I-735 

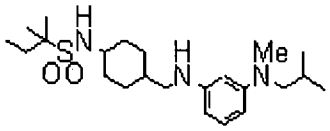
I-736 

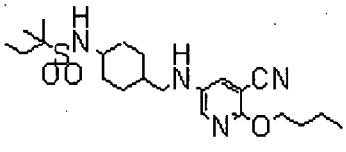
I-737 

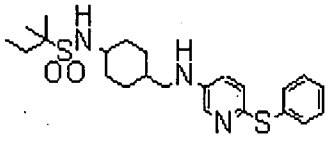
I-738 

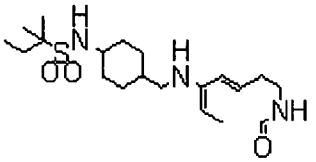
I-739 

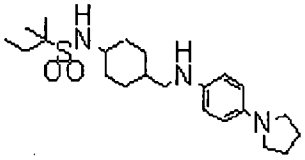
[Formula 104]

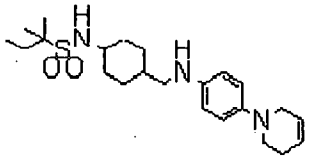
I-740 

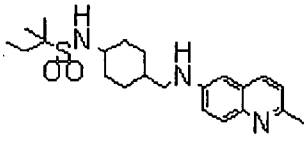
I-741 

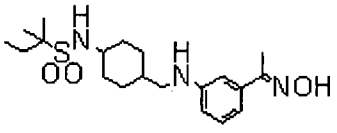
I-742 

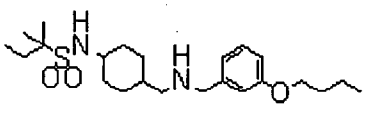
I-743 

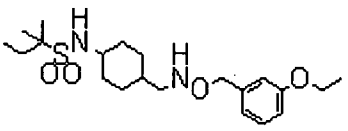
I-744 

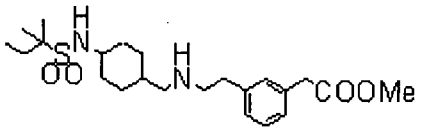
I-745 

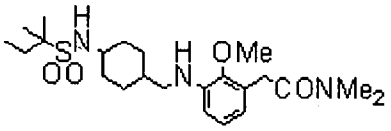
I-746 

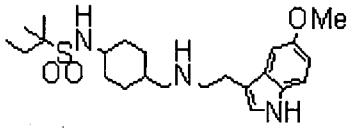
I-747 

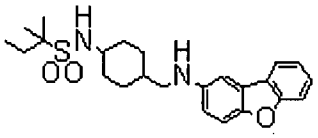
I-748 

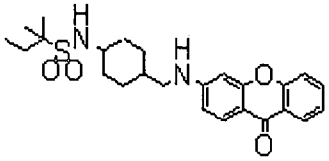
I-749 

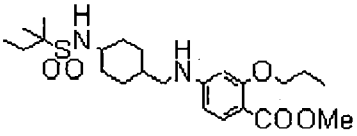
I-750 

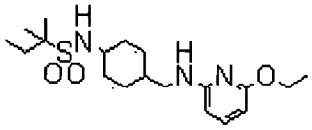
I-751 

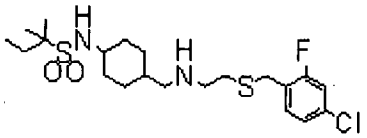
I-752 

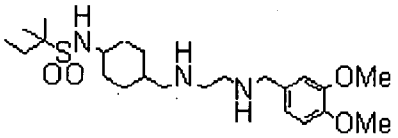
I-753 

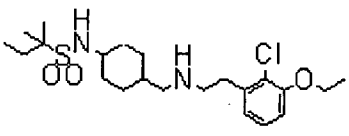
I-754 

I-755 

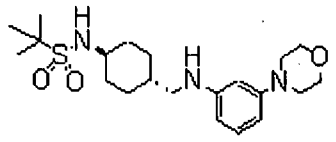
I-756 

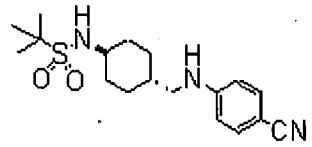
I-757 

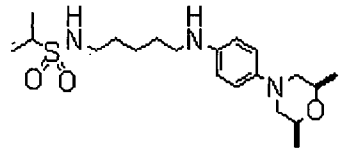
I-758 

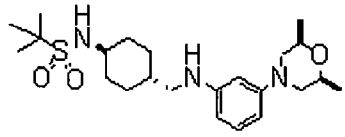
I-759 

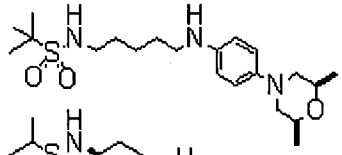
[Formula 105]

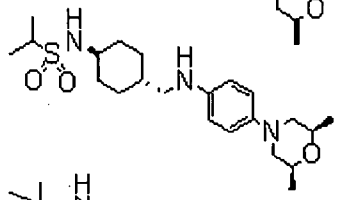
Ia-1 

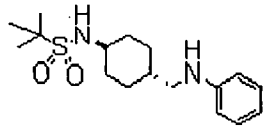
Ia-2 

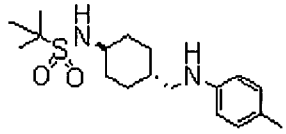
Ia-3 

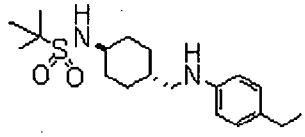
Ia-4 

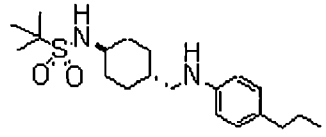
Ia-5 

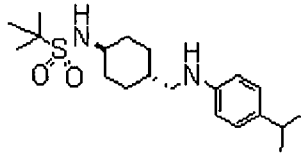
Ia-6 

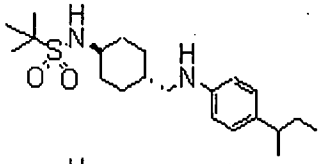
Ia-7 

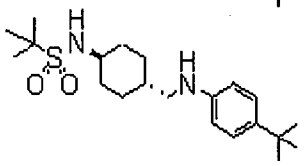
Ia-8 

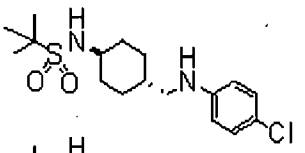
Ia-9 

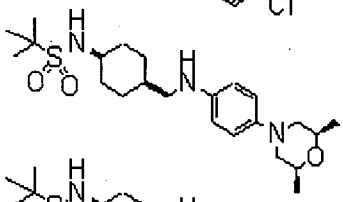
Ia-10 

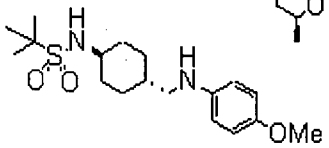
Ia-11 

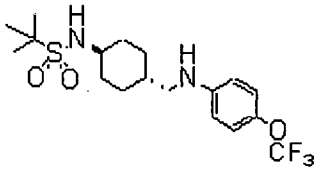
Ia-12 

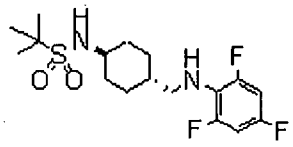
Ia-13 

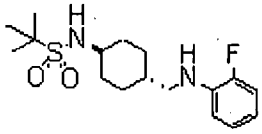
Ia-14 

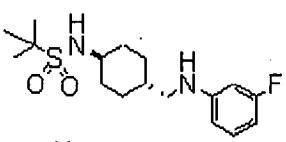
Ia-15 

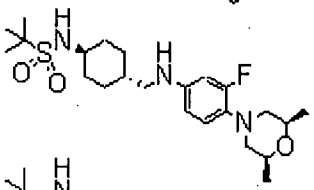
Ia-16 

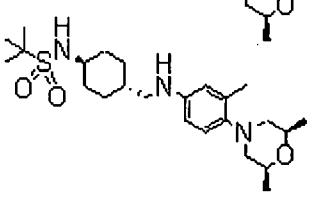
Ia-17 

Ia-18 

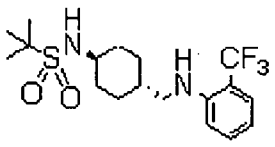
Ia-19 

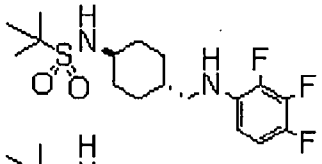
Ia-20 

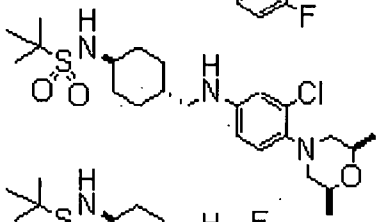
Ia-21 

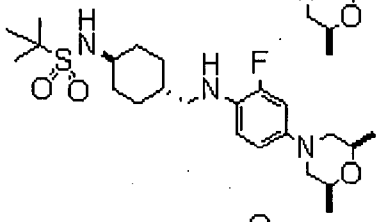
Ia-22 

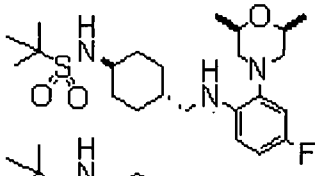
[Formula 106]

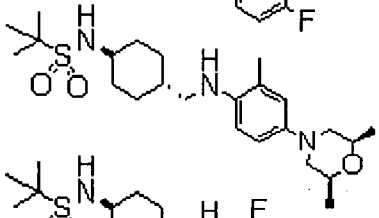
Ia-23 

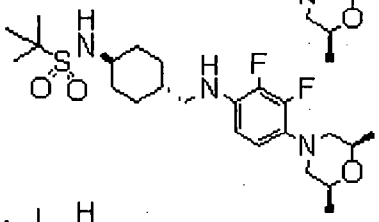
Ia-24 

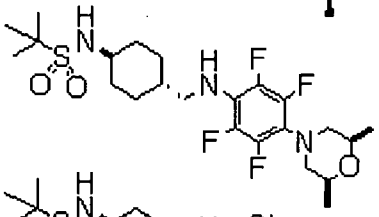
Ia-25 

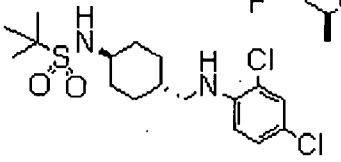
Ia-26 

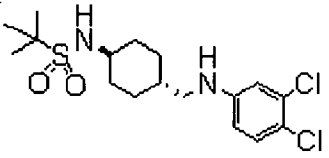
Ia-27 

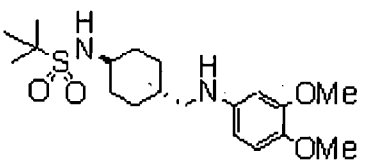
Ia-28 

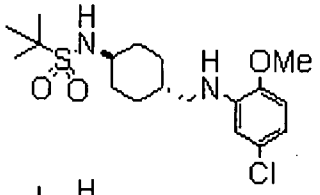
Ia-29 

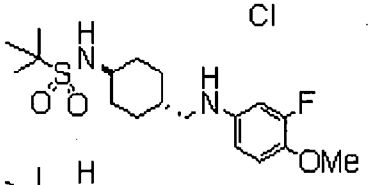
Ia-30 

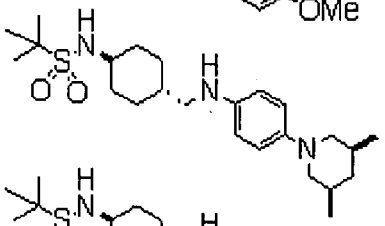
Ia-31 

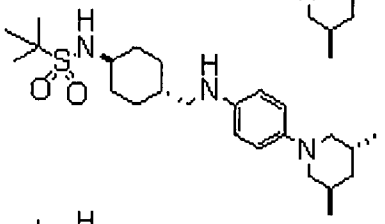
Ia-32 

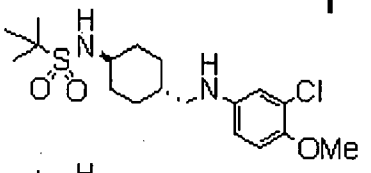
Ia-33 

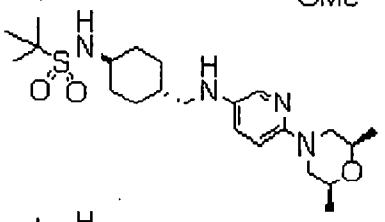
Ia-35 

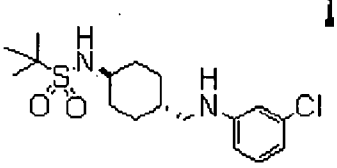
Ia-36 

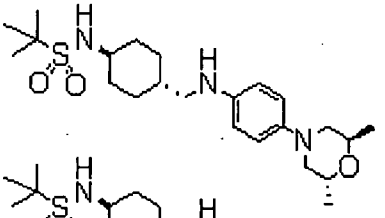
Ia-37 

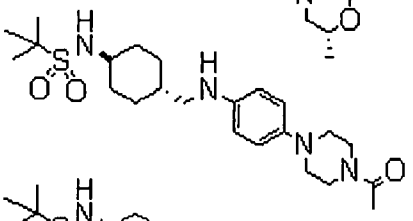
Ia-38 

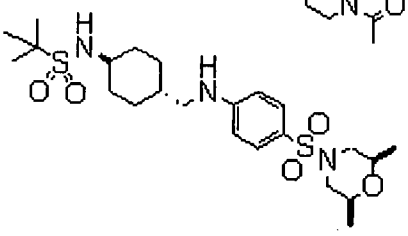
Ia-39 

Ia-40 

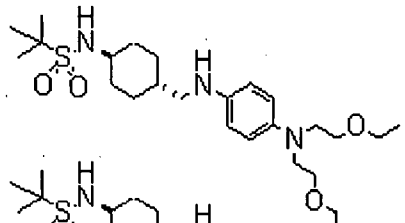
Ia-41 

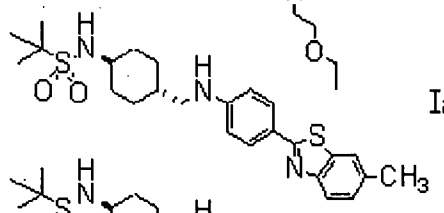
Ia-42 

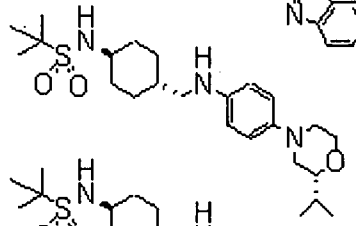
Ia-43 

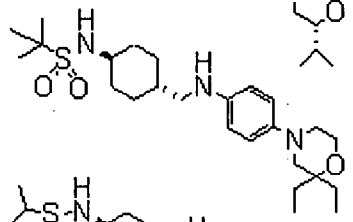
Ia-44 

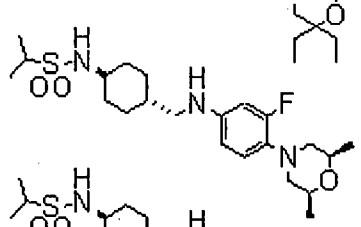
[Formula 107]

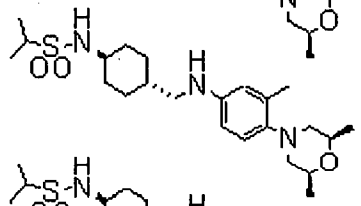
Ia-45 

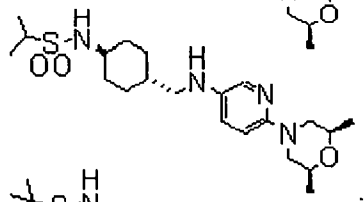
Ia-46 

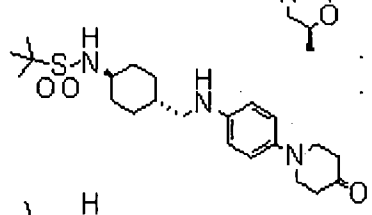
Ia-47 

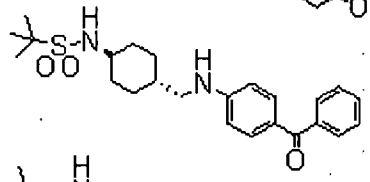
Ia-48 

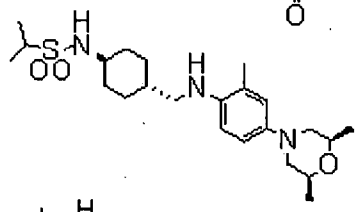
Ia-49 

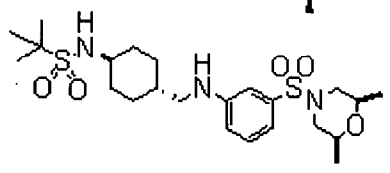
Ia-50 

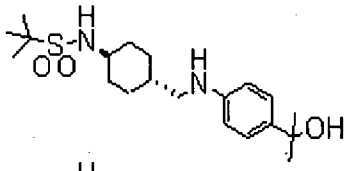
Ia-51 

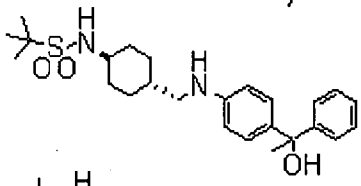
Ia-52 

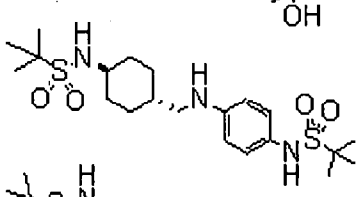
Ia-53 

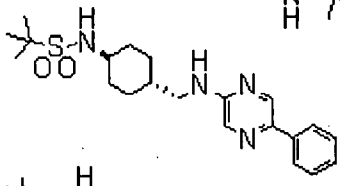
Ia-54 

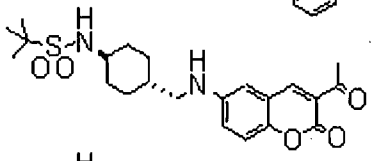
Ia-55 

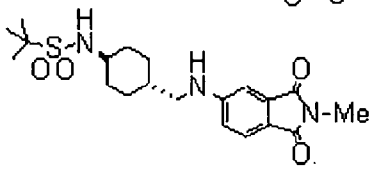
Ia-56 

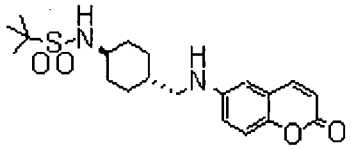
Ia-57 

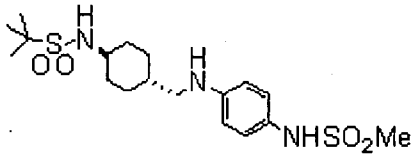
Ia-58 

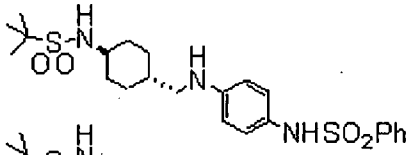
Ia-59 

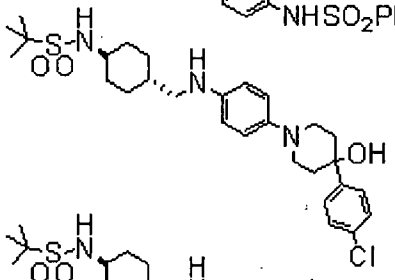
Ia-60 

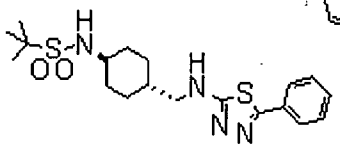
Ia-61 

Ia-62 

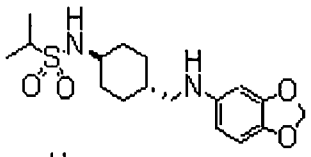
Ia-63 

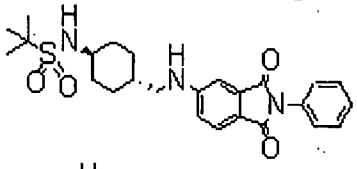
Ia-64 

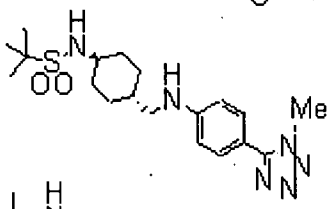
Ia-65 

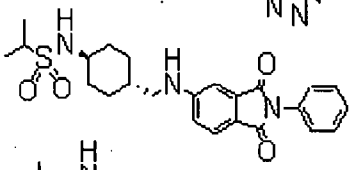
Ia-66 

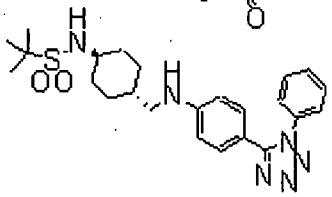
[Formula 108]

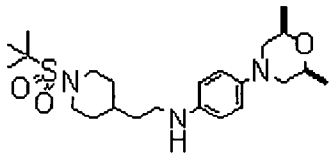
Ia-67 

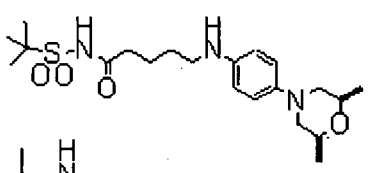
Ia-68 

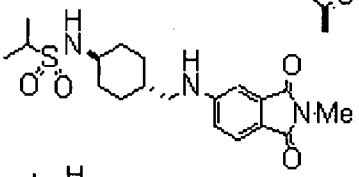
Ia-69 

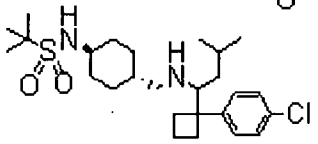
Ia-70 

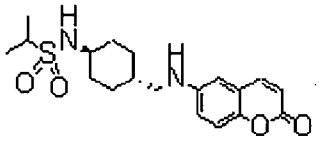
Ia-71 

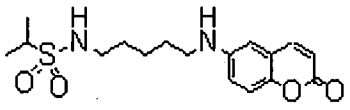
Ia-72 

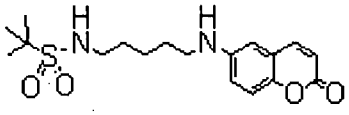
Ia-73 

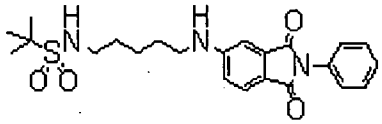
Ia-74 

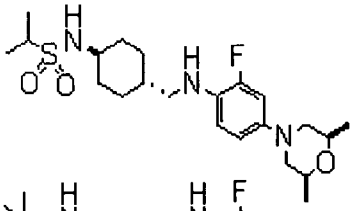
Ia-75 

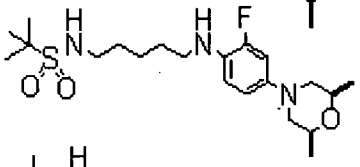
Ia-76 

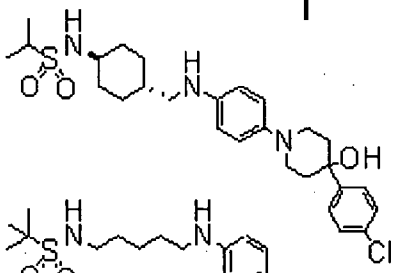
Ia-77 

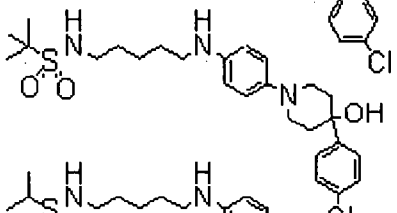
Ia-78 

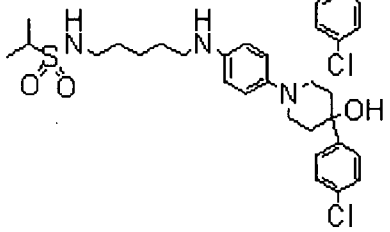
Ia-79 

Ia-80 

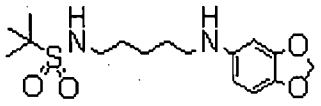
Ia-81 

Ia-82 

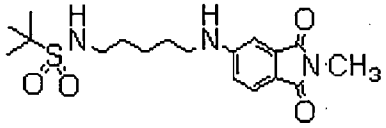
Ia-83 

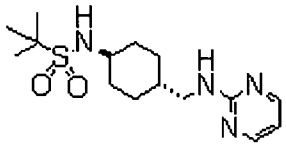
Ia-84 

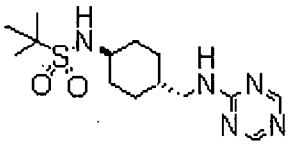
[Formula 109]

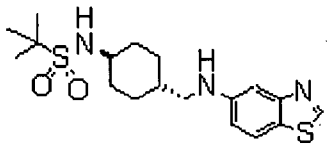
Ia-89 

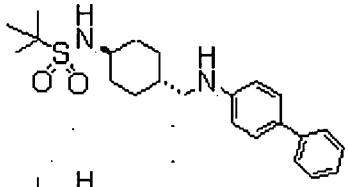
Ia-90 

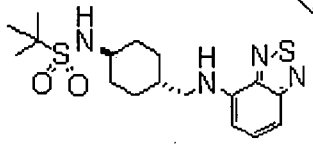
Ia-91 

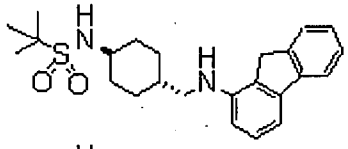
Ia-104 

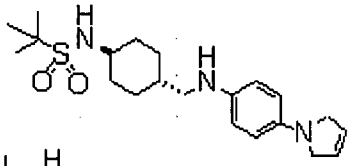
Ia-105 

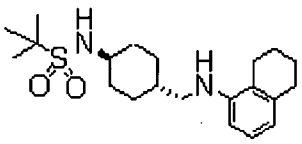
Ia-106 

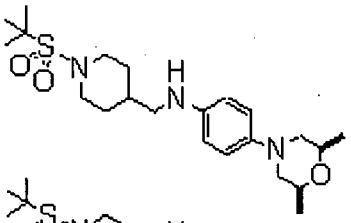
Ia-107 

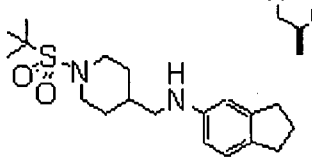
Ia-108 

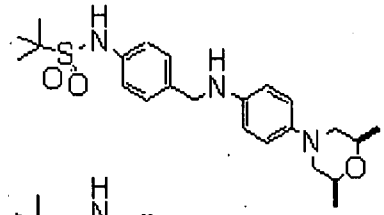
Ia-109 

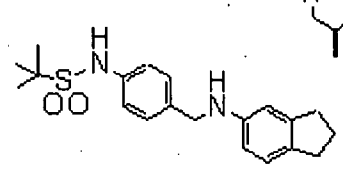
Ia-110 

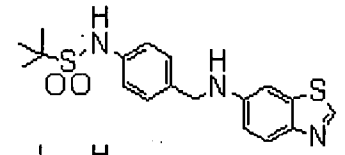
Ia-111 

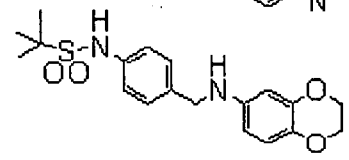
Ia-122 

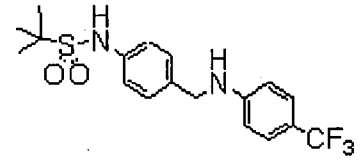
Ia-123 

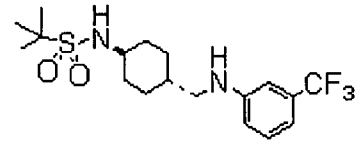
Ia-124 

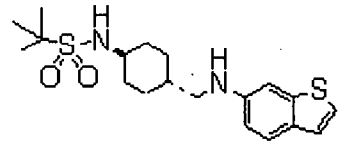
Ia-125 

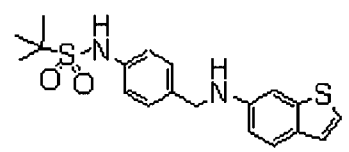
Ia-126 

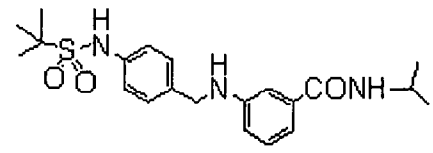
Ia-127 

Ia-128 

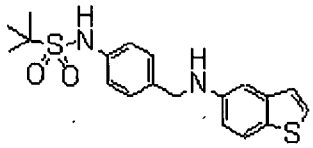
Ia-129 

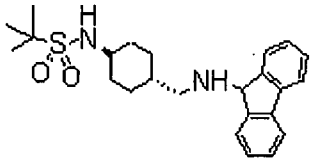
Ia-130 

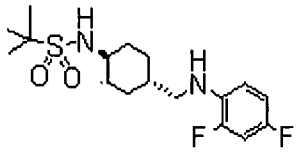
Ia-131 

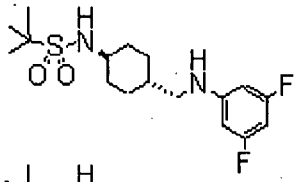
Ia-132 

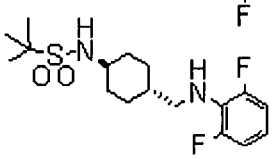
[Formula 110]

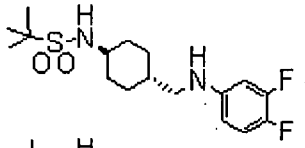
Ia-133 

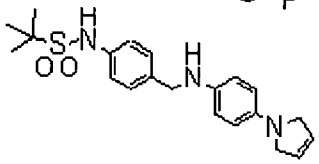
Ia-134 

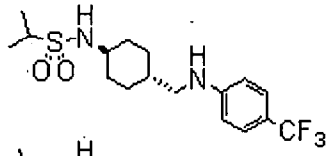
Ia-135 

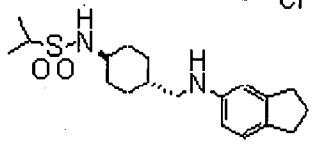
Ia-136 

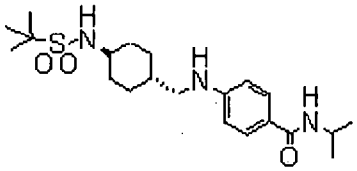
Ia-137 

Ia-138 

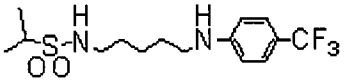
Ia-139 

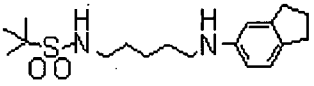
Ia-140 

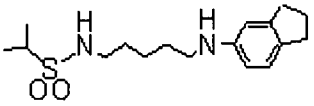
Ia-141 

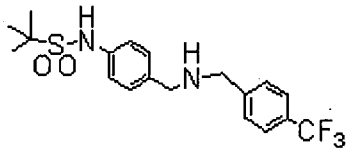
Ia-142 

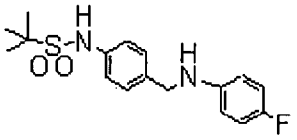
Ia-143 

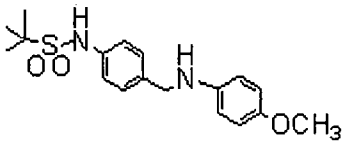
Ia-144 

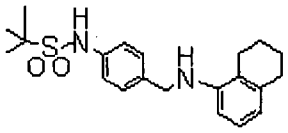
Ia-145 

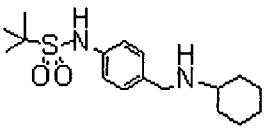
Ia-146 

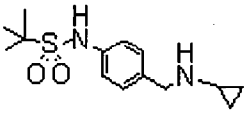
Ia-147 

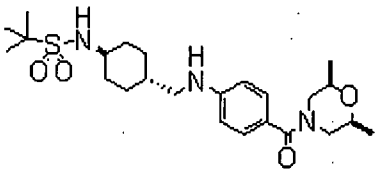
Ia-148 

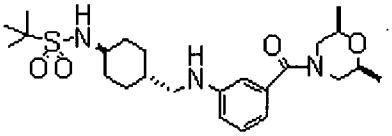
Ia-149 

Ia-150 

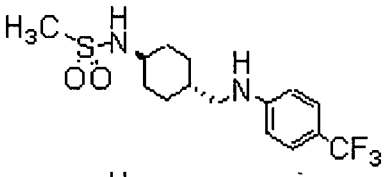
Ia-151 

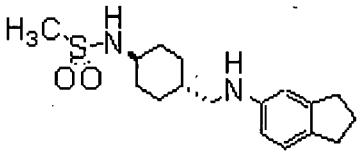
Ia-152 

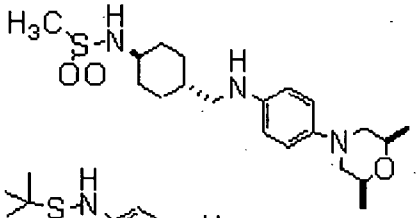
Ia-153 

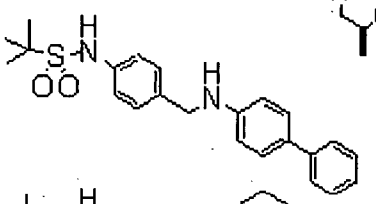
Ia-154 

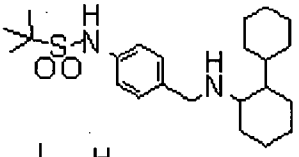
[Formula 111]

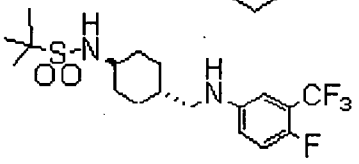
Ia-155 

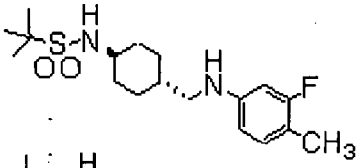
Ia-156 

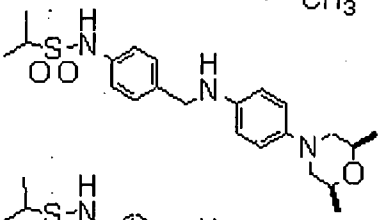
Ia-157 

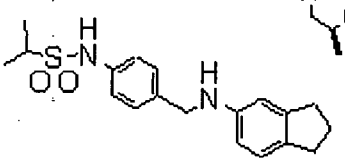
Ia-158 

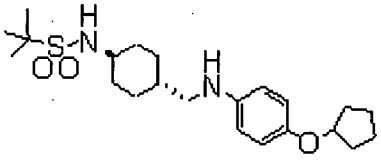
Ia-159 

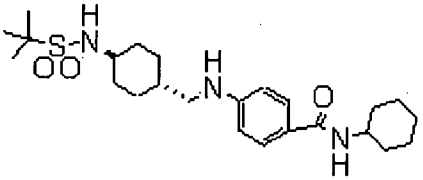
Ia-160 

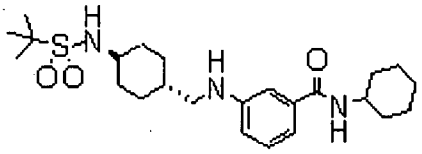
Ia-161 

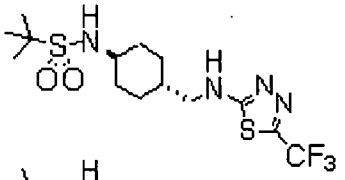
Ia-162 

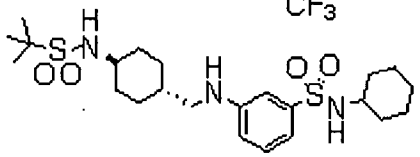
Ia-163 

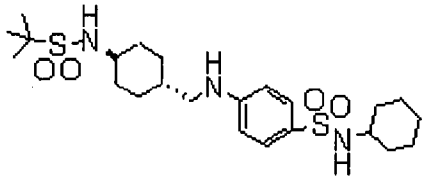
Ia-164 

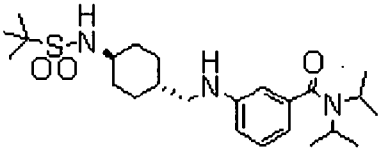
Ia-165 

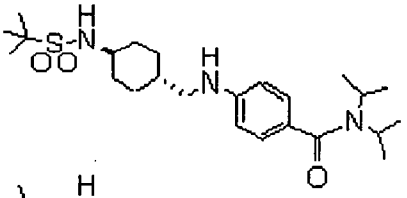
Ia-166 

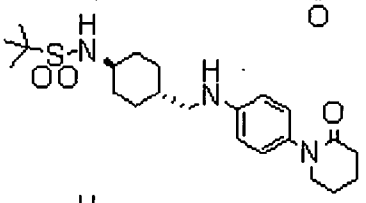
Ia-167 

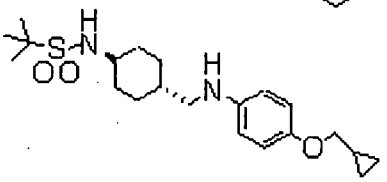
Ia-168 

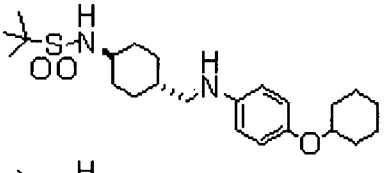
Ia-169 

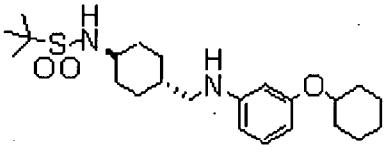
Ia-171 

Ia-172 

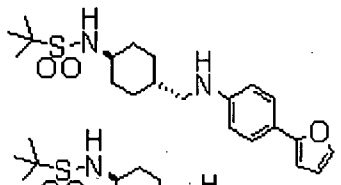
Ia-173 

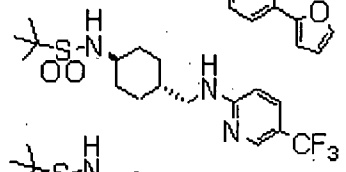
Ia-174 

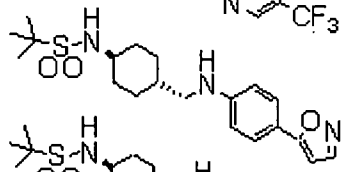
Ia-175 

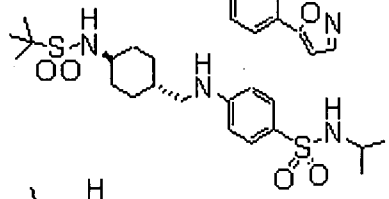
Ia-176 

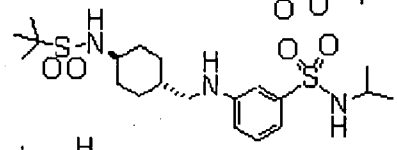
[Formula 112]

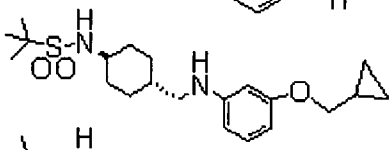
Ia-177 

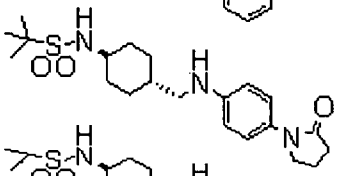
Ia-178 

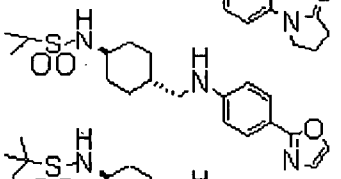
Ia-179 

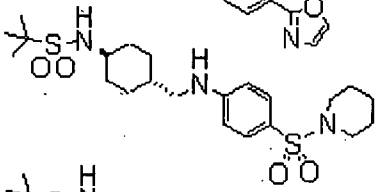
Ia-180 

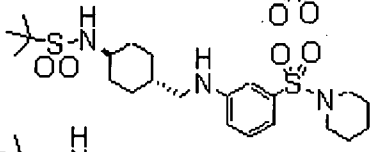
Ia-181 

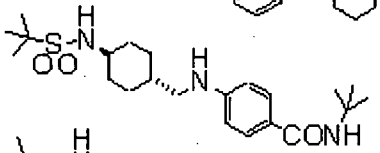
Ia-182 

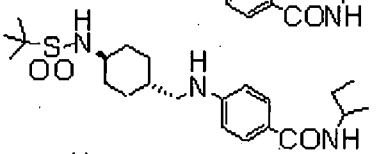
Ia-183 

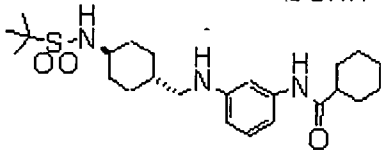
Ia-184 

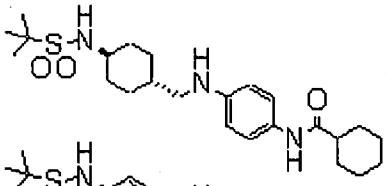
Ia-185 

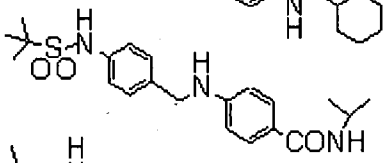
Ia-186 

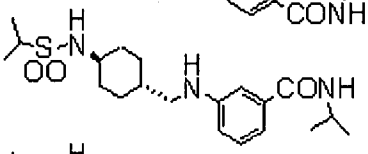
Ia-187 

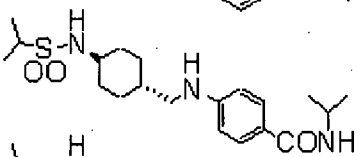
Ia-188 

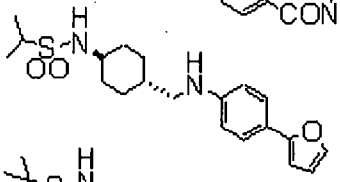
Ia-189 

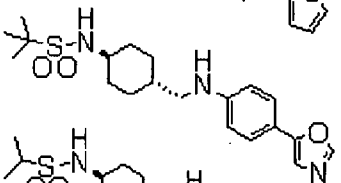
Ia-190 

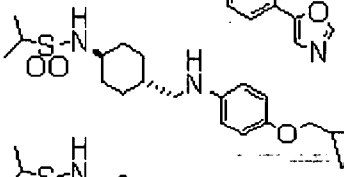
Ia-191 

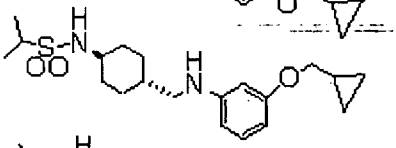
Ia-192 

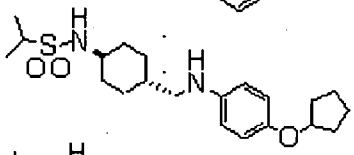
Ia-193 

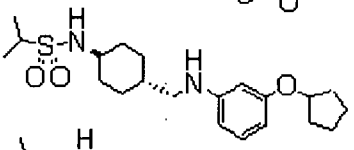
Ia-194 

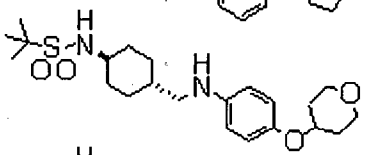
Ia-195 

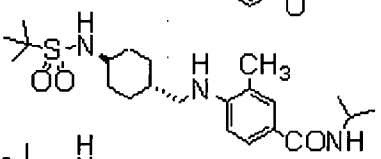
Ia-196 

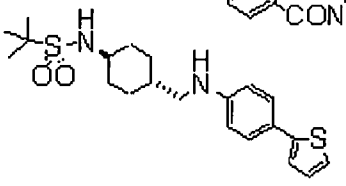
Ia-197 

Ia-198 

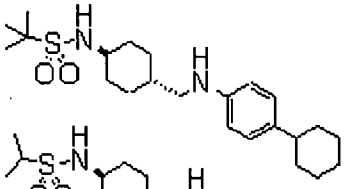
Ia-199 

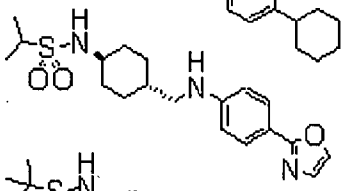
Ia-200 

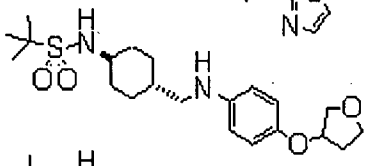
Ia-201 

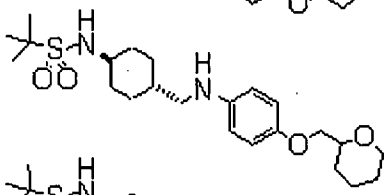
Ia-202 

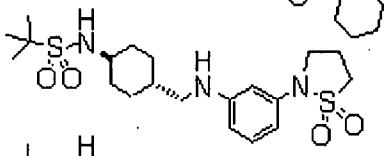
[Formula 113]

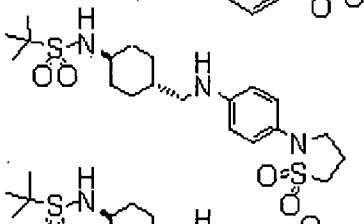
Ia-203 

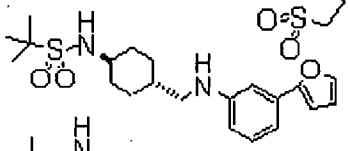
Ia-204 

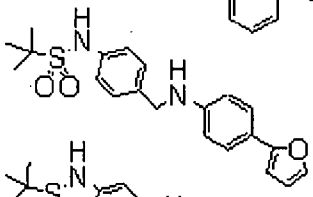
Ia-205 

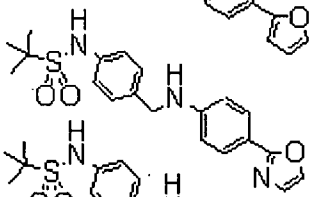
Ia-206 

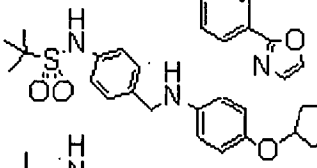
Ia-207 

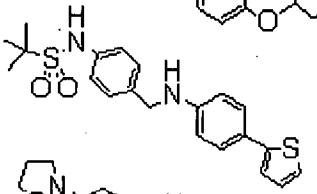
Ia-208 

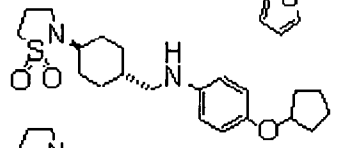
Ia-209 

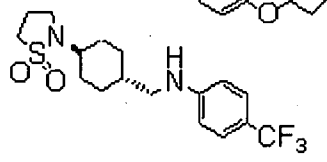
Ia-210 

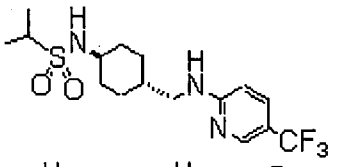
Ia-211 

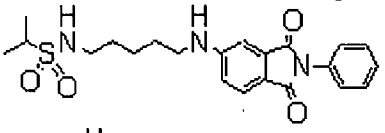
Ia-212 

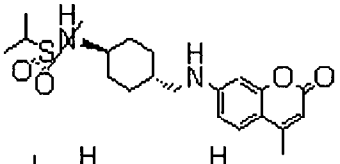
Ia-213 

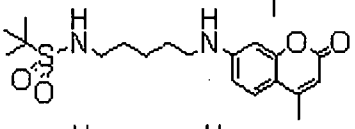
Ia-214 

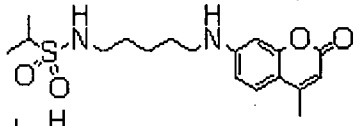
Ia-215 

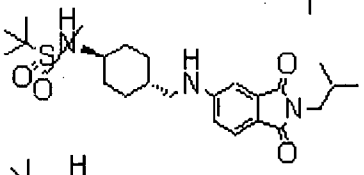
Ia-216 

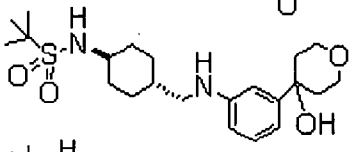
Ia-219 

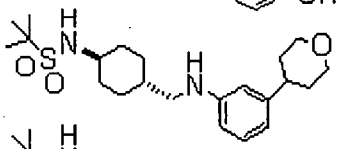
Ia-220 

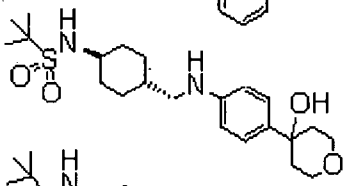
Ia-221 

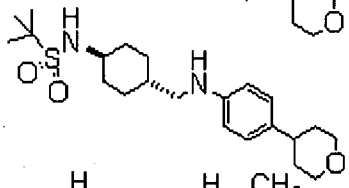
Ia-222 

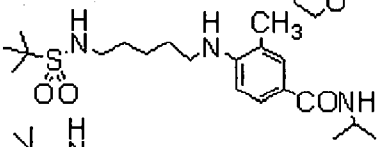
Ia-223 

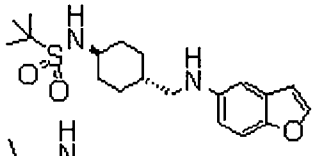
Ia-224 

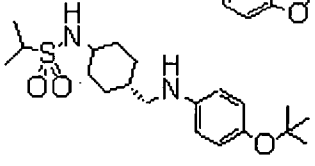
Ia-225 

Ia-226 

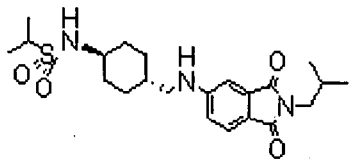
Ia-227 

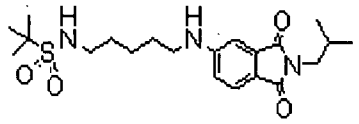
Ia-228 

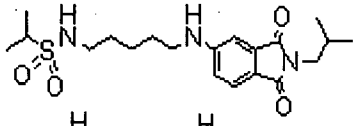
Ia-229 

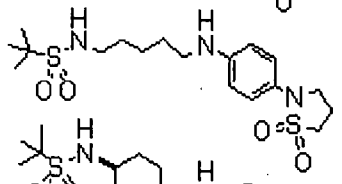
Ia-230 

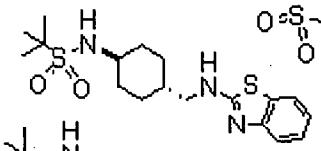
[Formula 114]

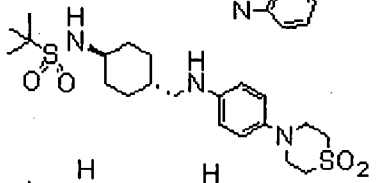
Ia-231 

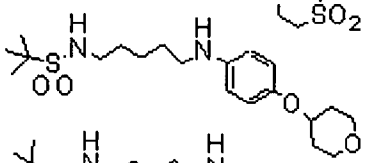
Ia-232 

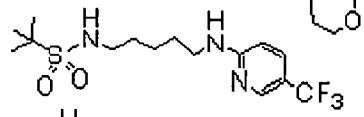
Ia-233 

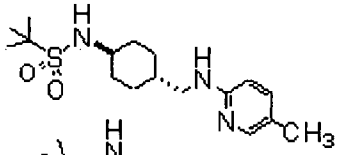
Ia-234 

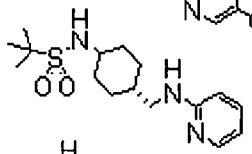
Ia-235 

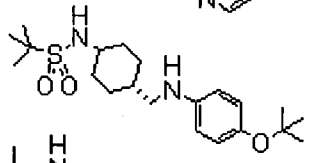
Ia-236 

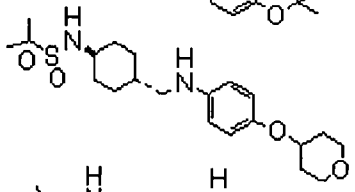
Ia-237 

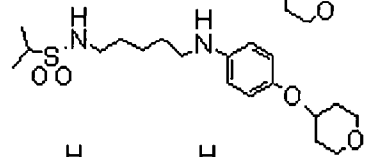
Ia-238 

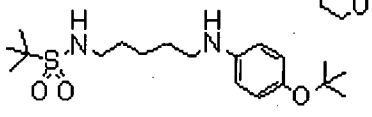
Ia-239 

Ia-240 

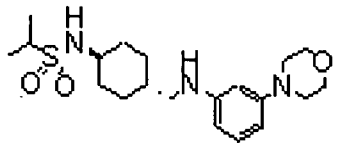
Ia-241 

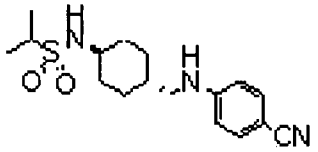
Ia-242 

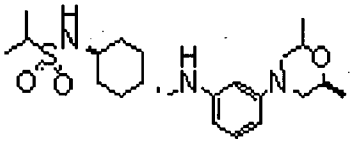
Ia-243 

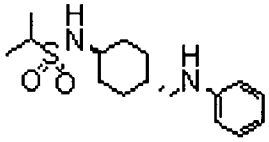
Ia-244 

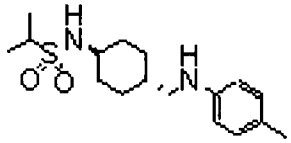
[Formula 115]

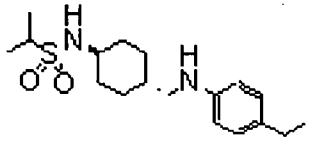
Ib-1 

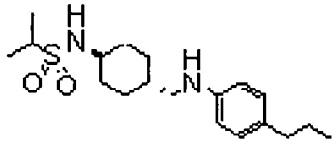
Ib-2 

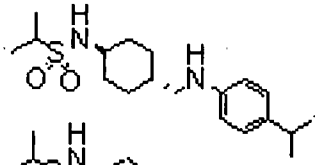
Ib-5 

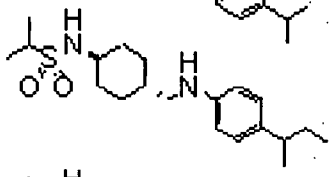
Ib-7 

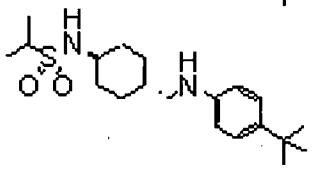
Ib-8 

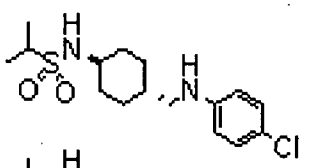
Ib-9 

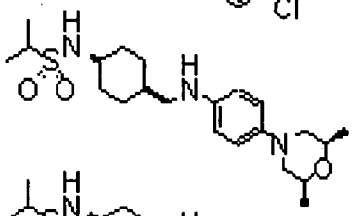
Ib-10 

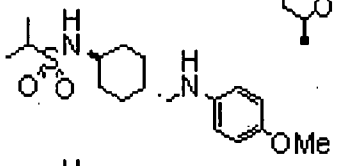
Ib-11 

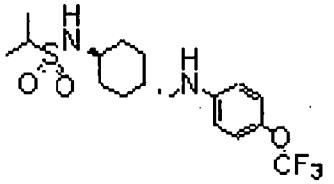
Ib-12 

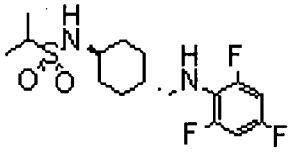
Ib-13 

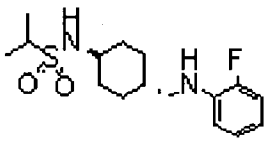
Ib-14 

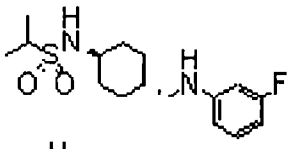
Ib-15 

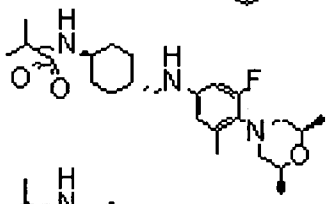
Ib-16 

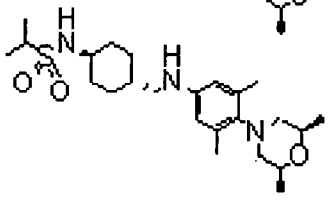
Ib-17 

Ib-18 

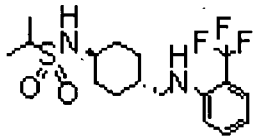
Ib-19 

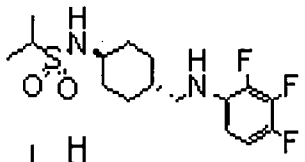
Ib-20 

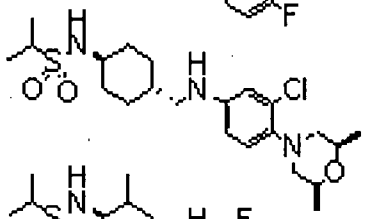
Ib-21 

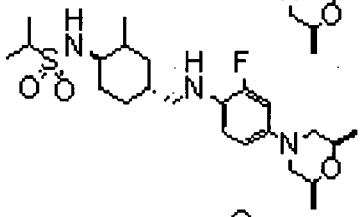
Ib-22 

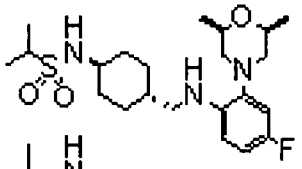
[Formula 116]

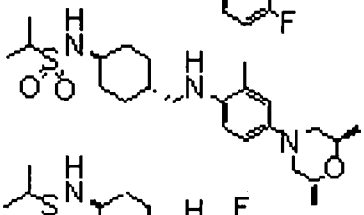
Ib-23 

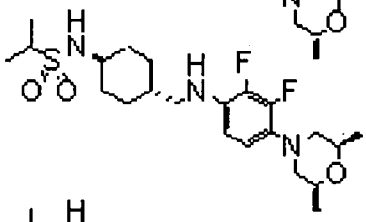
Ib-24 

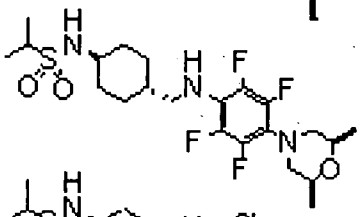
Ib-25 

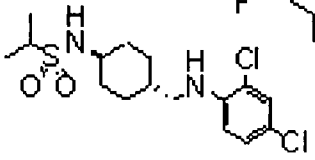
Ib-26 

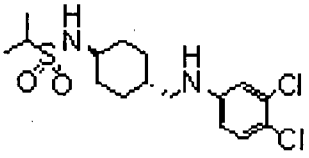
Ib-27 

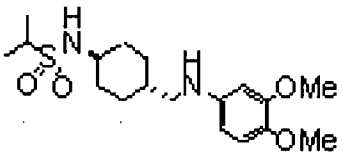
Ib-28 

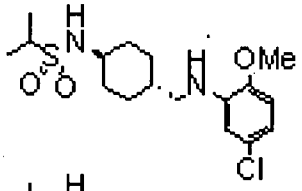
Ib-29 

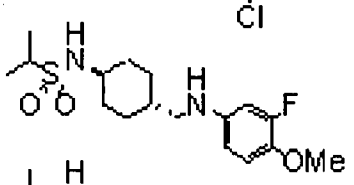
Ib-30 

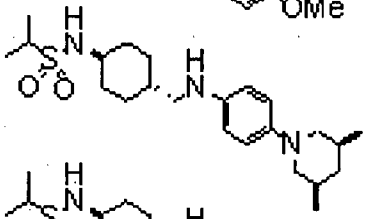
Ib-31 

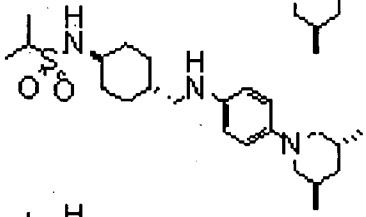
Ib-32 

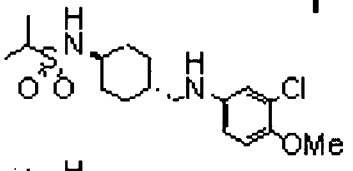
Ib-33 

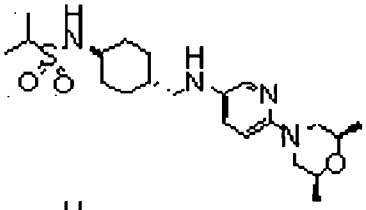
Ib-35 

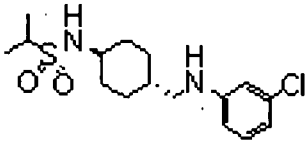
Ib-36 

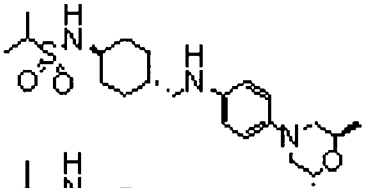
Ib-37 

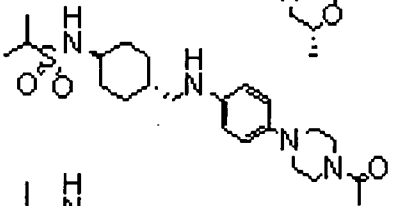
Ib-38 

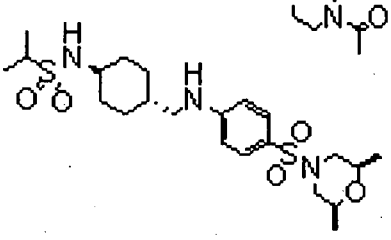
Ib-39 

Ib-40 

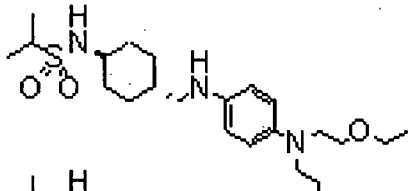
Ib-41 

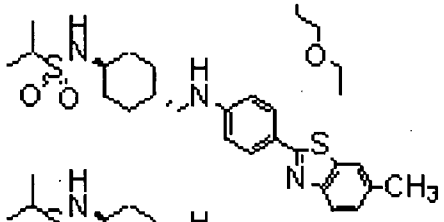
Ib-42 

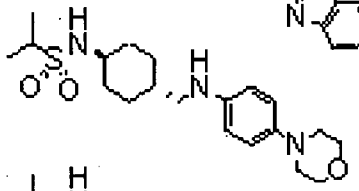
Ib-43 

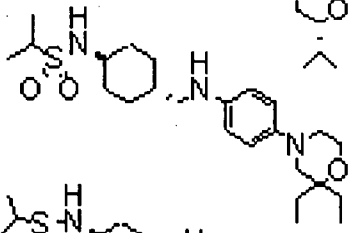
Ib-44 

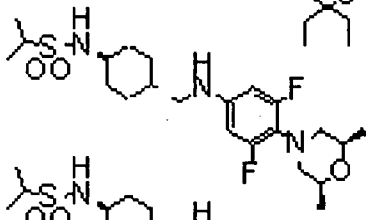
[Formula 117]

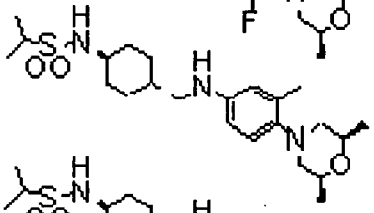
Ib-45 

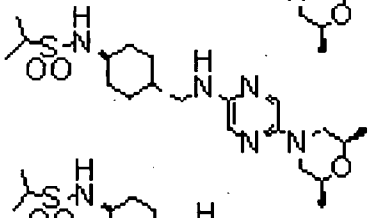
Ib-46 

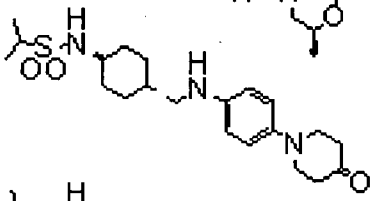
Ib-47 

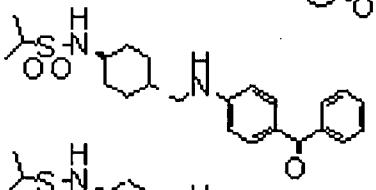
Ib-48 

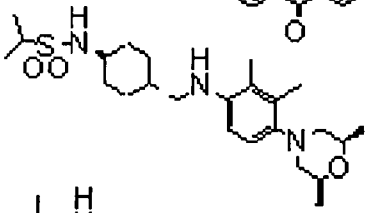
Ib-49 

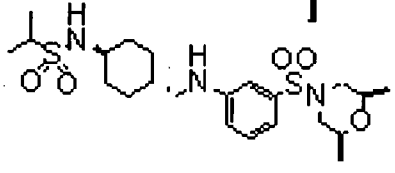
Ib-50 

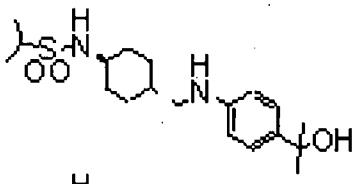
Ib-51 

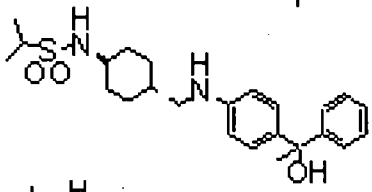
Ib-52 

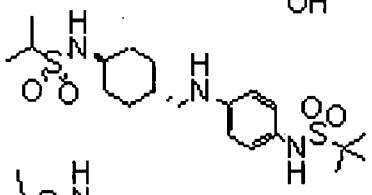
Ib-53 

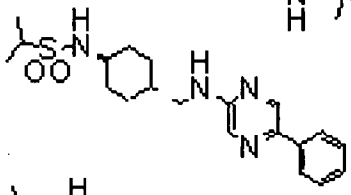
Ib-54 

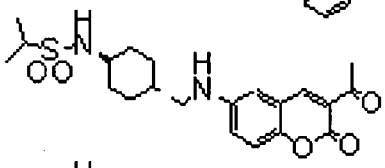
Ib-55 

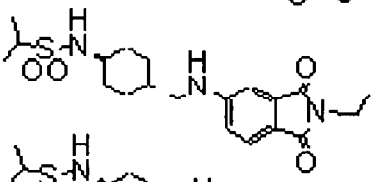
Ib-56 

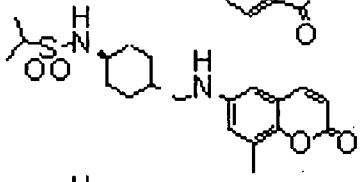
Ib-57 

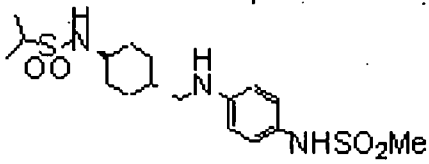
Ib-58 

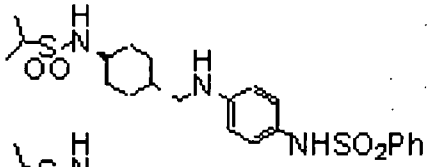
Ib-59 

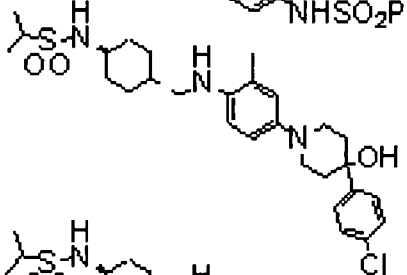
Ib-60 

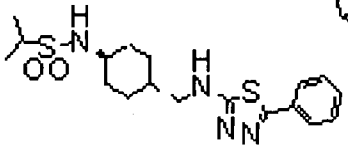
Ib-61 

Ib-62 

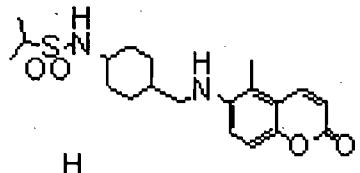
Ib-63 

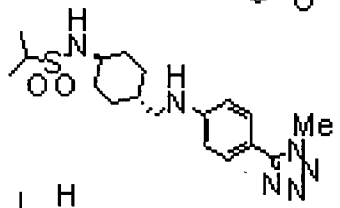
Ib-64 

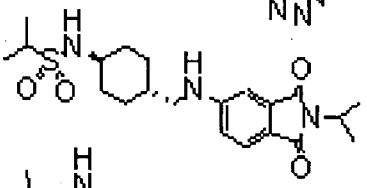
Ib-65 

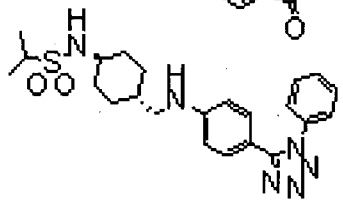
Ib-66 

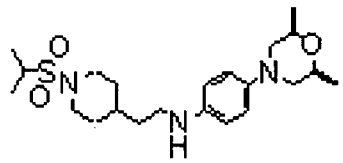
[Formula 118]

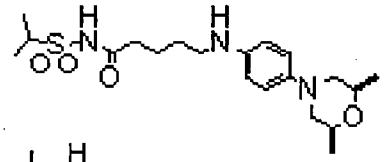
Ib-68 

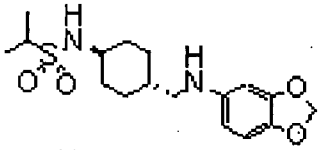
Ib-69 

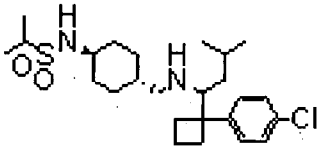
Ib-70 

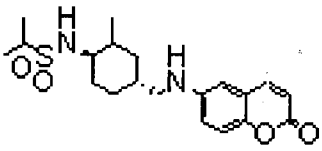
Ib-71 

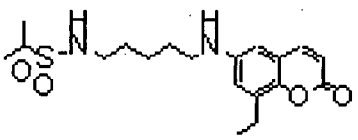
Ib-72 

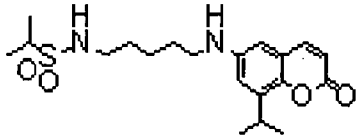
Ib-73 

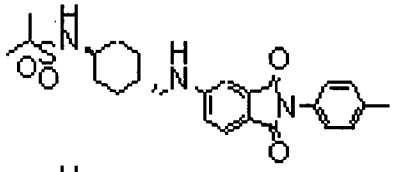
Ib-74 

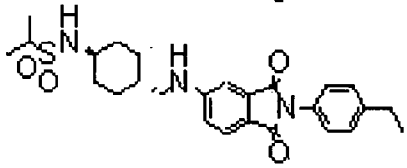
Ib-75 

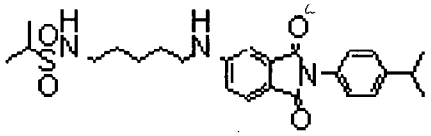
Ib-76 

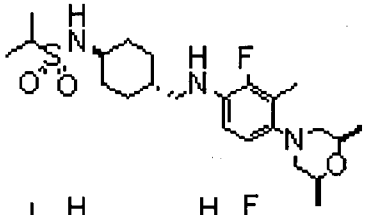
Ib-77 

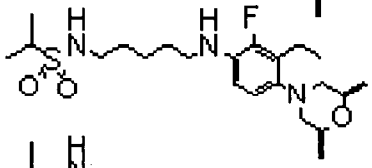
Ib-78 

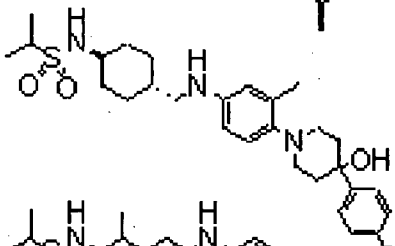
Ib-79 

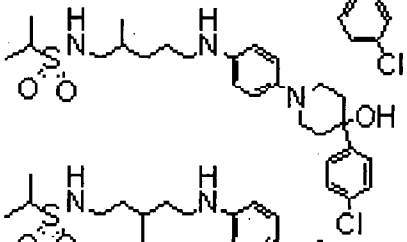
Ib-80 

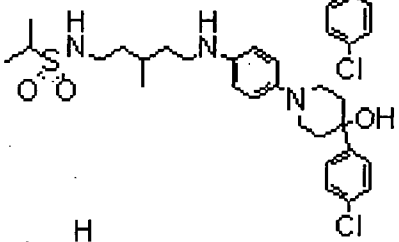
Ib-81 

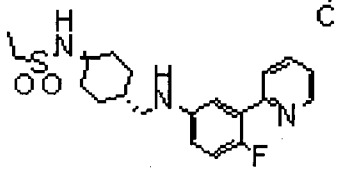
Ib-82 

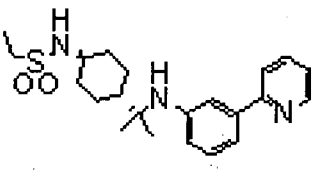
Ib-83 

Ib-84 

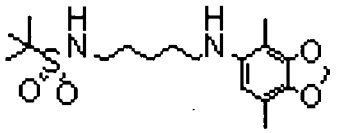
Ib-85 

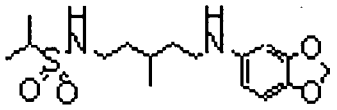
Ib-86 

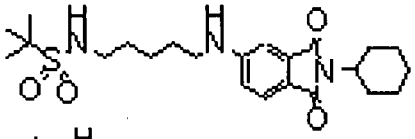
Ib-87 

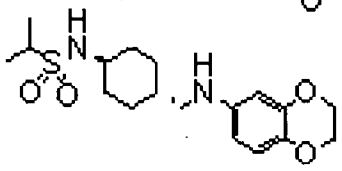
Ib-88 

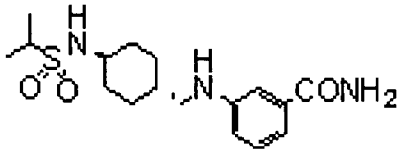
[Formula 119]

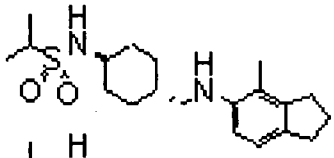
Ib-89 

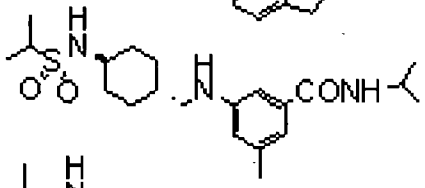
Ib-90 

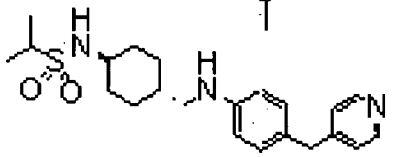
Ib-91 

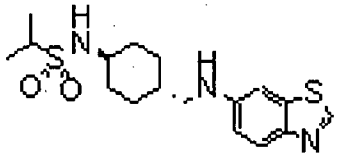
Ib-92 

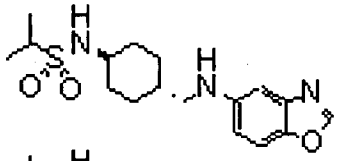
Ib-93 

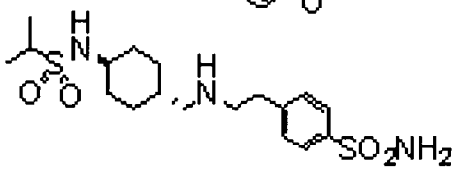
Ib-94 

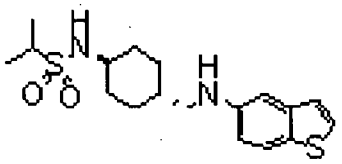
Ib-95 

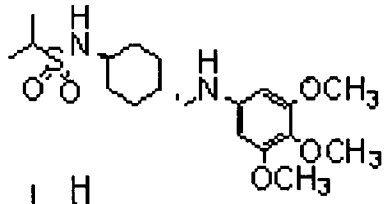
Ib-96 

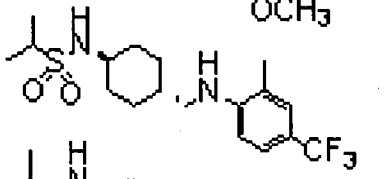
Ib-97 

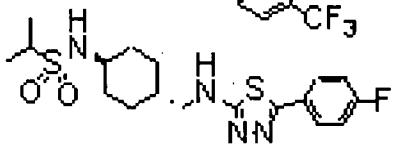
Ib-98 

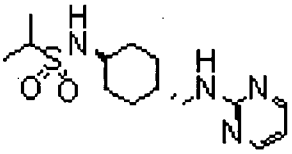
Ib-99 

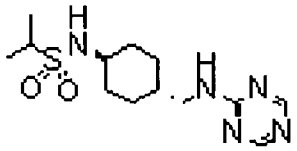
Ib-100 

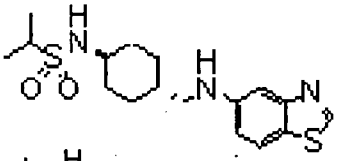
Ib-101 

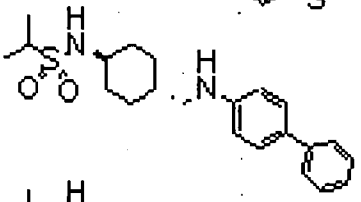
Ib-102 

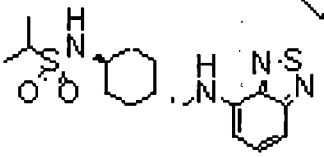
Ib-103 

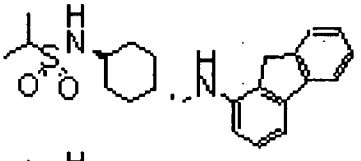
Ib-104 

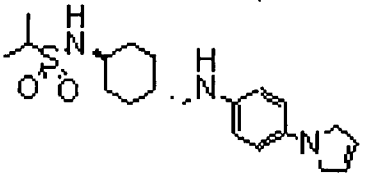
Ib-105 

Ib-106 

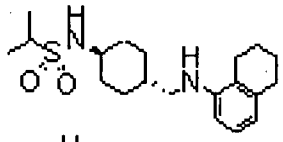
Ib-107 

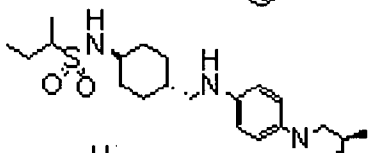
Ib-108 

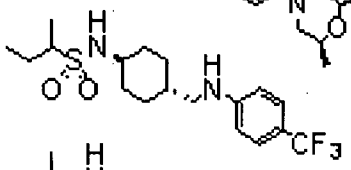
Ib-109 

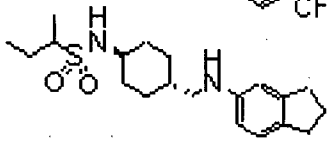
Ib-110 

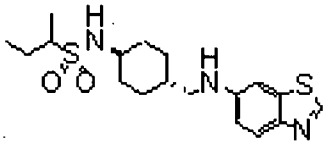
[Formula 120]

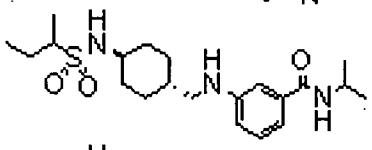
Ib-111 

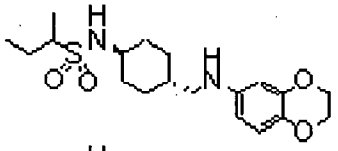
Ib-112 

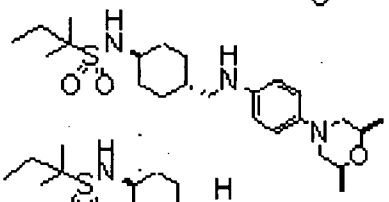
Ib-113 

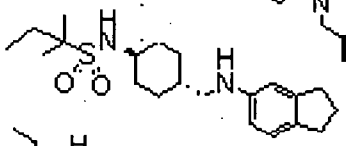
Ib-114 

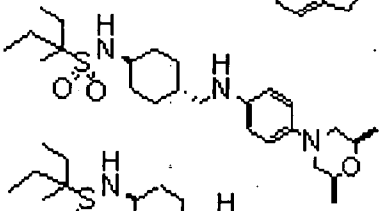
Ib-115 

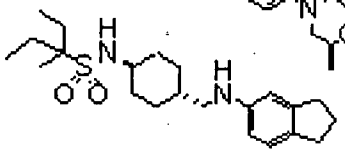
Ib-116 

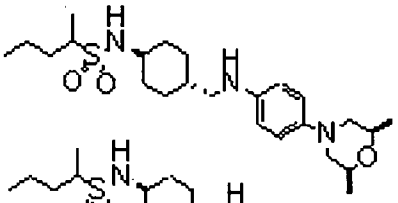
Ib-117 

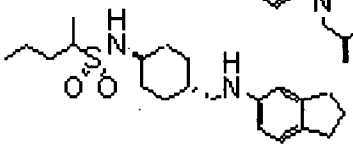
Ib-118 

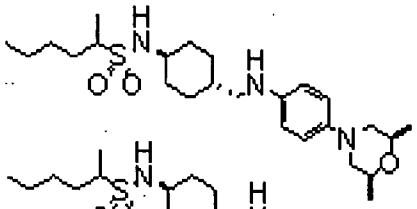
Ib-119 

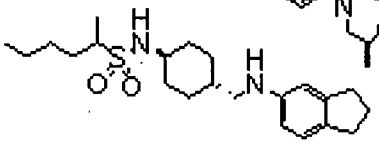
Ib-120 

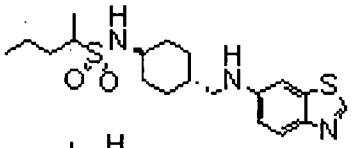
Ib-121 

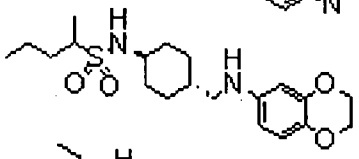
Ib-122 

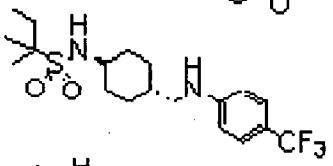
Ib-123 

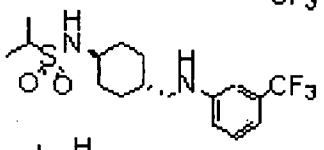
Ib-124 

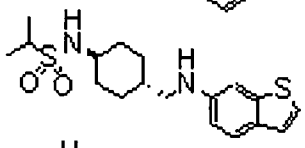
Ib-125 

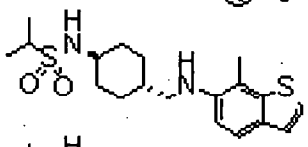
Ib-126 

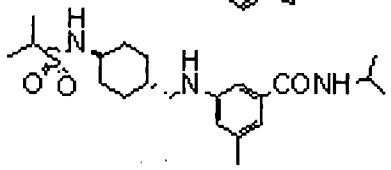
Ib-127 

Ib-128 

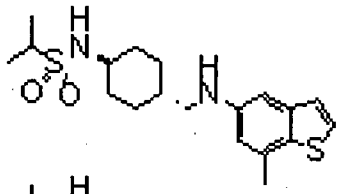
Ib-129 

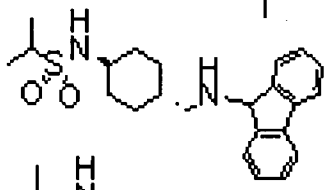
Ib-130 

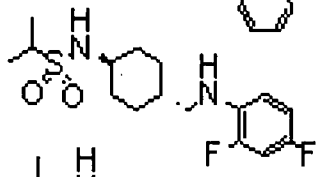
Ib-131 

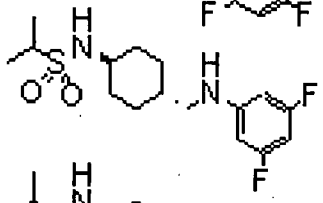
Ib-132 

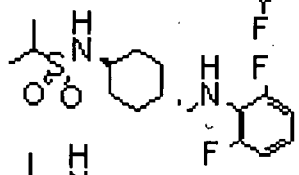
[Formula 121]

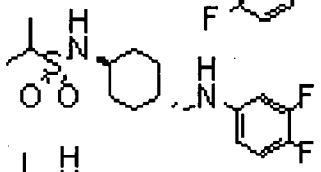
Ib-133 

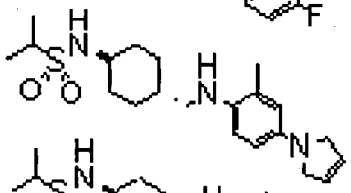
Ib-134 

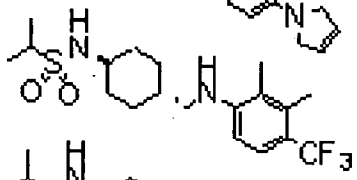
Ib-135 

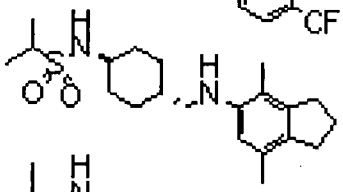
Ib-136 

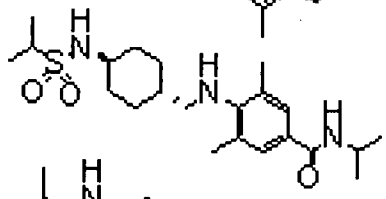
Ib-137 

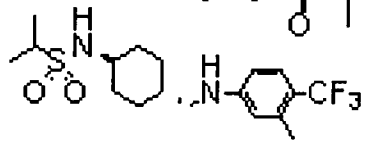
Ib-138 

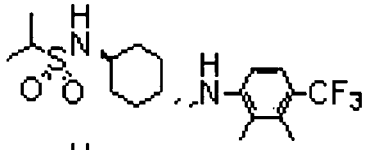
Ib-139 

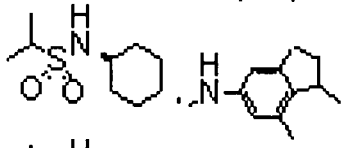
Ib-140 

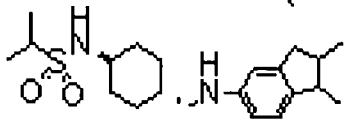
Ib-141 

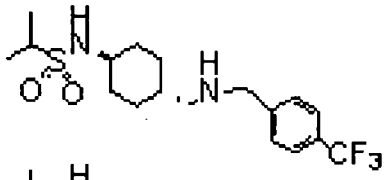
Ib-142 

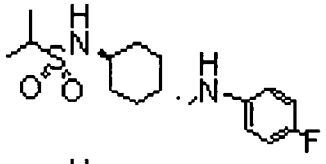
Ib-143 

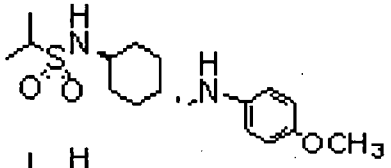
Ib-144 

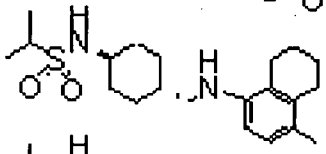
Ib-145 

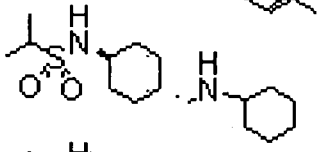
Ib-146 

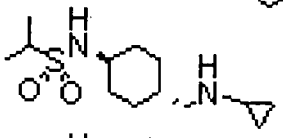
Ib-147 

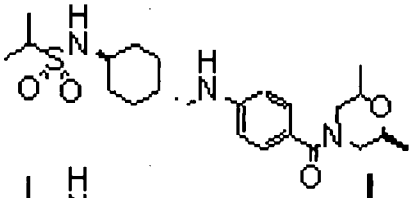
Ib-148 

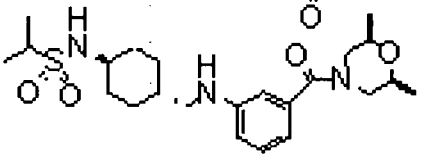
Ib-149 

Ib-150 

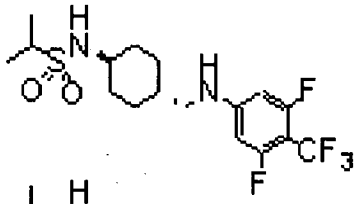
Ib-151 

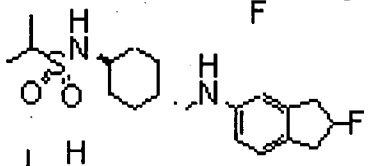
Ib-152 

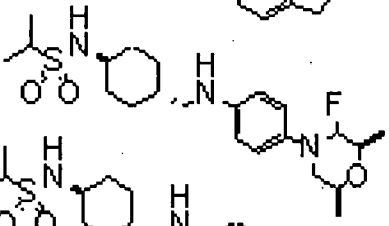
Ib-153 

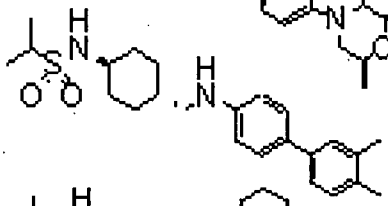
Ib-154 

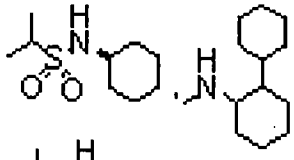
[Formula 122]

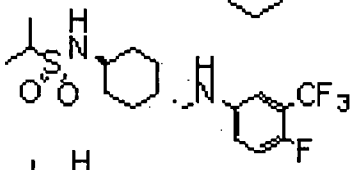
Ib-155 

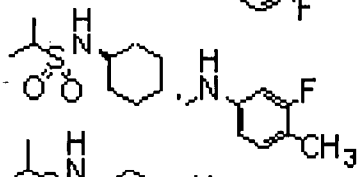
Ib-156 

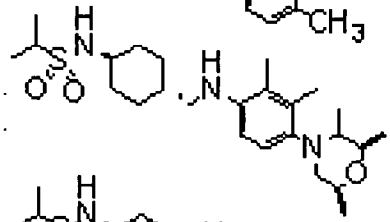
Ib-157 

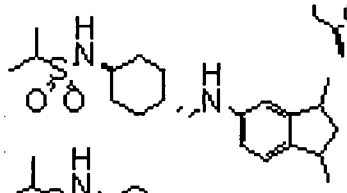
Ib-158 

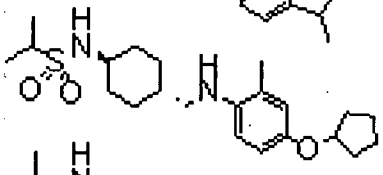
Ib-159 

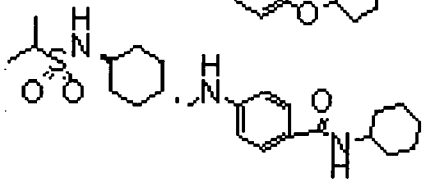
Ib-160 

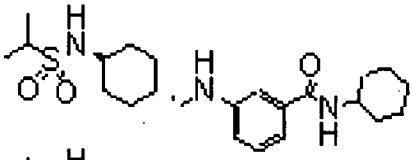
Ib-161 

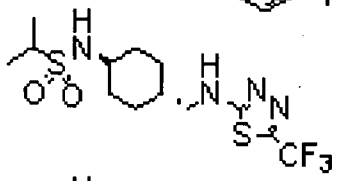
Ib-162 

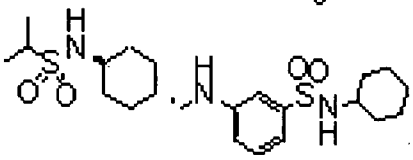
Ib-163 

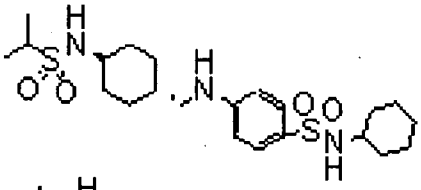
Ib-164 

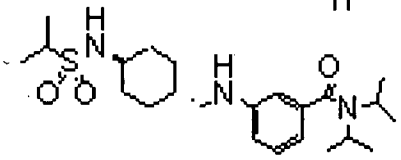
Ib-165 

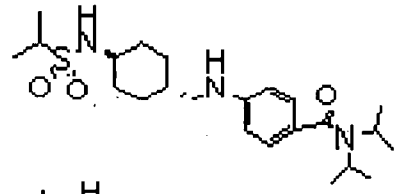
Ib-166 

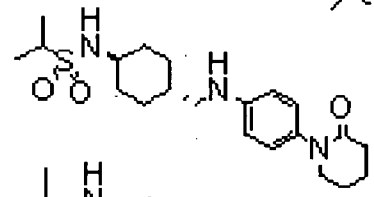
Ib-167 

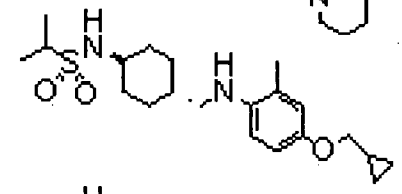
Ib-168 

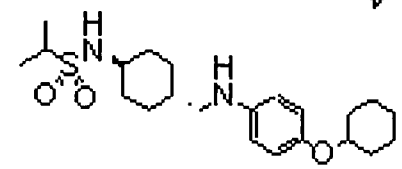
Ib-169 

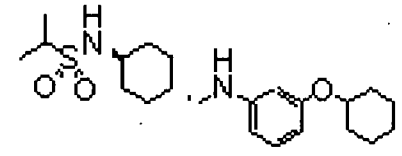
Ib-171 

Ib-172 

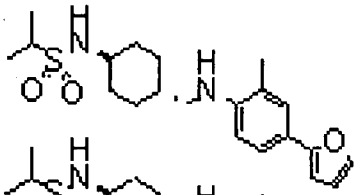
Ib-173 

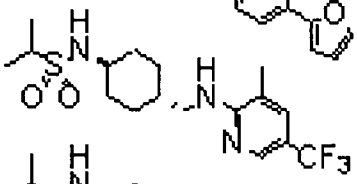
Ib-174 

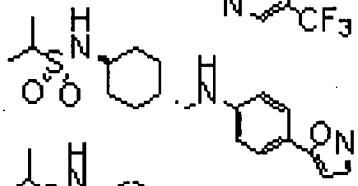
Ib-175 

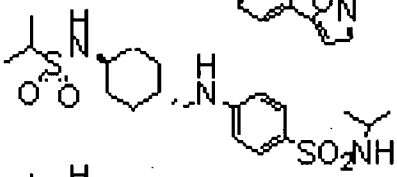
Ib-176 

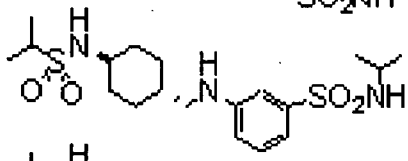
[Formula 123]

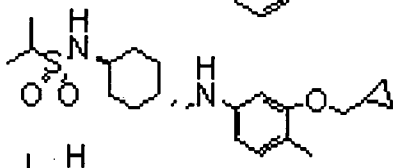
Ib-177 

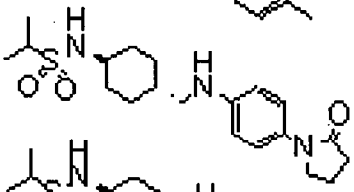
Ib-178 

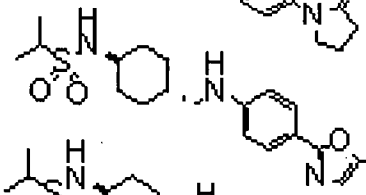
Ib-179 

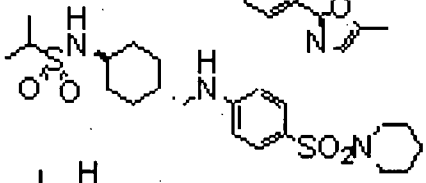
Ib-180 

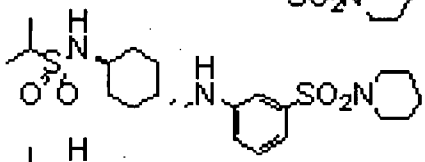
Ib-181 

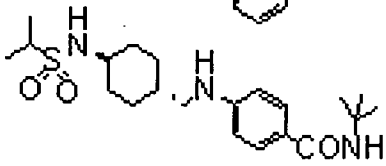
Ib-182 

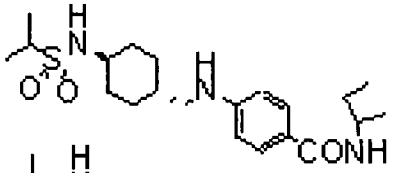
Ib-183 

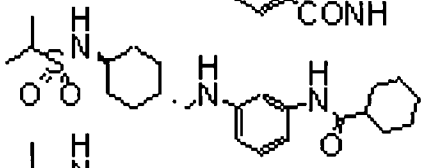
Ib-184 

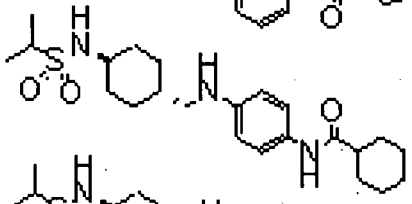
Ib-185 

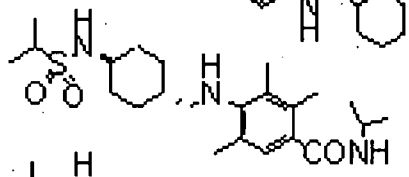
Ib-186 

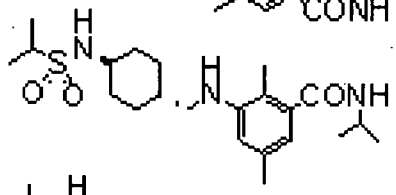
Ib-187 

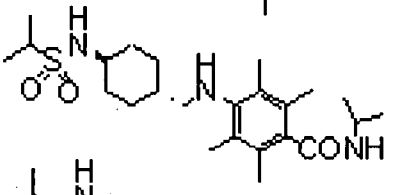
Ib-188 

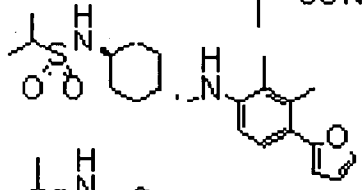
Ib-189 

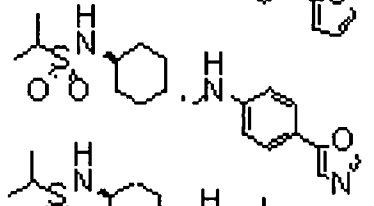
Ib-190 

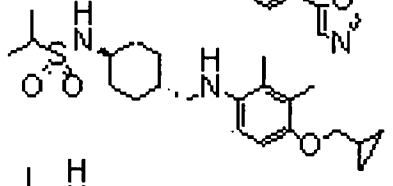
Ib-191 

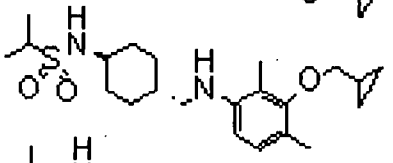
Ib-192 

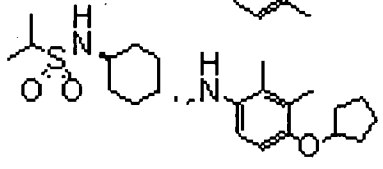
Ib-193 

Ib-194 

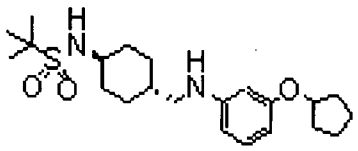
Ib-195 

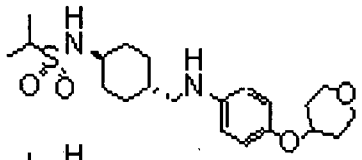
Ib-196 

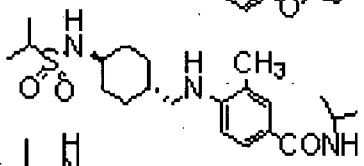
Ib-197 

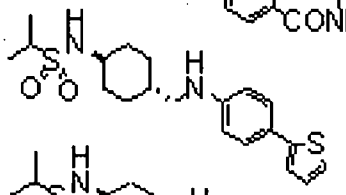
Ib-198 

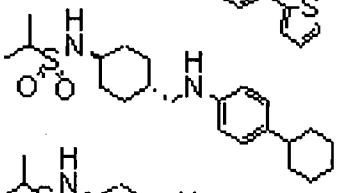
[Formula 124]

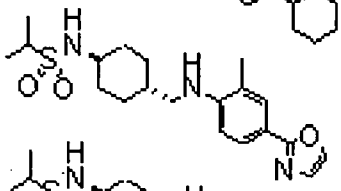
Ib-199 

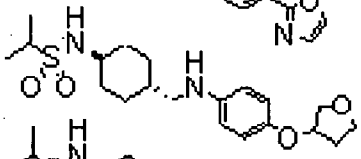
Ib-200 

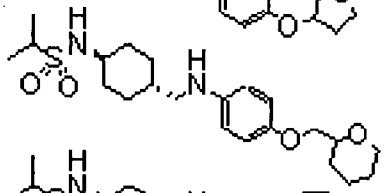
Ib-201 

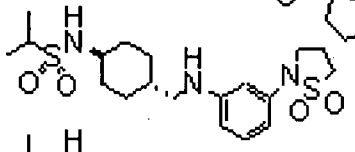
Ib-202 

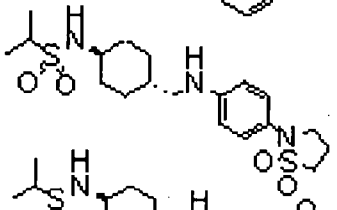
Ib-203 

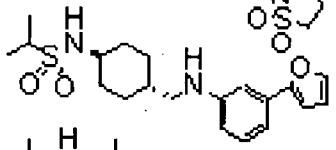
Ib-204 

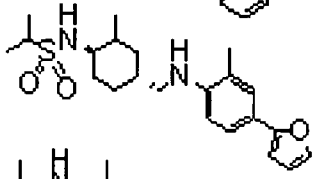
Ib-205 

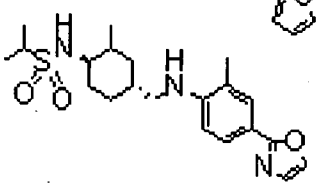
Ib-206 

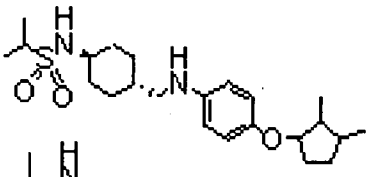
Ib-207 

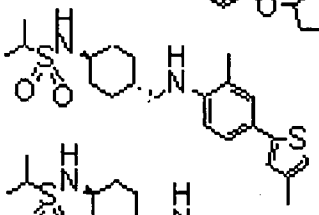
Ib-208 

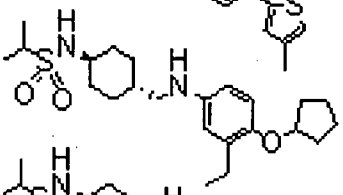
Ib-209 

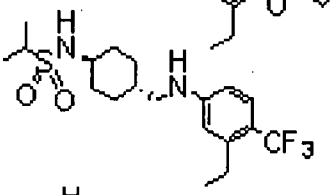
Ib-210 

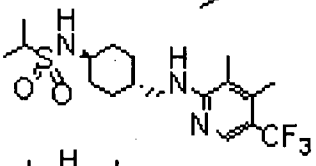
Ib-211 

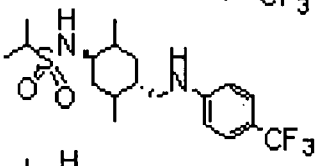
Ib-212 

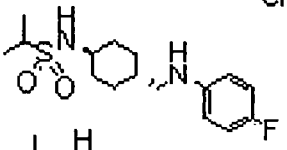
Ib-213 

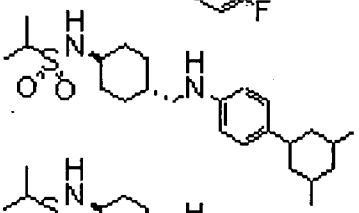
Ib-214 

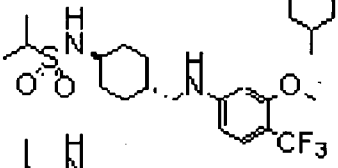
Ib-215 

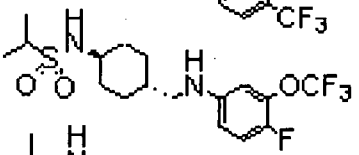
Ib-216 

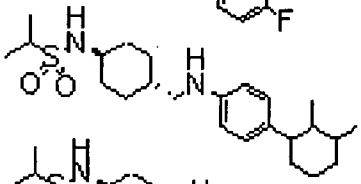
Ib-219 

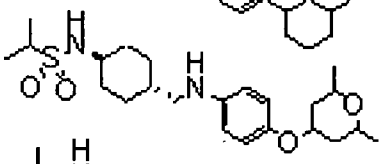
Ib-220 

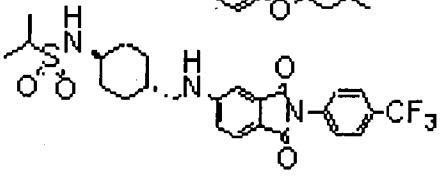
Ib-221 

Ib-222 

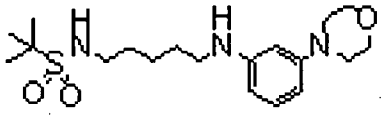
Ib-223 

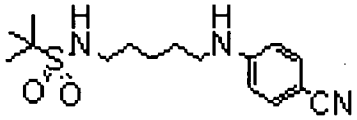
Ib-224 

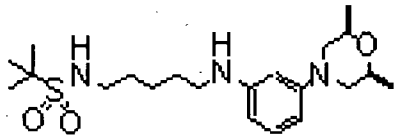
Ib-225 

Ib-226 

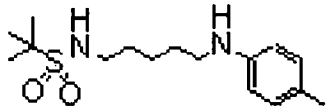
[Formula 125]

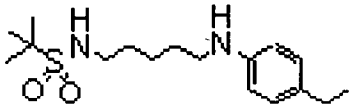
Ic-1 

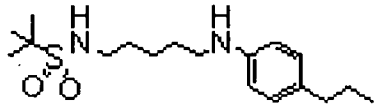
Ic-2 

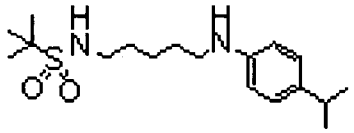
Ic-5 

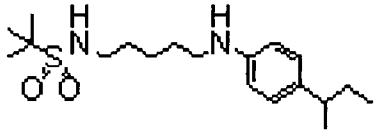
Ic-7 

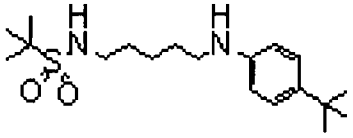
Ic-8 

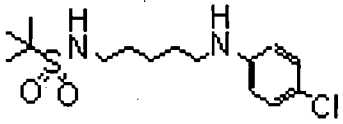
Ic-9 

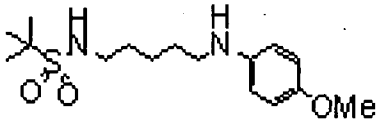
Ic-10 

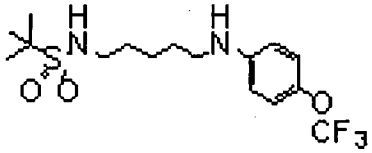
Ic-11 

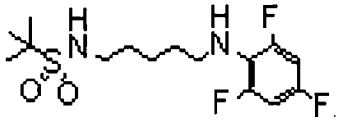
Ic-12 

Ic-13 

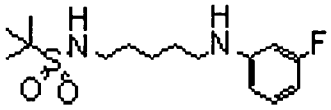
Ic-14 

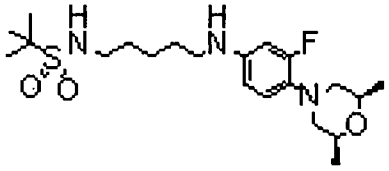
Ic-16 

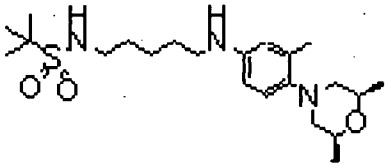
Ic-17 

Ic-18 

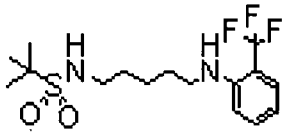
Ic-19 

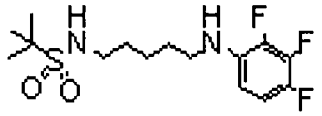
Ic-20 

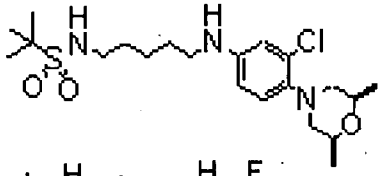
Ic-21 

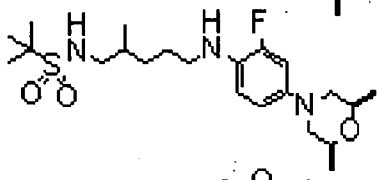
Ic-22 

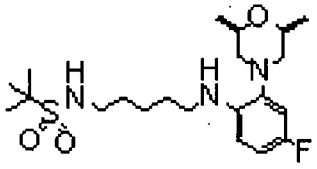
[Formula 126]

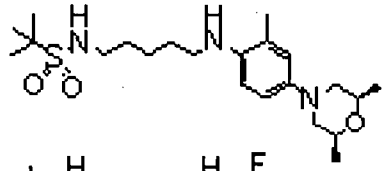
Ic-23 

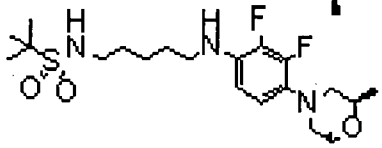
Ic-24 

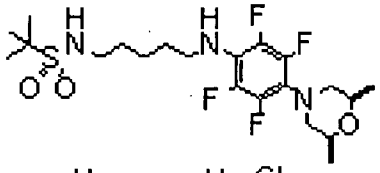
Ic-25 

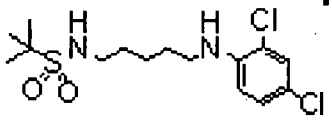
Ic-26 

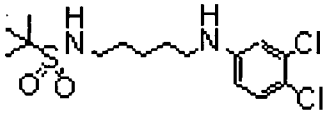
Ic-27 

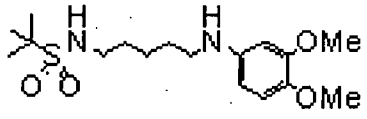
Ic-28 

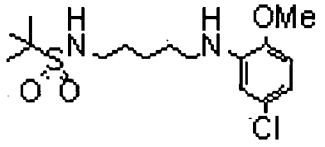
Ic-29 

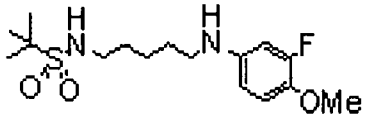
Ic-30 

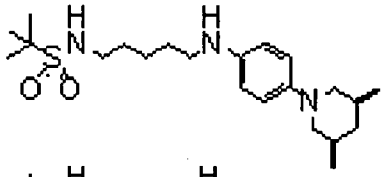
Ic-31 

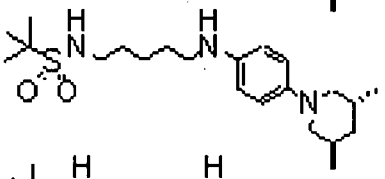
Ic-32 

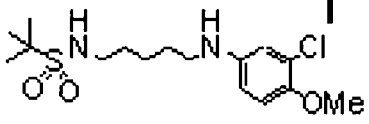
Ic-33 

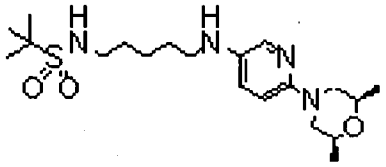
Ic-35 

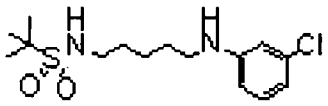
Ic-36 

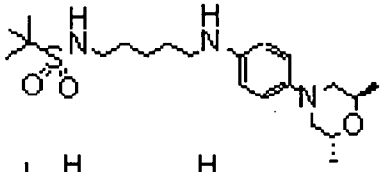
Ic-37 

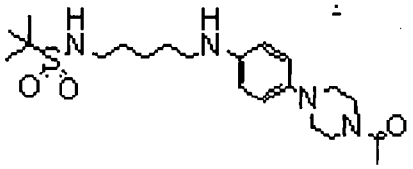
Ic-38 

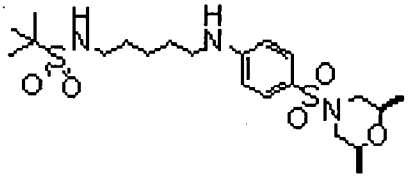
Ic-39 

Ic-40 

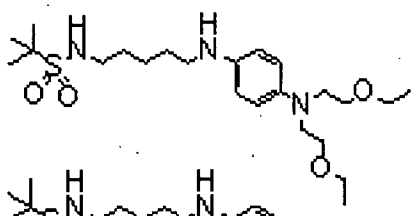
Ic-41 

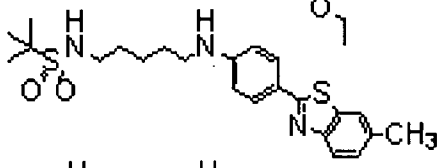
Ic-42 

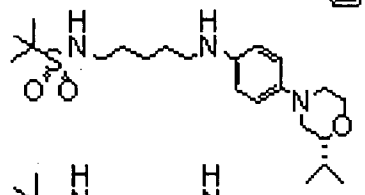
Ic-43 

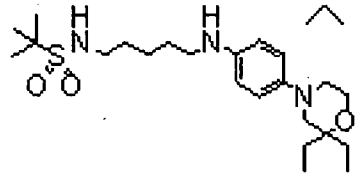
Ic-44 

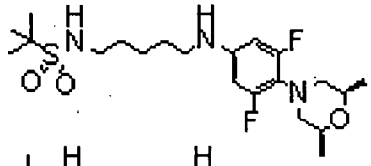
[Formula 127]

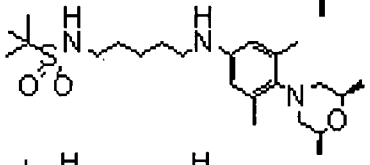
Ic-45 

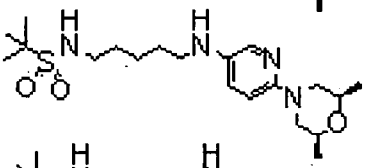
Ic-46 

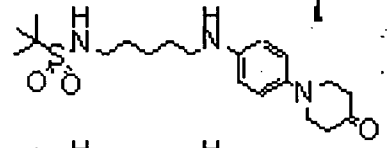
Ic-47 

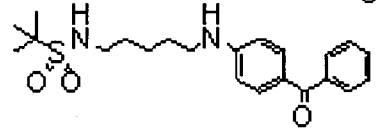
Ic-48 

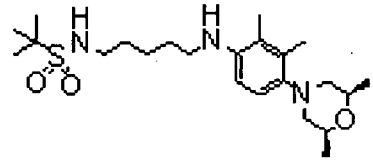
Ic-49 

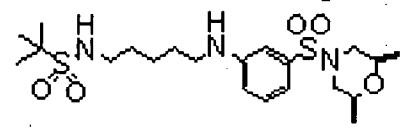
Ic-50 

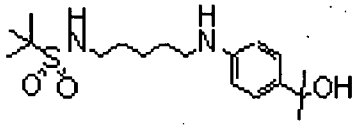
Ic-51 

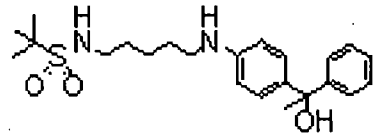
Ic-52 

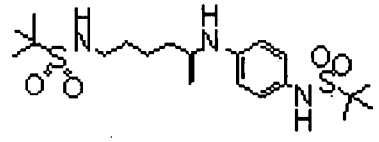
Ic-53 

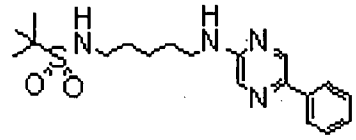
Ic-54 

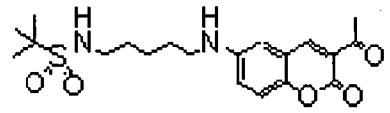
Ic-55 

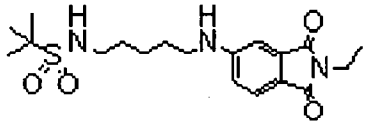
Ic-56 

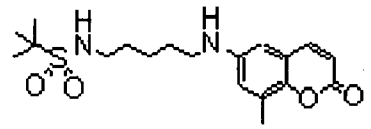
Ic-57 

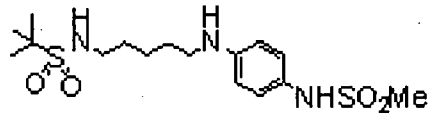
Ic-58 

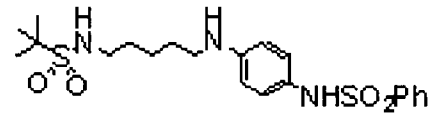
Ic-59 

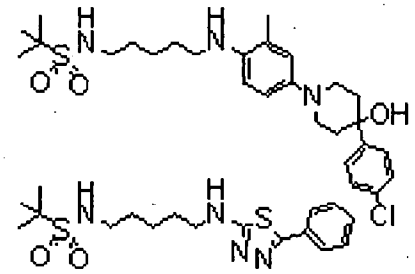
Ic-60 

Ic-61 

Ic-62 

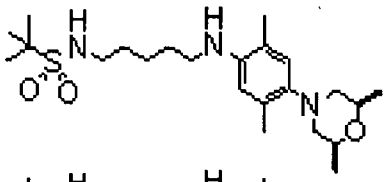
Ic-63 

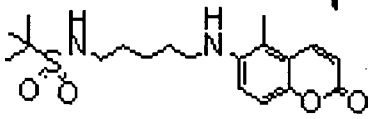
Ic-64 

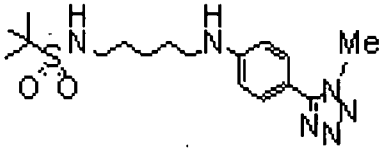
Ic-65 

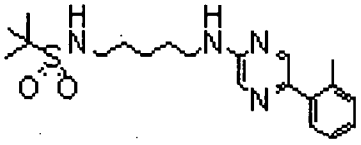
Ic-66 

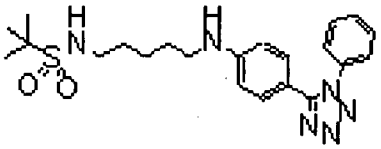
[Formula 128]

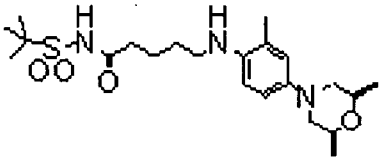
Ic-67 

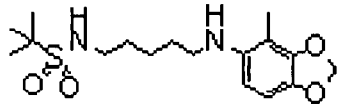
Ic-68 

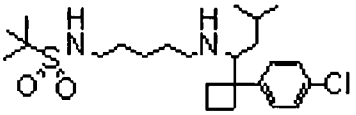
Ic-69 

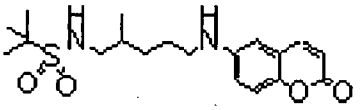

Ic-70 

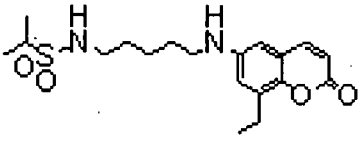
Ic-71 

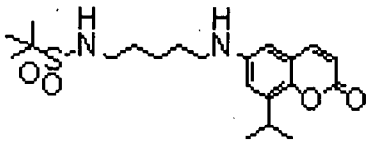
Ic-73 

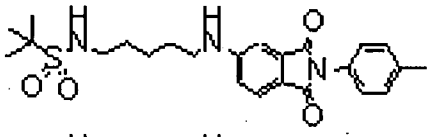
Ic-74 

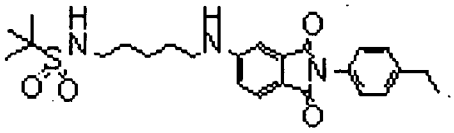
Ic-75 

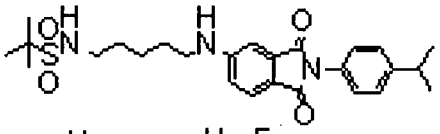

Ic-76 

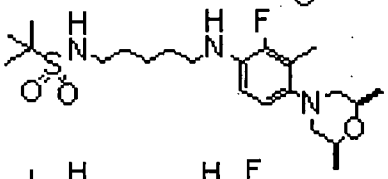
Ic-77 

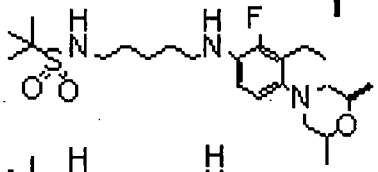
Ic-78 

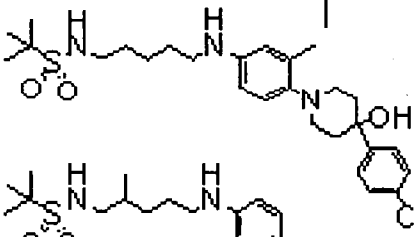
Ic-79 

Ic-80 

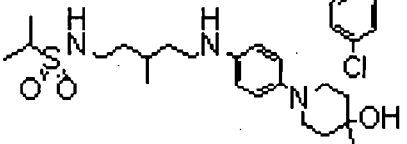
Ic-81 

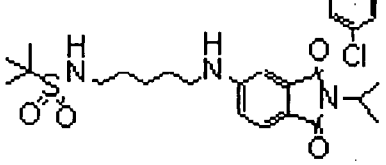
Ic-82 


Ic-83 

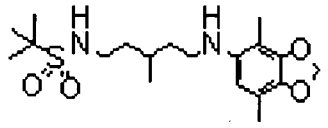

Ic-84 

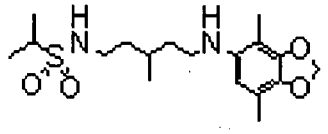

Ic-85 

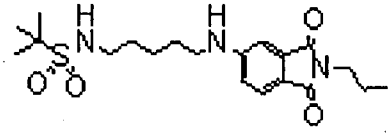

Ic-86 

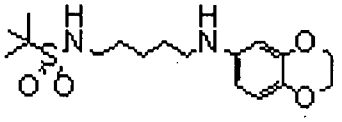

Ic-87 

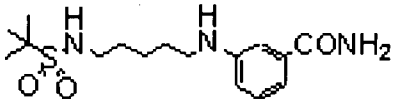

[Formula 129]

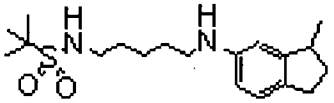
Ic-89 

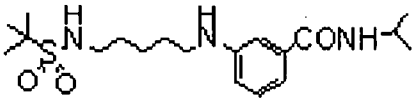
Ic-90 

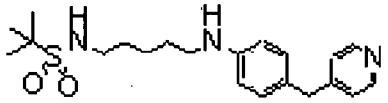
Ic-91 

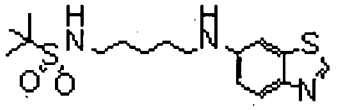
Ic-92 

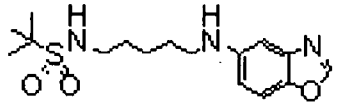
Ic-93 

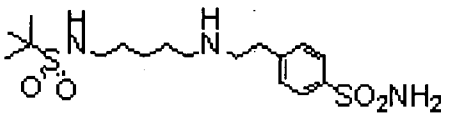
Ic-94 

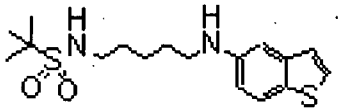
Ic-95 

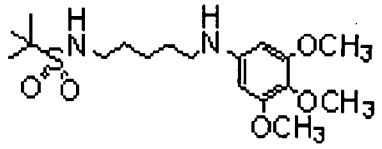
Ic-96 

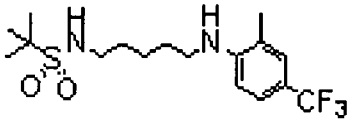
Ic-97 

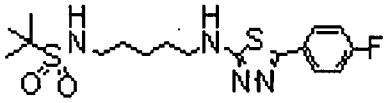
Ic-98 

Ic-99 

Ic-100 

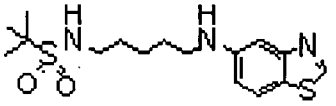
Ic-101 

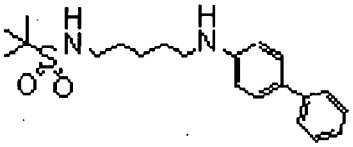
Ic-102 

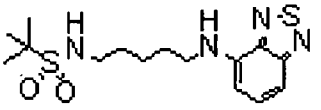
Ic-103 

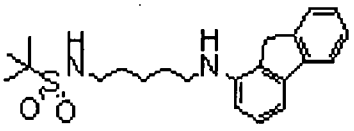
Ic-104 

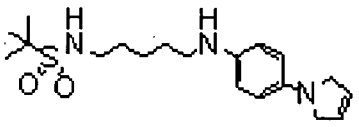
Ic-105 

Ic-106 

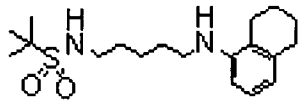
Ic-107 

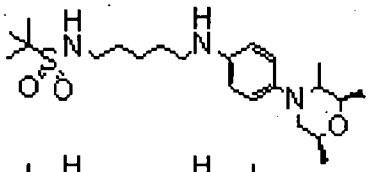
Ic-108 

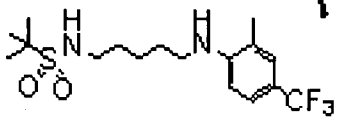
Ic-109 

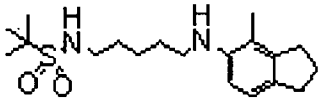
Ic-110 

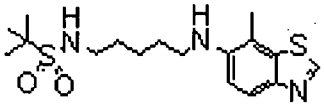
[Formula 130]

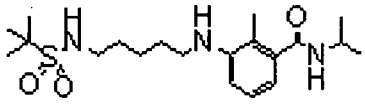
Ic-111 

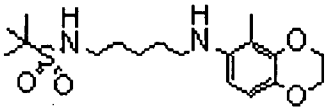
Ic-112 

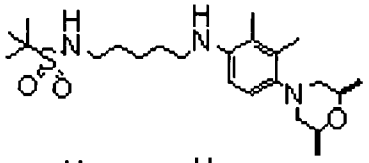
Ic-113 

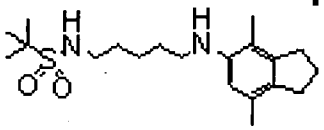
Ic-114 

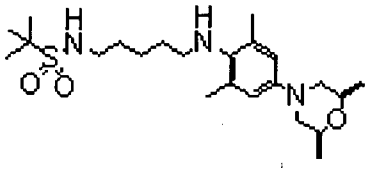
Ic-115 

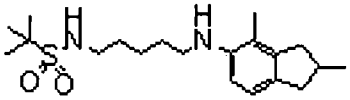
Ic-116 

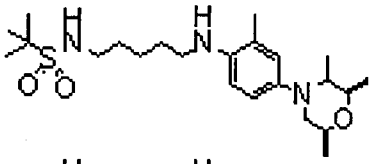
Ic-117 

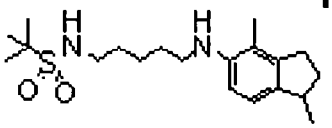
Ic-118 

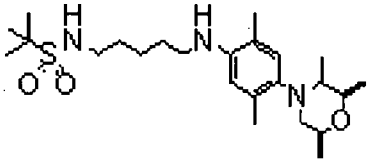
Ic-119 

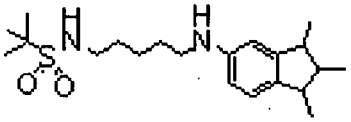
Ic-120 

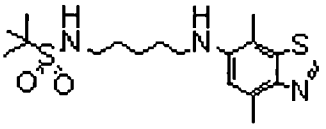
Ic-121 

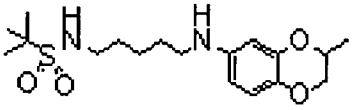
Ic-122 

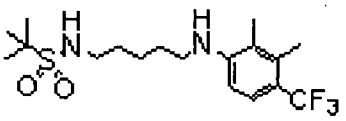
Ic-123 

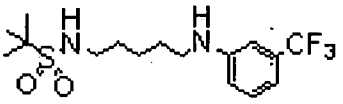
Ic-124 

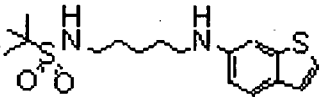
Ic-125 

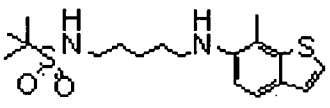
Ic-126 

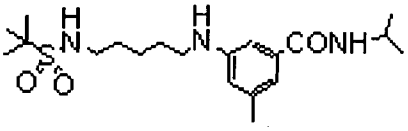
Ic-127 

Ic-128 

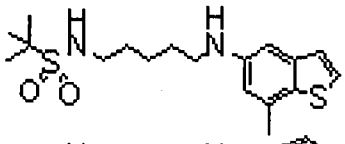
Ic-129 

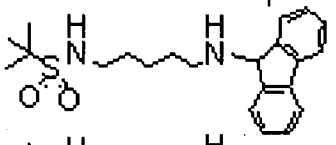
Ic-130 

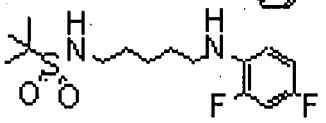
Ic-131 

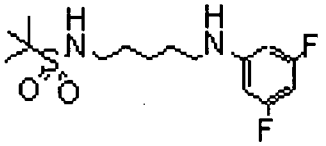
Ic-132 

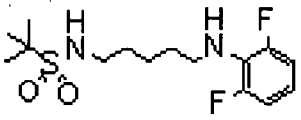
[Formula 131]

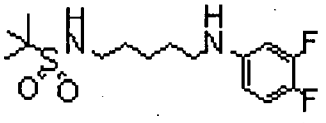
Ic-133 

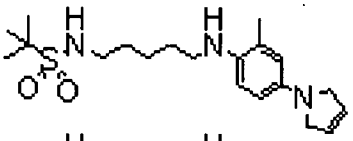
Ic-134 

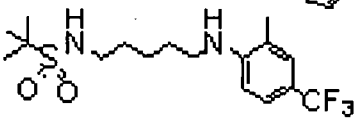
Ic-135 

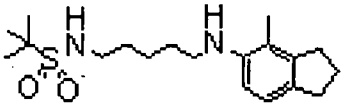
Ic-136 

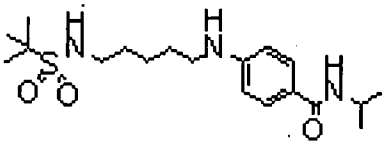
Ic-137 

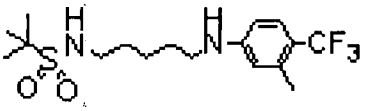
Ic-138 

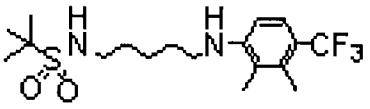
Ic-139 

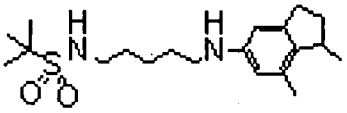
Ic-140 

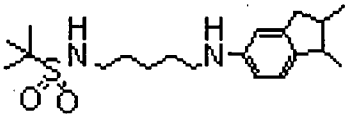
Ic-141 

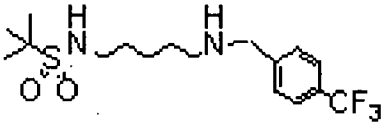
Ic-142 

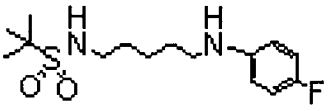
Ic-143 

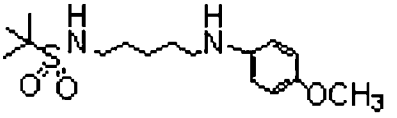
Ic-144 

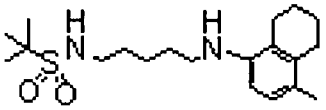
Ic-145 

Ic-146 

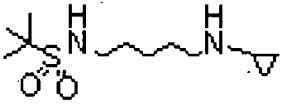
Ic-147 

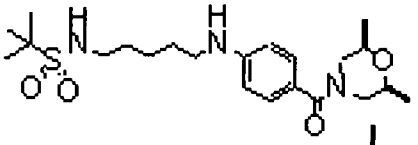
Ic-148 

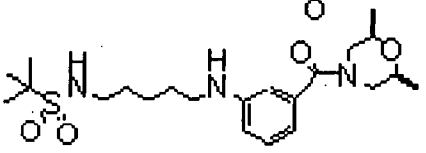
Ic-149 

Ic-150 

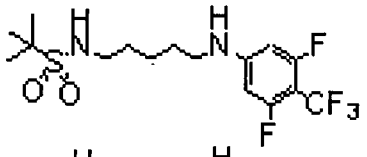
Ic-151 

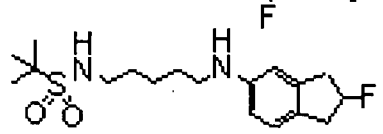
Ic-152 

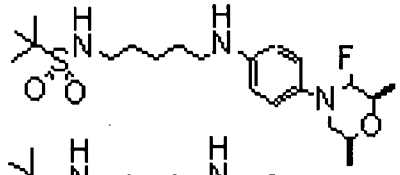
Ic-153 

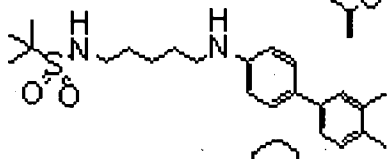
Ic-154 

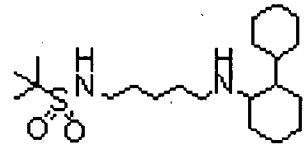
[Formula 132]

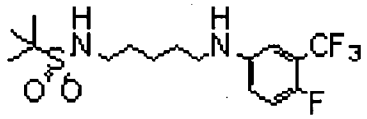
Ic-155 

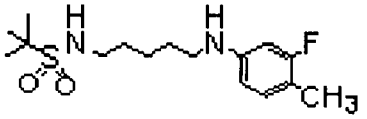
Ic-156 

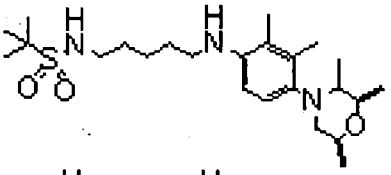
Ic-157 

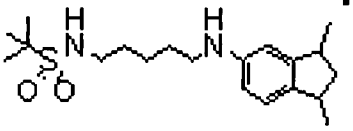
Ic-158 

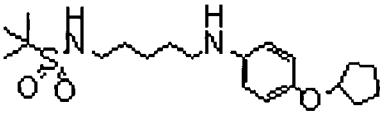
Ic-159 

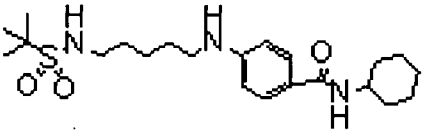
Ic-160 

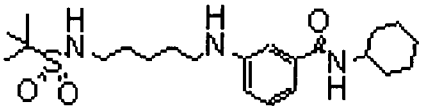
Ic-161 

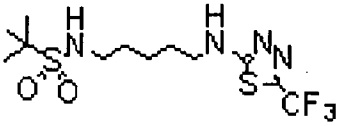
Ic-162 

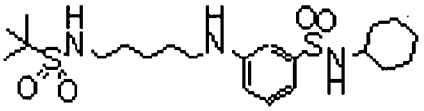
Ic-163 

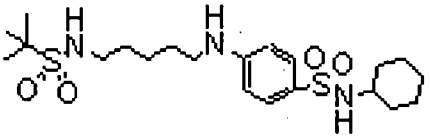
Ic-164 

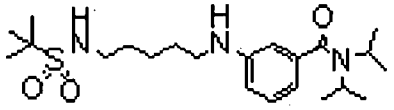
Ic-165 

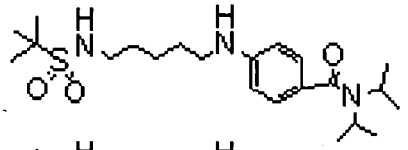
Ic-166 

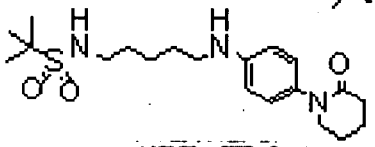
Ic-167 

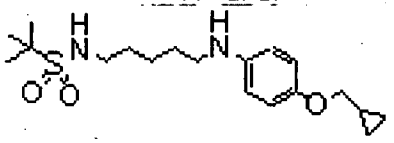
Ic-168 

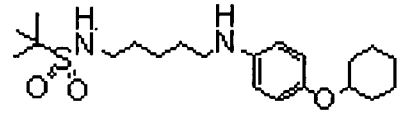
Ic-169 

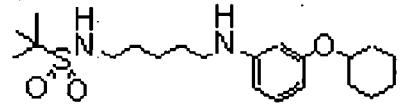
Ic-171 

Ic-172 

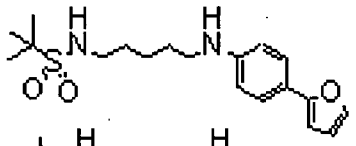
Ic-173 

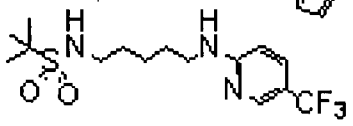
Ic-174 

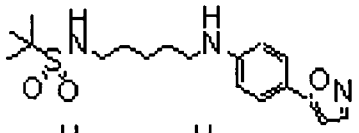
Ic-175 

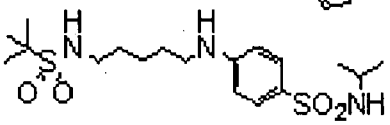
Ic-176 

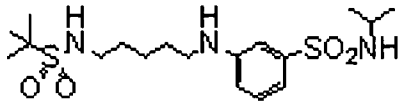
[Formula 133]

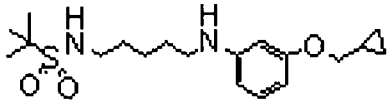
Ic-177 

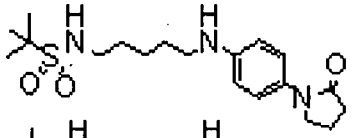
Ic-178 

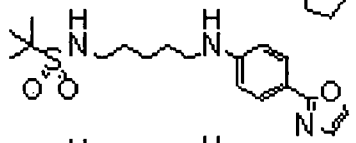
Ic-179 

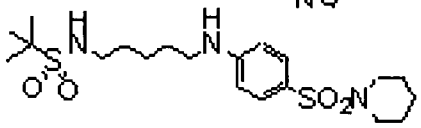
Ic-180 

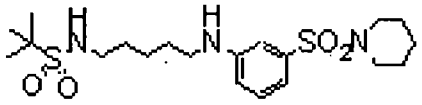
Ic-181 

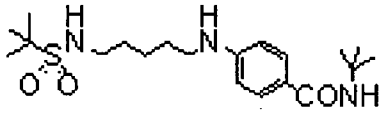
Ic-182 

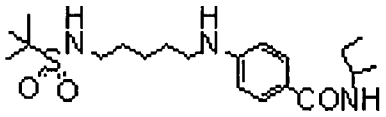
Ic-183 

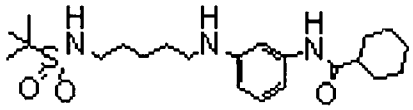
Ic-184 

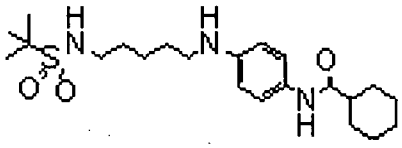
Ic-185 

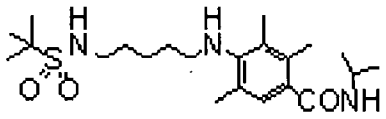
Ic-186 

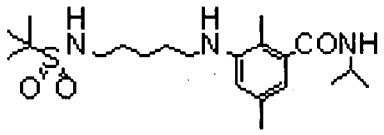
Ic-187 

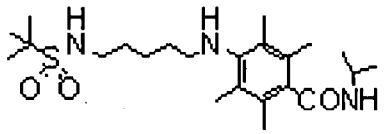
Ic-188 

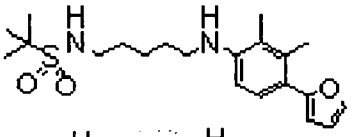
Ic-189 

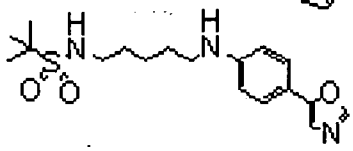
Ic-190 

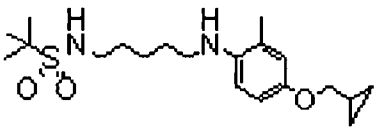
Ic-191 

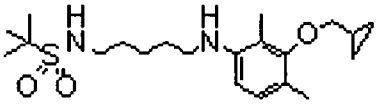
Ic-192 

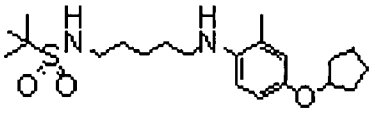
Ic-193 

Ic-194 

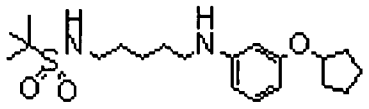
Ic-195 

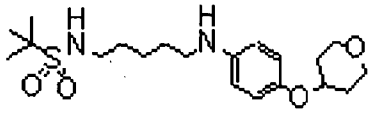
Ic-196 

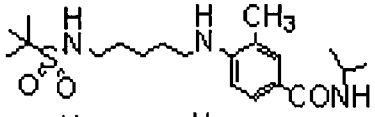
Ic-197 

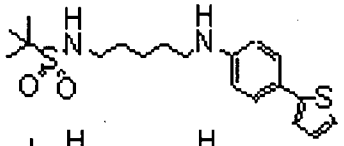
Ic-198 

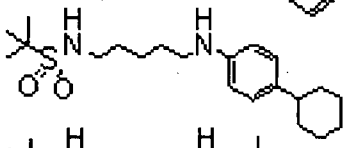
[Formula 134]

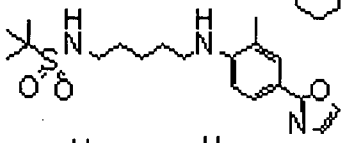
Ic-199 

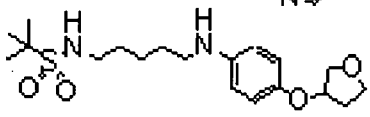
Ic-200 

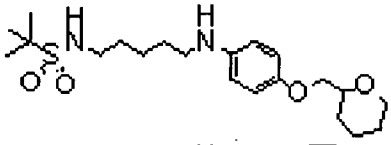
Ic-201 

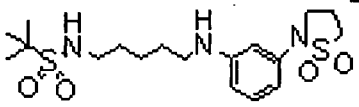
Ic-202 

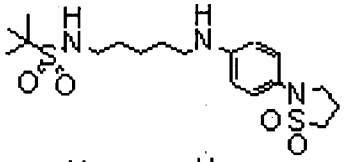
Ic-203 

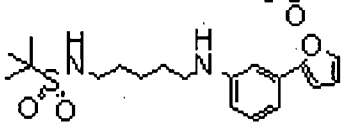
Ic-204 

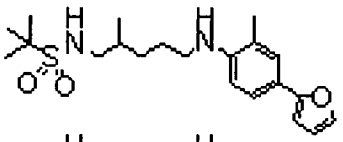
Ic-205 

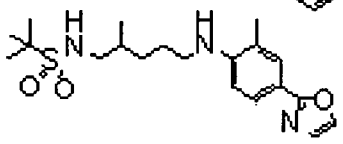
Ic-206 

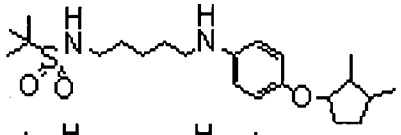
Ic-207 

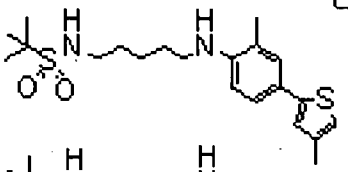
Ic-208 

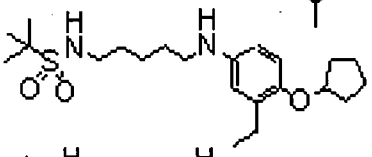
Ic-209 

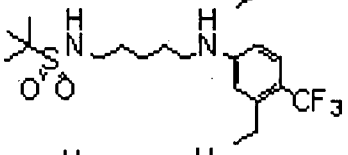
Ic-210 

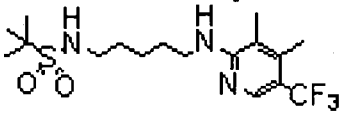
Ic-211 

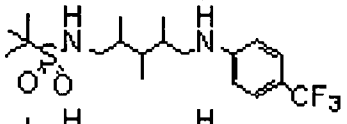
Ic-212 

Ic-213 

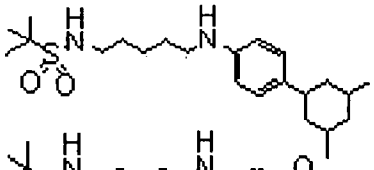
Ic-214 

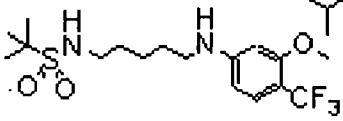
Ic-215 

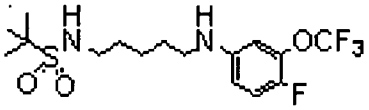
Ic-216 

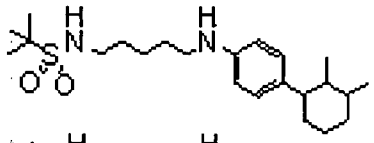
Ic-219 

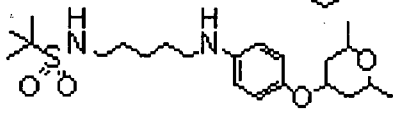
Ic-220 

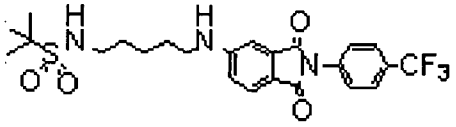
Ic-221 

Ic-222 

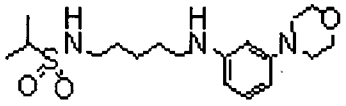
Ic-223 

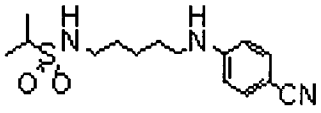
Ic-224 

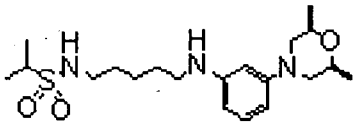
Ic-225 

Ic-226 

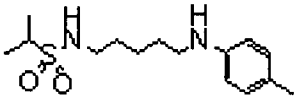
[Formula 135]

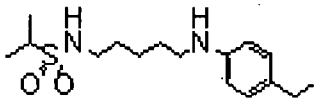
Id-1 

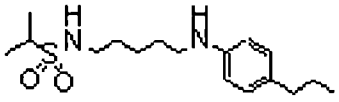
Id-2 

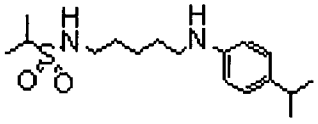
Id-4 

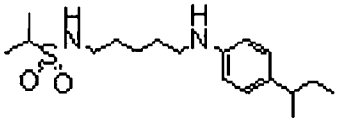
Id-7 

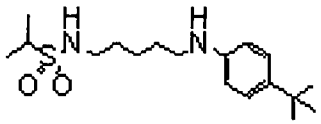
Id-8 

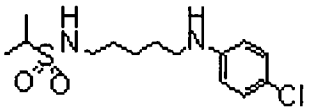
Id-9 

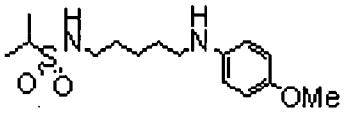
Id-10 

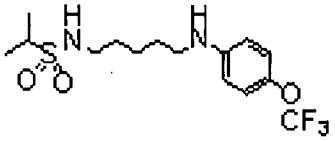
Id-11 

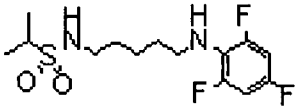
Id-12 

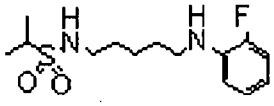
Id-13 

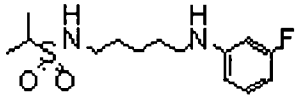
Id-14 

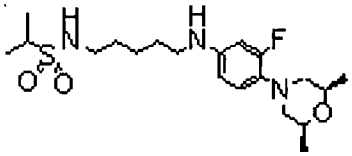
Id-16 

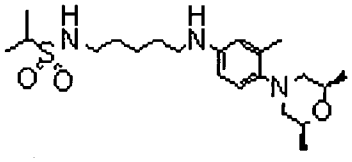
Id-17 

Id-18 

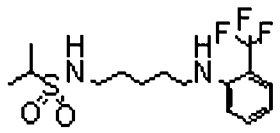
Id-19 

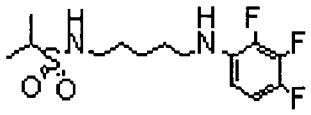
Id-20 

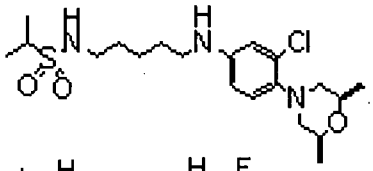
Id-21 

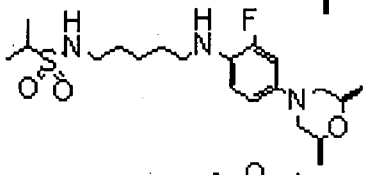
Id-22 

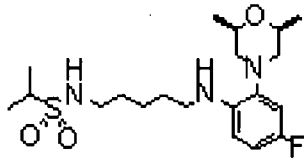
[Formula 136]

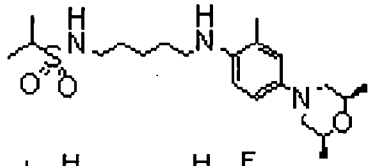
Id-23 

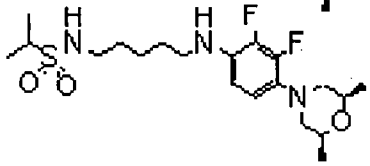
Id-24 

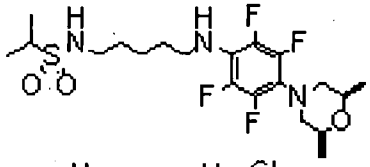
Id-25 

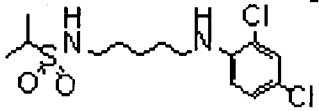
Id-26 

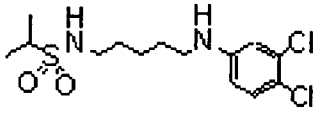
Id-27 

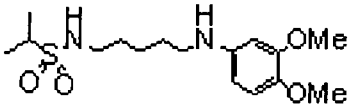
Id-28 

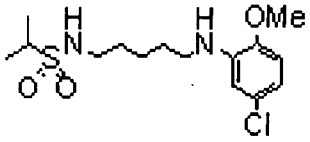
Id-29 

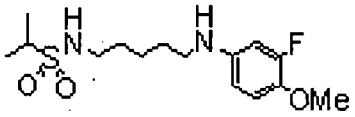
Id-30 

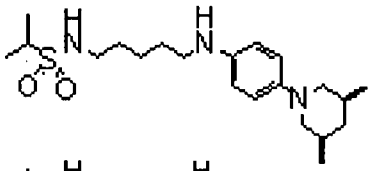
Id-31 

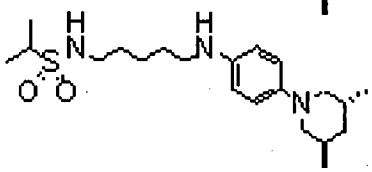
Id-32 

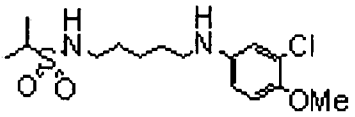
Id-33 

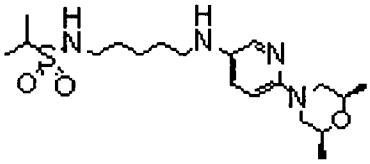
Id-35 

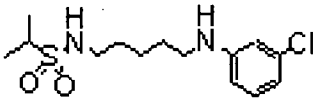
Id-36 

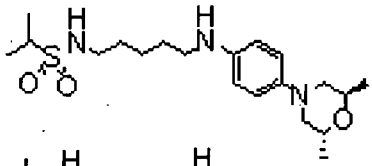
Id-37 

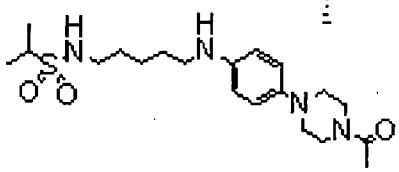
Id-38 

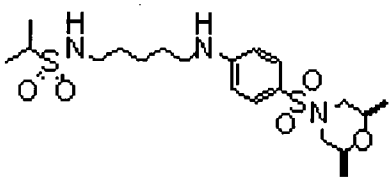
Id-39 

Id-40 

Id-41 

Id-42 

Id-43 

Id-44 

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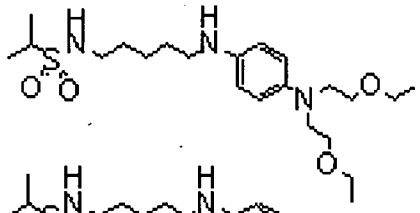
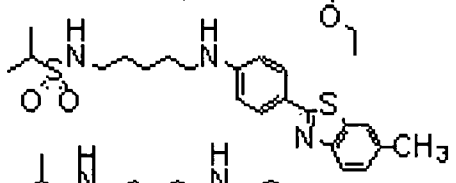
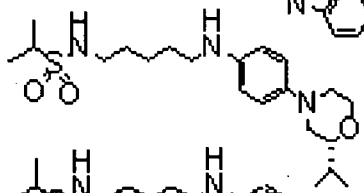
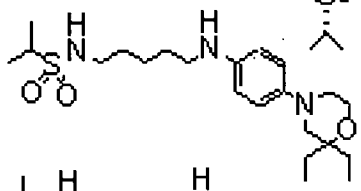
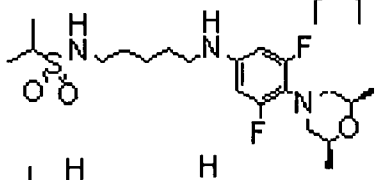
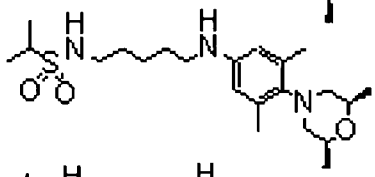
Id-45 

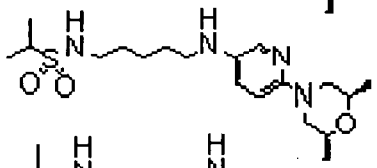
Id-46 

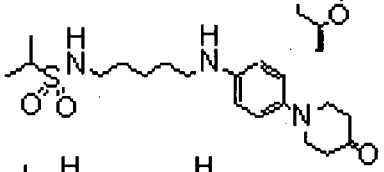
Id-47 

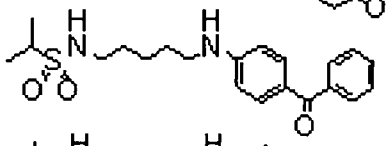
Id-48 

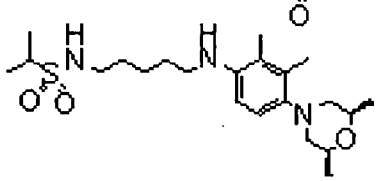
Id-49 

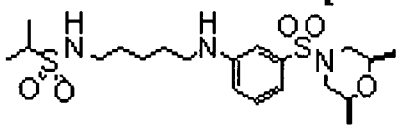
Id-50 

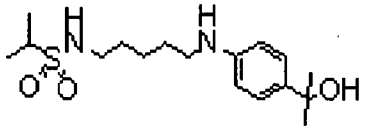
Id-51 

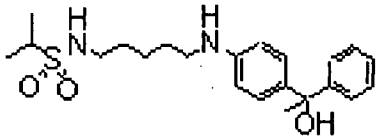
Id-52 

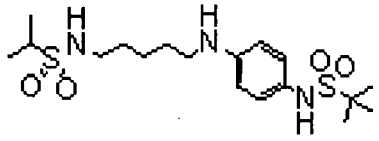
Id-53 

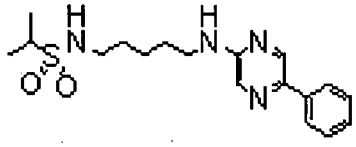
Id-54 

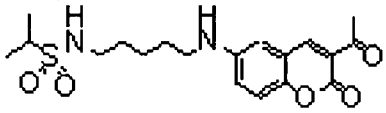
Id-55 

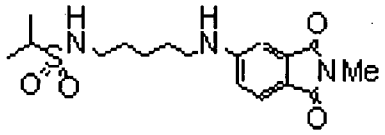
Id-56 

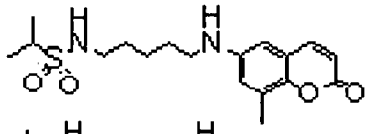
Id-57 

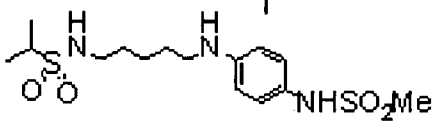
Id-58 

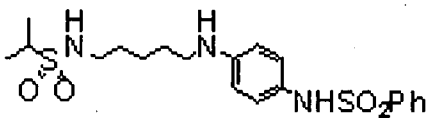
Id-59 

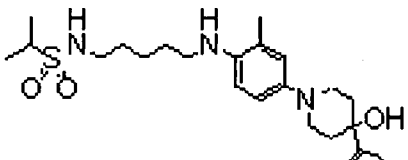
Id-60 

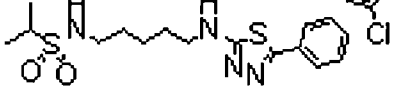
Id-61 

Id-62 

Id-63 

Id-64 

Id-65 

Id-66 

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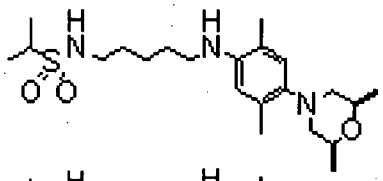
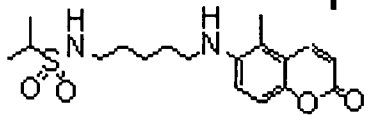
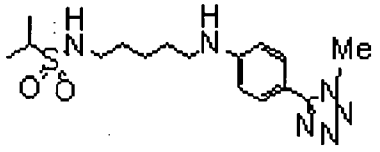
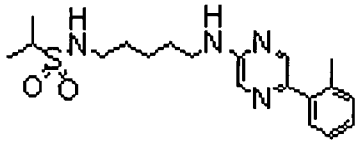
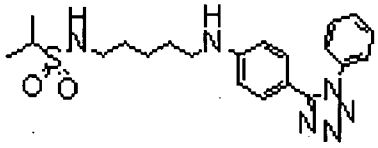
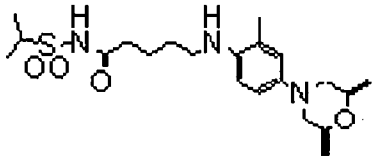
Id-67 

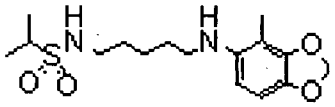
Id-68 

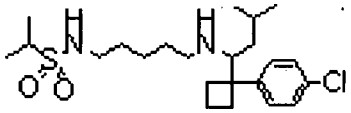
Id-69 

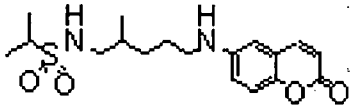
Id-70 

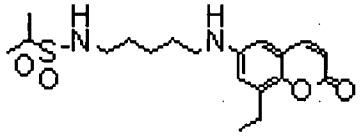
Id-71 

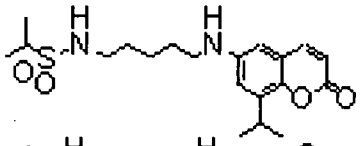
Id-73 

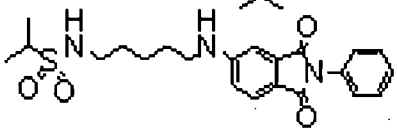
Id-74 

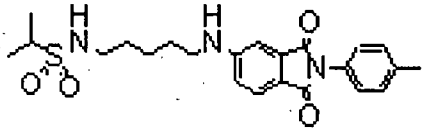
Id-75 

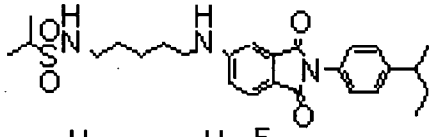
Id-76 

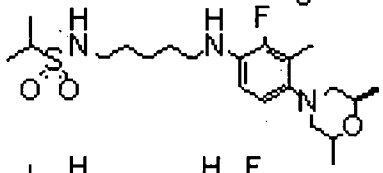
Id-77 

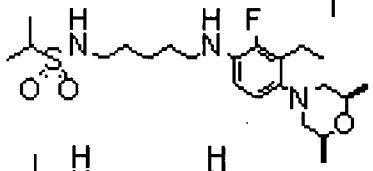
Id-78 

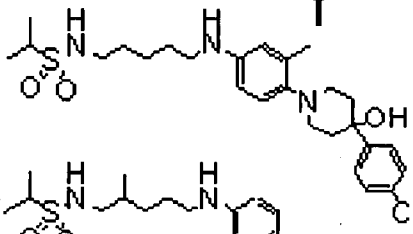
Id-79 

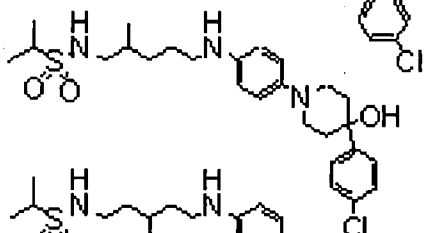
Id-80 

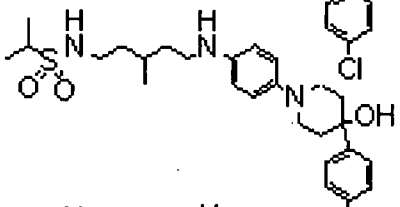
Id-81 

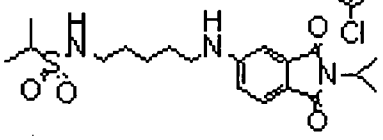
Id-82 

Id-83 

Id-84 

Id-85 

Id-86 

Id-87 

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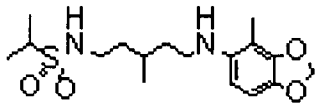
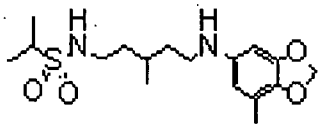
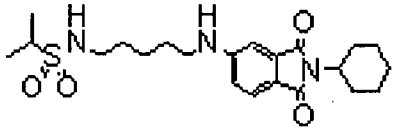
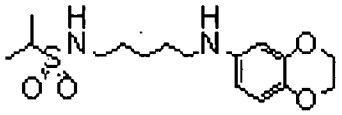
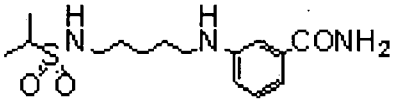
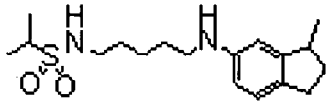
Id-89 

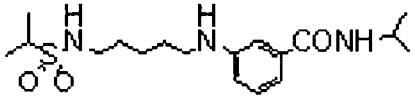
Id-90 

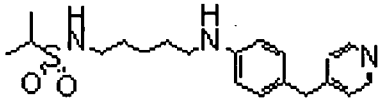
Id-91 

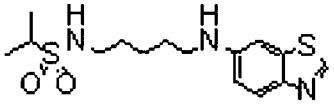
Id-92 

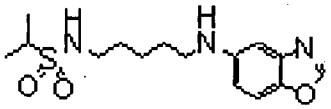
Id-93 

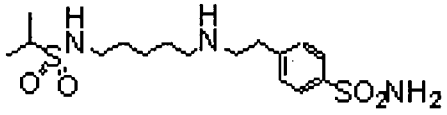
Id-94 

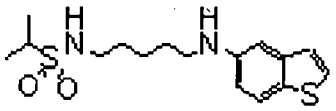
Id-95 

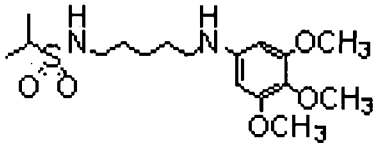
Id-96 

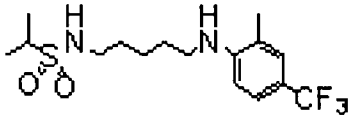
Id-97 

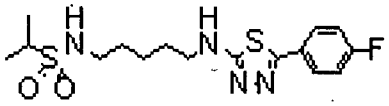
Id-98 

Id-99 

Id-100 

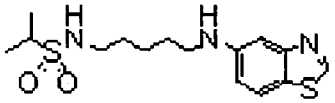
Id-101 

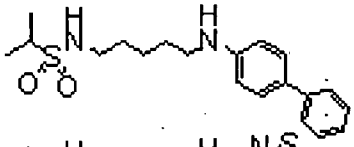
Id-102 

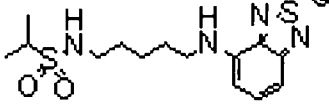
Id-103 

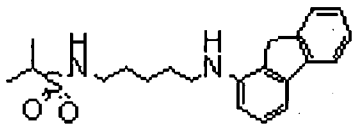
Id-104 

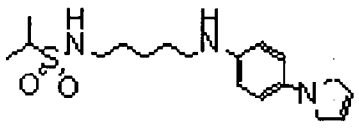
Id-105 

Id-106 

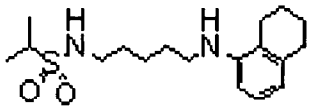
Id-107 

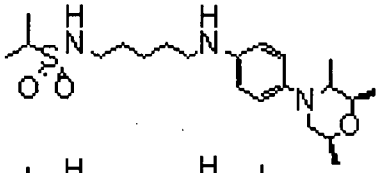
Id-108 

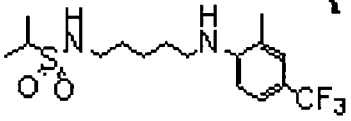
Id-109 

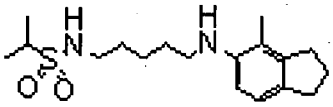
Id-110 

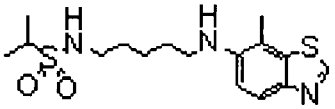
[Formula 140]

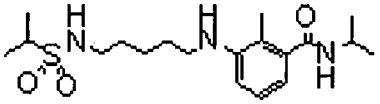
Id-111 

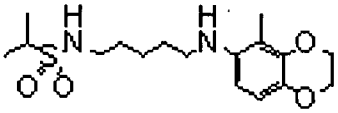
Id-112 

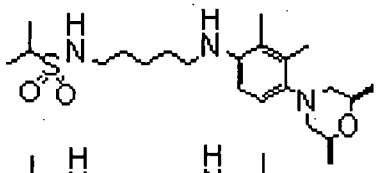
Id-113 

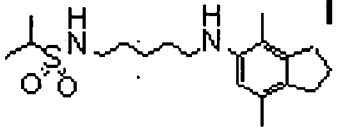
Id-114 

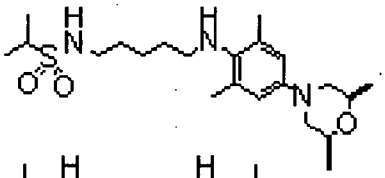
Id-115 

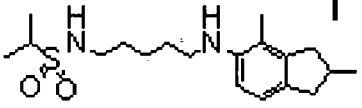
Id-116 

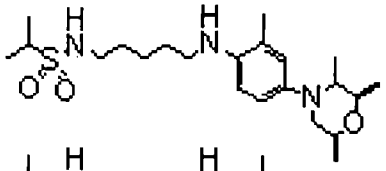
Id-117 

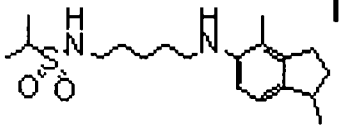
Id-118 

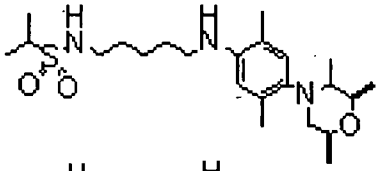
Id-119 

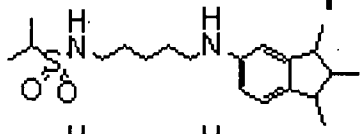
Id-120 

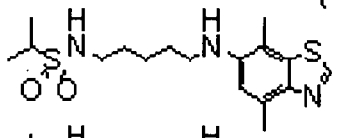
Id-121 

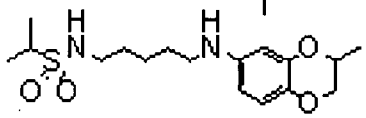
Id-122 

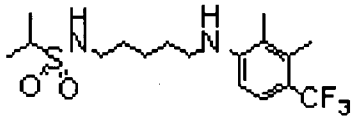
Id-123 

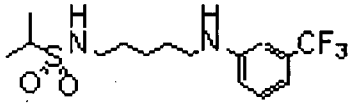
Id-124 

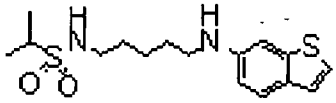
Id-125 

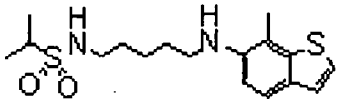
Id-126 

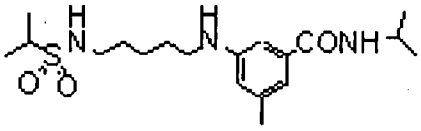
Id-127 

Id-128 

Id-129 

Id-130 

Id-131 

Id-132 

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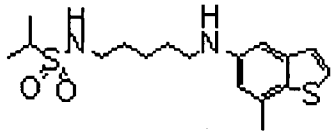
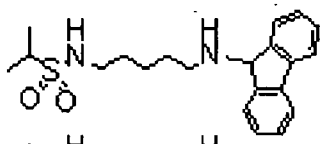
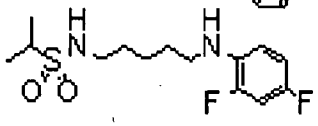
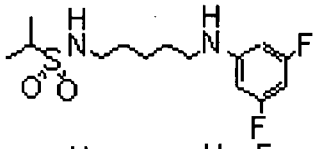
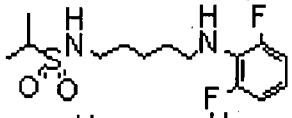
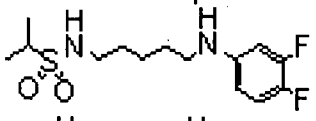
Id-133 

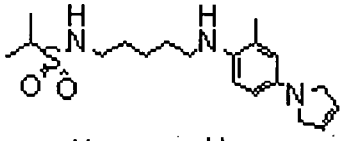
Id-134 

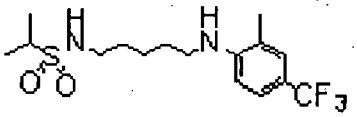
Id-135 

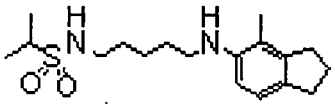
Id-136 

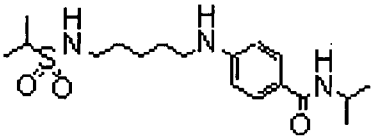
Id-137 

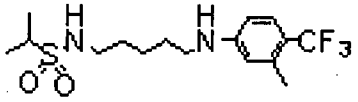
Id-138 

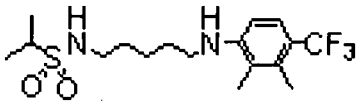
Id-139 

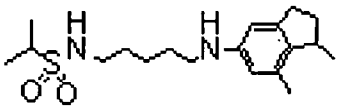
Id-140 

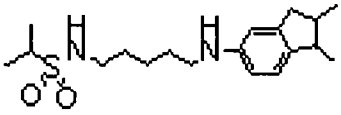
Id-141 

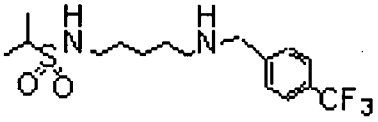
Id-142 

Id-143 

Id-144 

Id-145 

Id-146 

Id-147 

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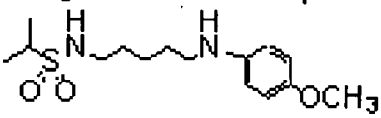
Id-149 

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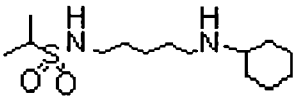
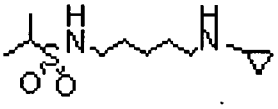
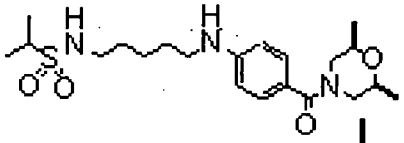
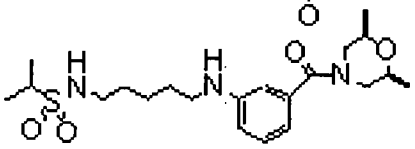
Id-151 

Id-152 

Id-153 

Id-154 

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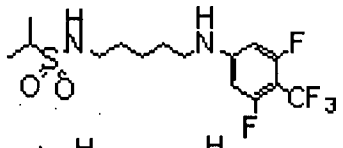
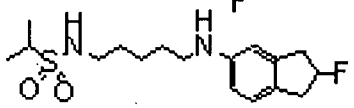
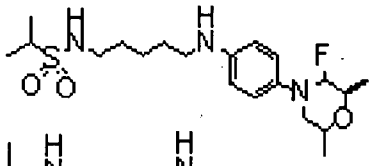
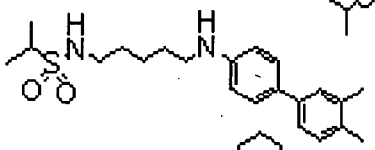
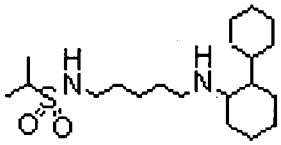
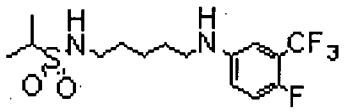
Id-155 

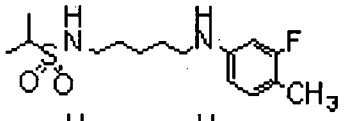
Id-156 

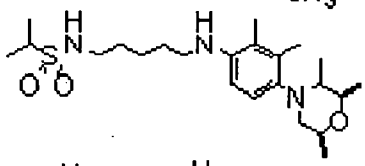
Id-157 

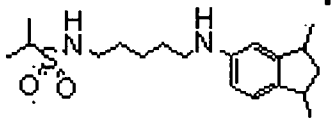
Id-158 

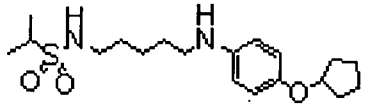
Id-159 

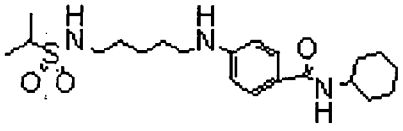
Id-160 

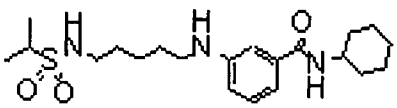
Id-161 

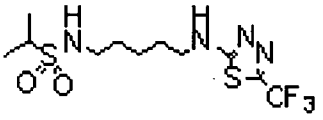
Id-162 

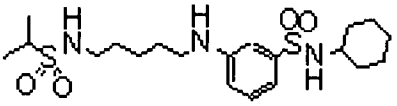
Id-163 

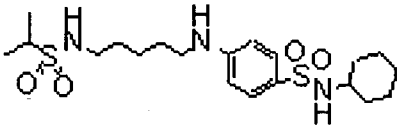
Id-164 

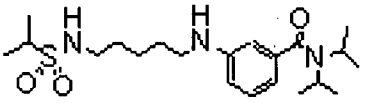
Id-165 

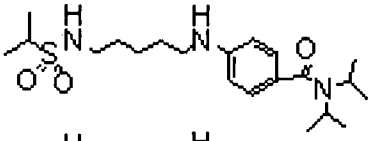
Id-166 

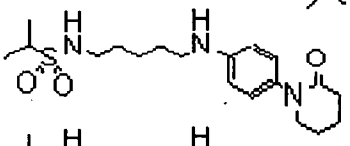
Id-167 

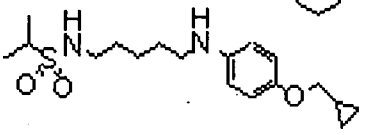
Id-168 

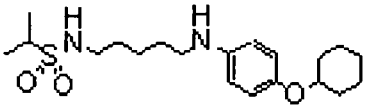
Id-169 

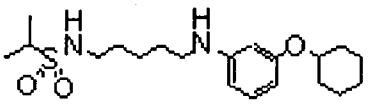
Id-171 

Id-172 

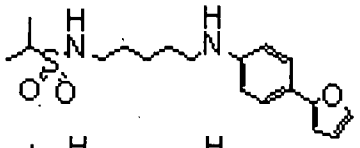
Id-173 

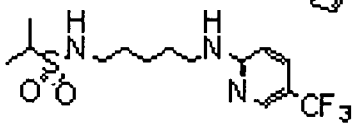
Id-174 

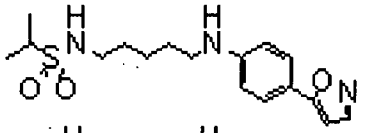
Id-175 

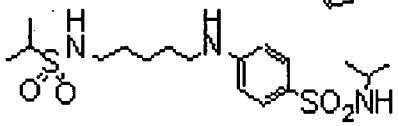
Id-176 

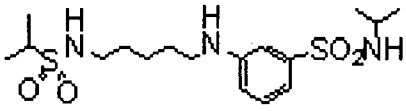
[Formula 143]

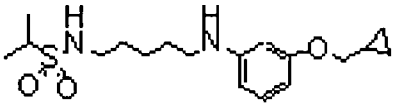
Id-177 

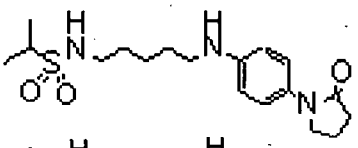
Id-178 

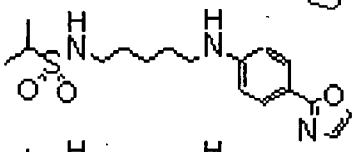
Id-179 

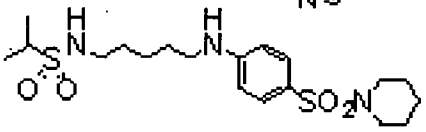
Id-180 

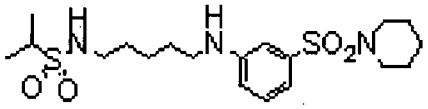
Id-181 

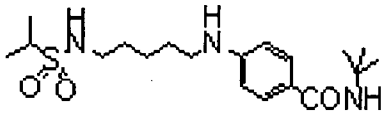
Id-182 

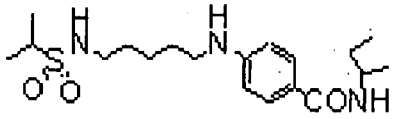
Id-183 

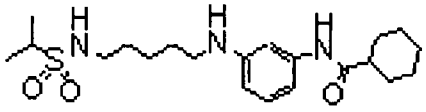
Id-184 

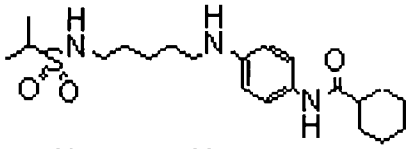
Id-185 

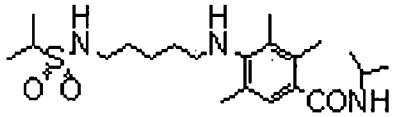
Id-186 

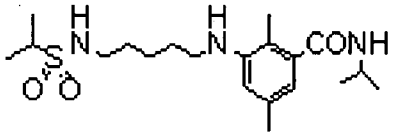
Id-187 

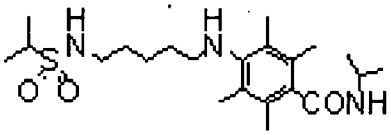
Id-188 

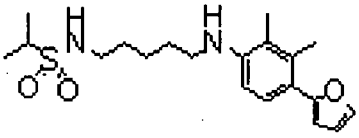
Id-189 

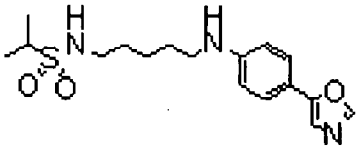
Id-190 

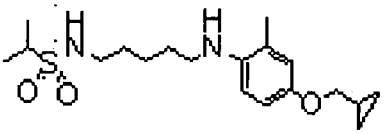
Id-191 

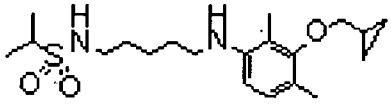
Id-192 

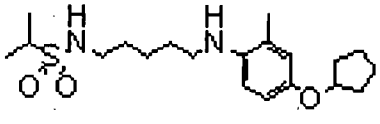
Id-193 

Id-194 

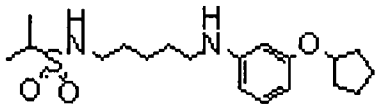
Id-195 

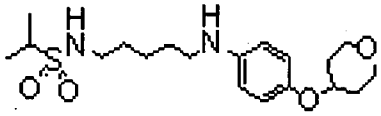
Id-196 

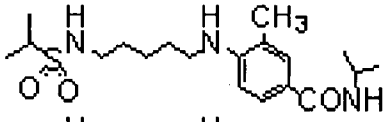
Id-197 

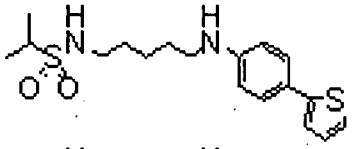
Id-198 

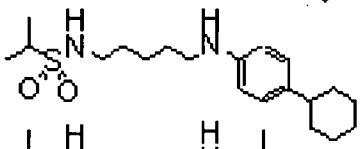
[Formula 144]

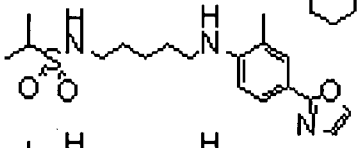
Id-199 

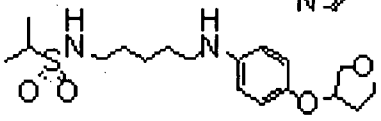
Id-200 

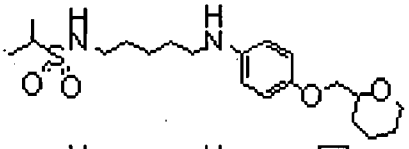
Id-201 

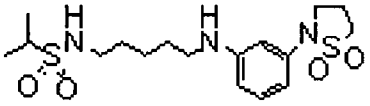
Id-202 

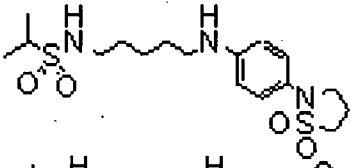
Id-203 

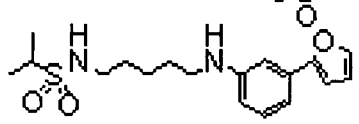
Id-204 

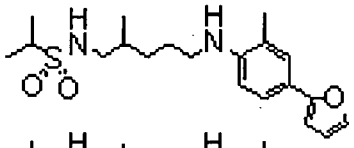
Id-205 

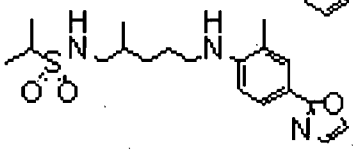
Id-206 

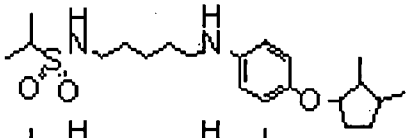
Id-207 

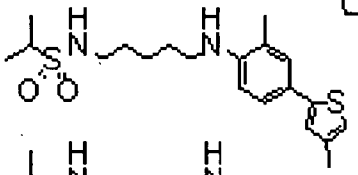
Id-208 

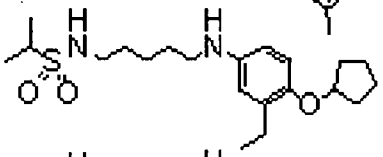
Id-209 

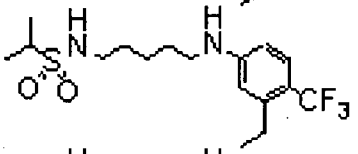
Id-210 

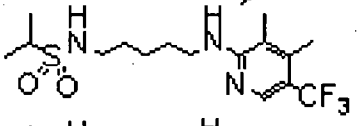
Id-211 

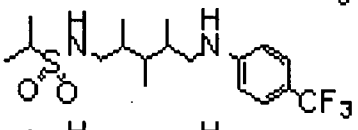
Id-212 

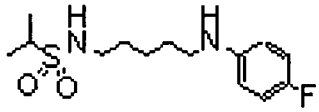
Id-213 

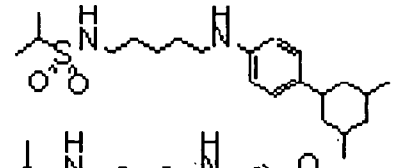
Id-214 

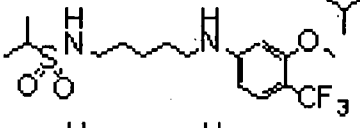
Id-215 

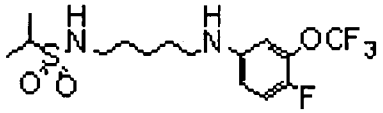
Id-216 

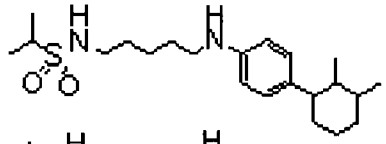
Id-219 

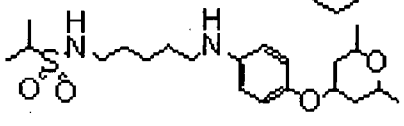
Id-220 

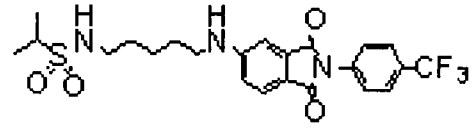
Id-221 

Id-222 

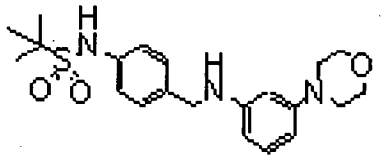
Id-223 

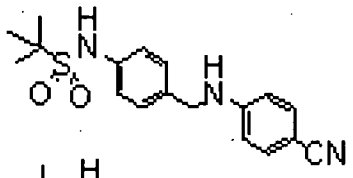
Id-224 

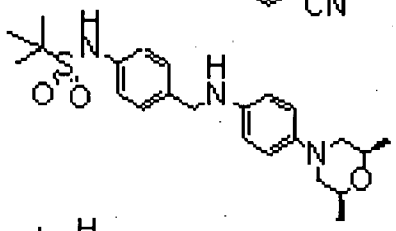
Id-225 

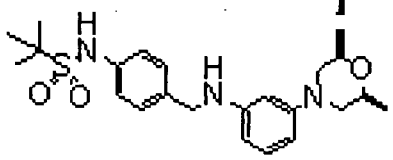
Id-226 

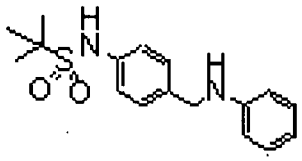
[Formula 145]

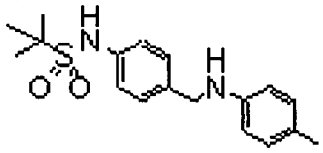
Ig-1 

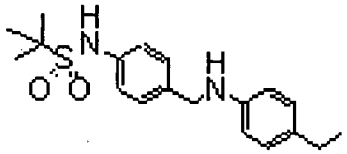
Ig-2 

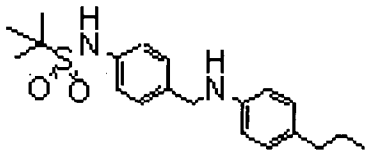
Ig-3 

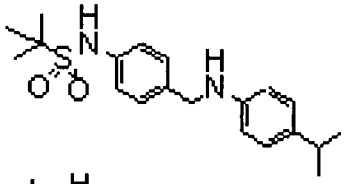
Ig-4 

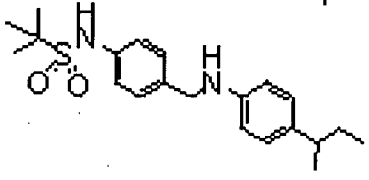
Ig-7 

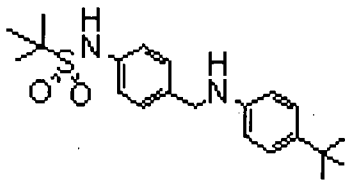
Ig-8 

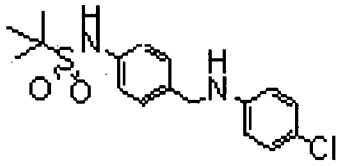
Ig-9 

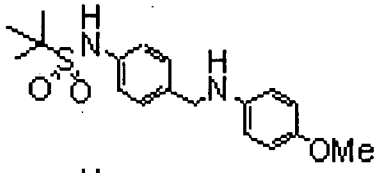
Ig-10 

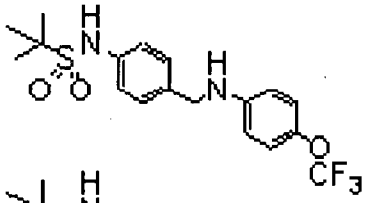
Ig-11 

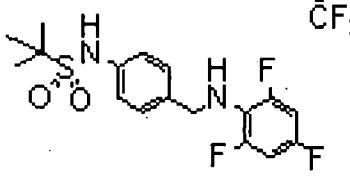
Ig-12 

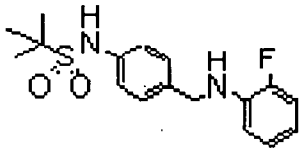
Ig-13 

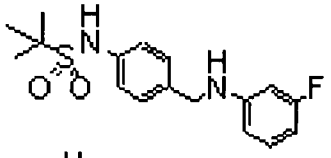
Ig-14 

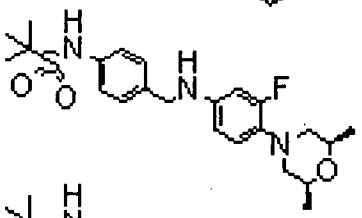
Ig-16 

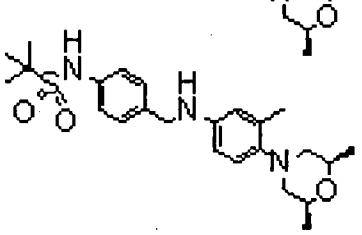
Ig-17 

Ig-18 

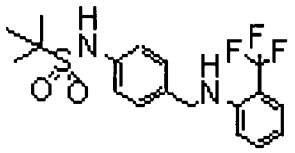
Ig-19 

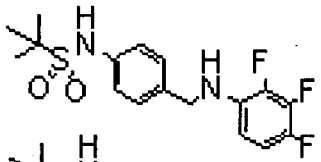
Ig-20 

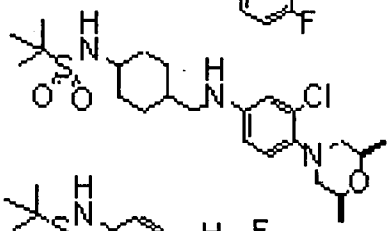
Ig-21 

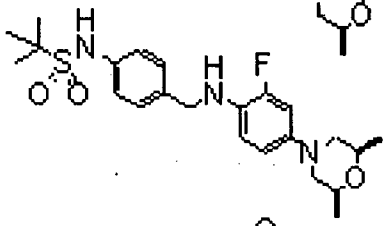
Ig-22 

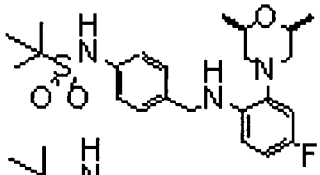
[Formula 146]

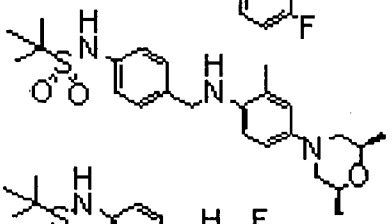
Ig-23 

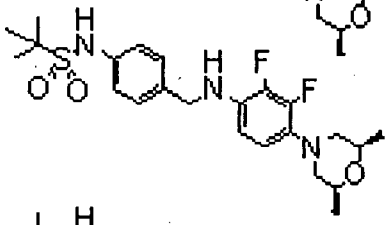
Ig-24 

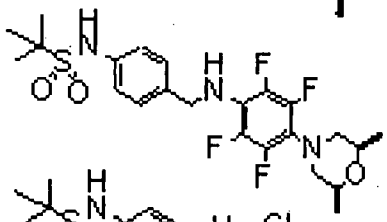
Ig-25 

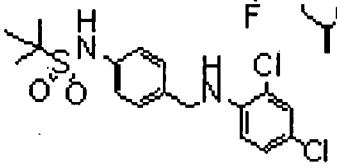
Ig-26 

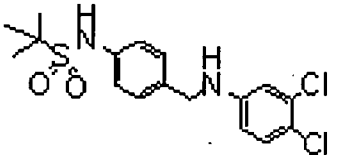
Ig-27 

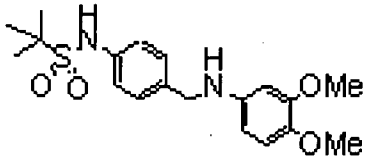
Ig-28 

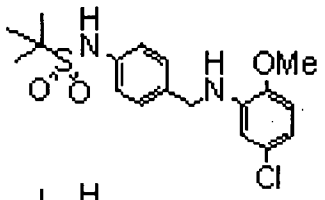
Ig-29 

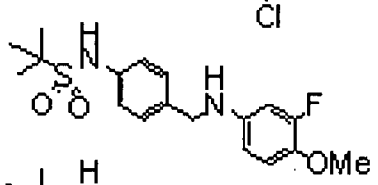
Ig-30 

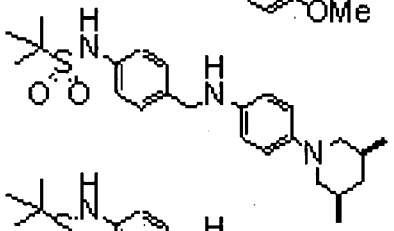
Ig-31 

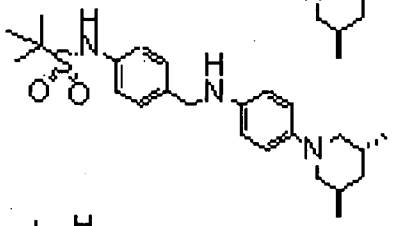
Ig-32 

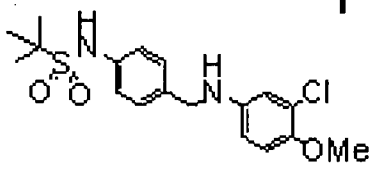
Ig-33 

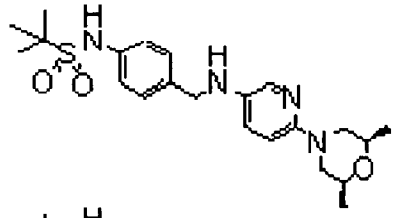
Ig-35 

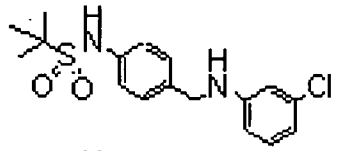
Ig-36 

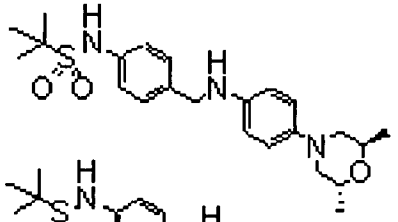
Ig-37 

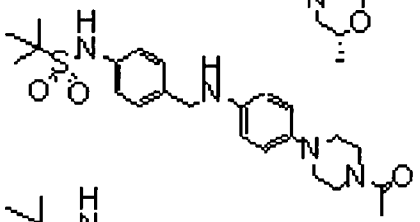
Ig-38 

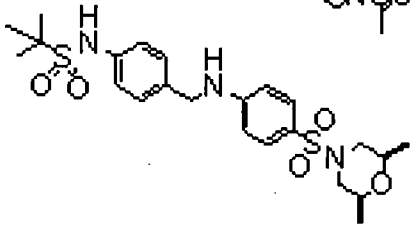
Ig-39 

Ig-40 

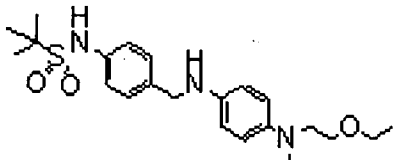
Ig-41 

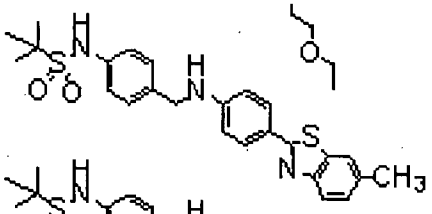
Ig-42 

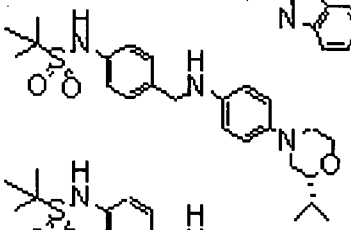
Ig-43 

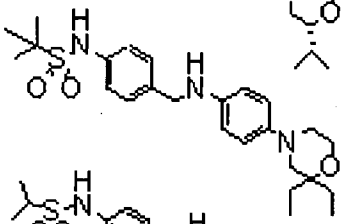
Ig-44 

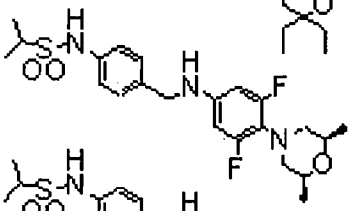
[Formula 147]

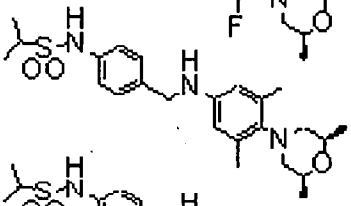
Ig-45 

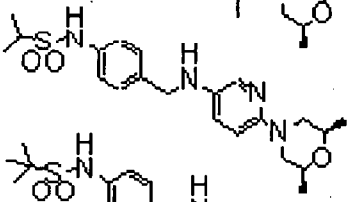
Ig-46 

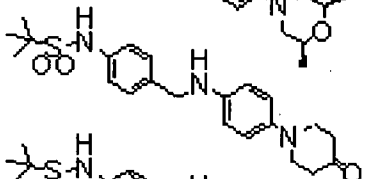
Ig-47 

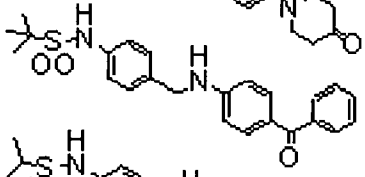
Ig-48 

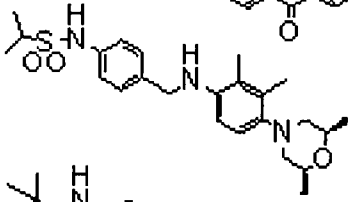
Ig-49 

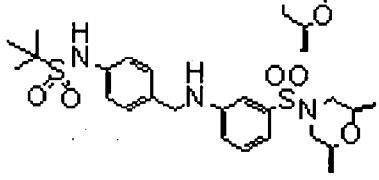
Ig-50 

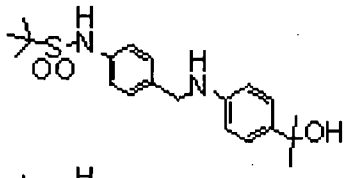
Ig-51 

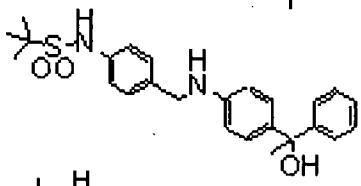
Ig-52 

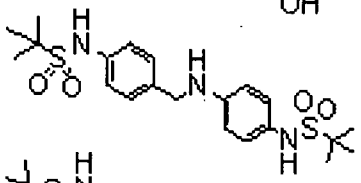
Ig-53 

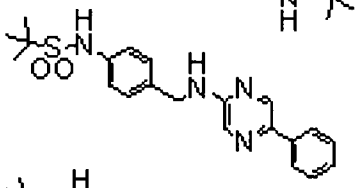
Ig-54 

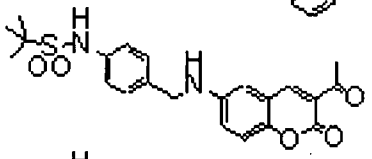
Ig-55 

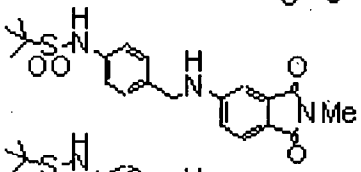
Ig-56 

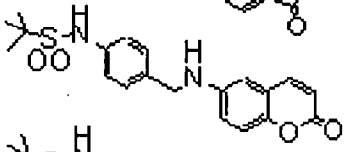
Ig-57 

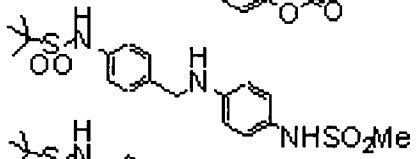
Ig-58 

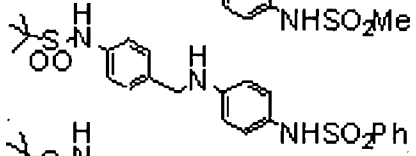
Ig-59 

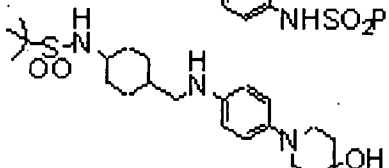
Ig-60 

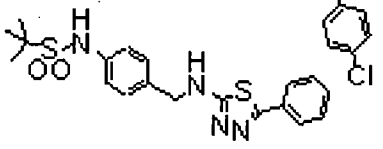
Ig-61 

Ig-62 

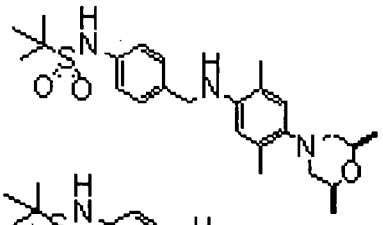
Ig-63 

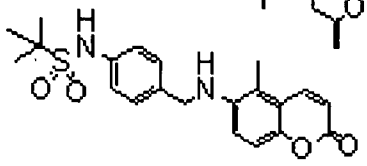
Ig-64 

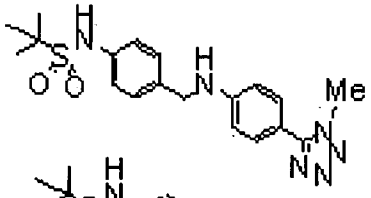
Ig-65 

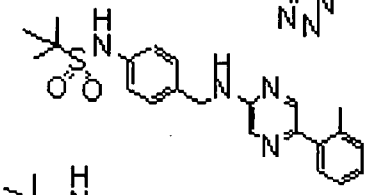
Ig-66 

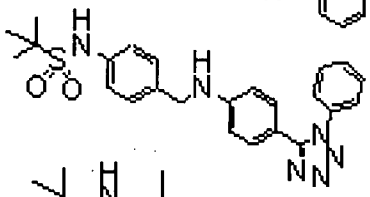
[Formula 148]

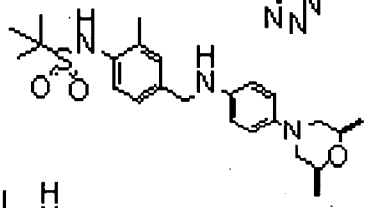
Ig-67 

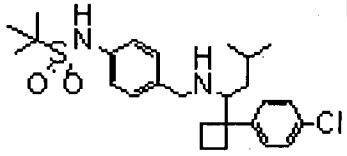
Ig-68 

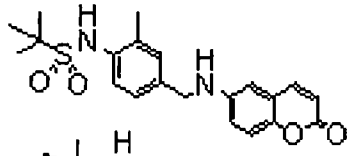
Ig-69 

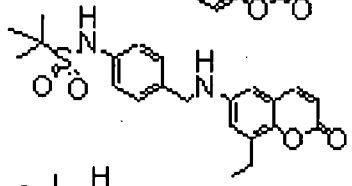
Ig-70 

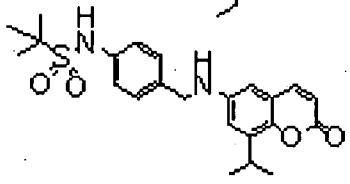
Ig-71 

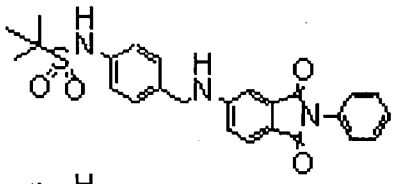
Ig-74 

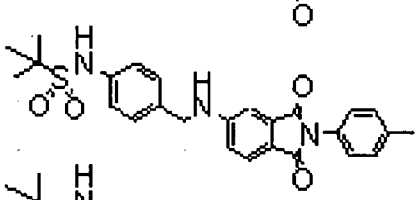
Ig-75 

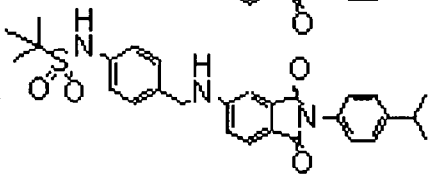
Ig-76 

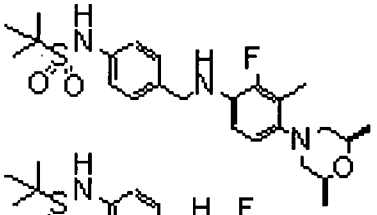
Ig-77 

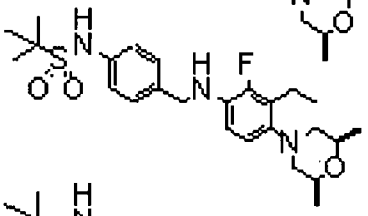
Ig-78 

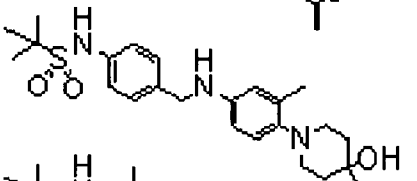
Ig-79 

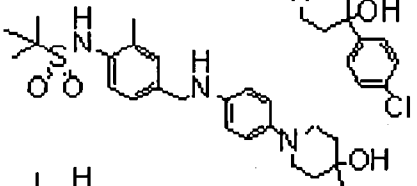
Ig-80 

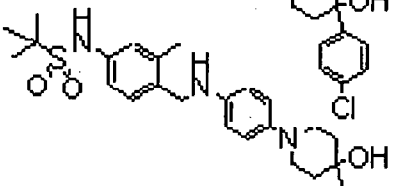
Ig-81 

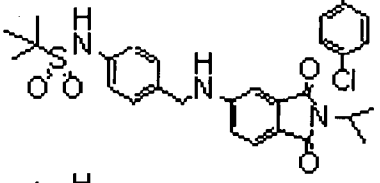
Ig-82 

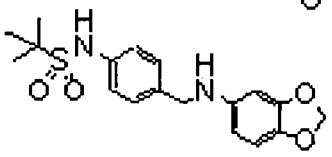
Ig-83 

Ig-84 

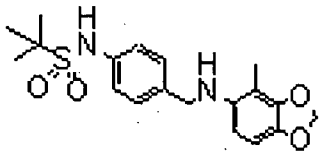
Ig-85 

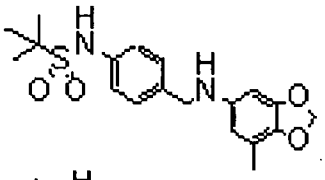
Ig-86 

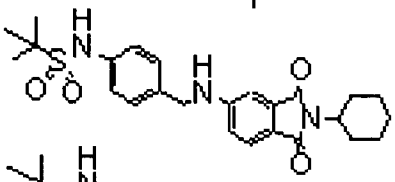
Ig-87 

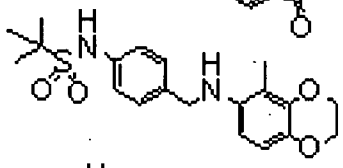
Ig-88 

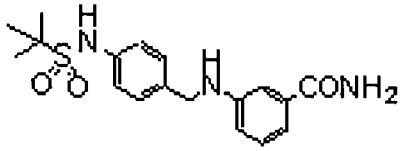
[Formula 149]

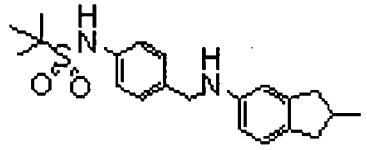
Ig-89 

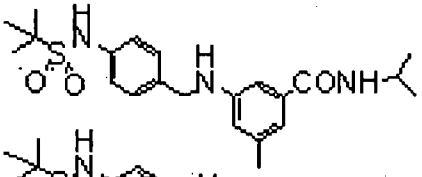
Ig-90 

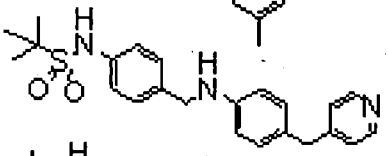
Ig-91 

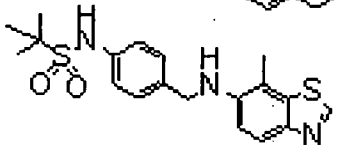
Ig-92 

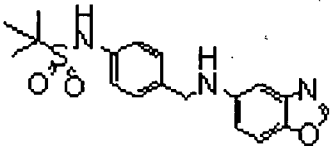
Ig-93 

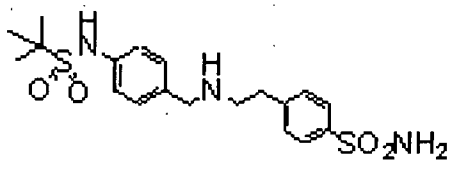
Ig-94 

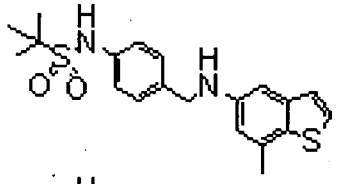
Ig-95 

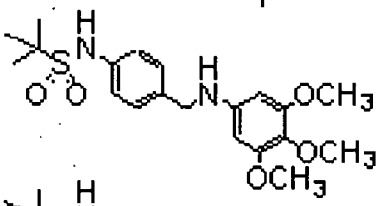
Ig-96 

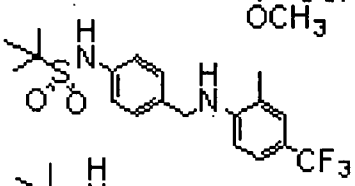
Ig-97 

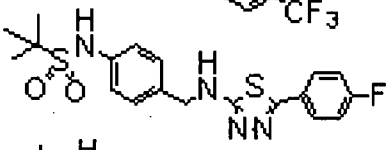
Ig-98 

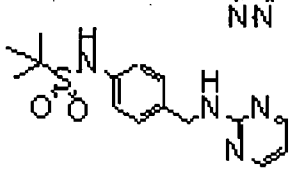
Ig-99 

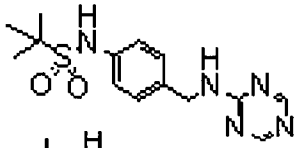
Ig-100 

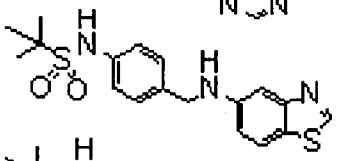
Ig-101 

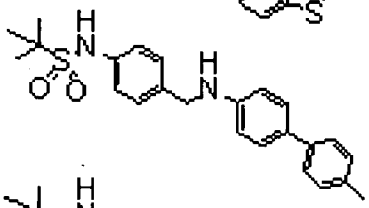
Ig-102 

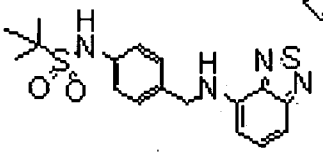
Ig-103 

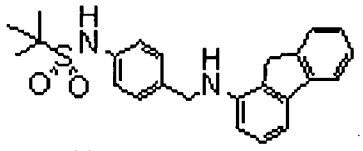
Ig-104 

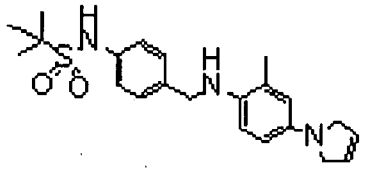
Ig-105 

Ig-106 

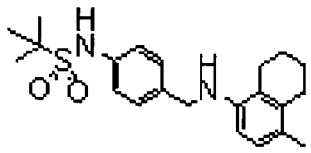
Ig-107 

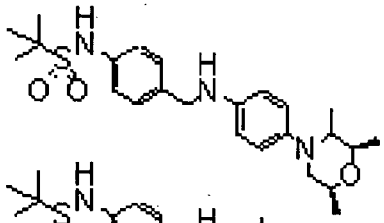
Ig-108 

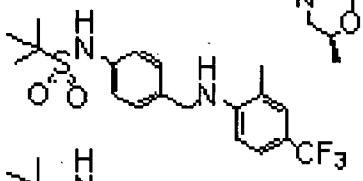
Ig-109 

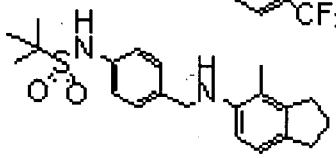
Ig-110 

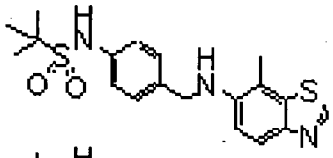
[Formula 150]

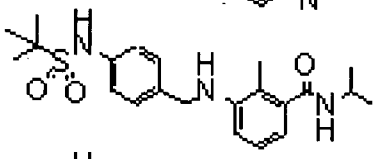
Ig-111 

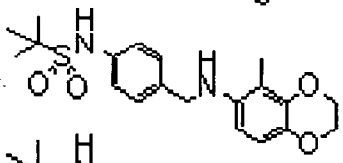
Ig-112 

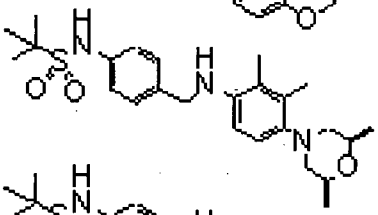
Ig-113 

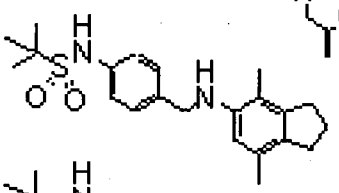
Ig-114 

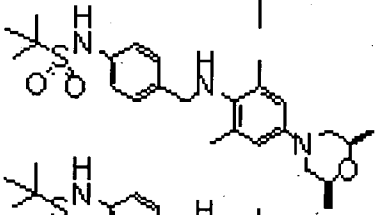
Ig-115 

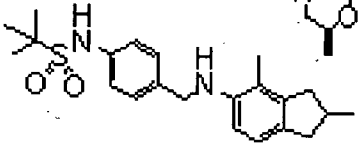
Ig-116 

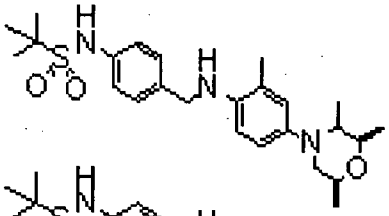
Ig-117 

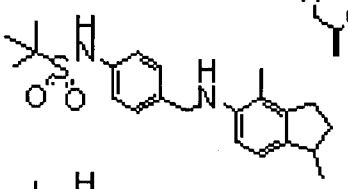
Ig-118 

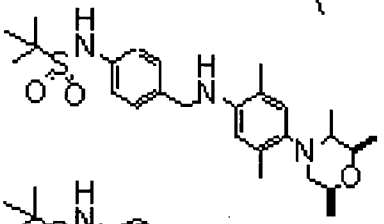
Ig-119 

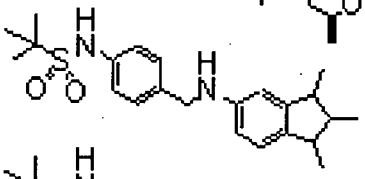
Ig-120 

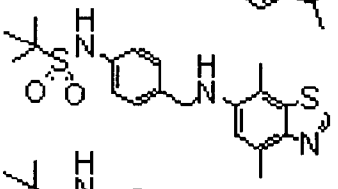
Ig-121 

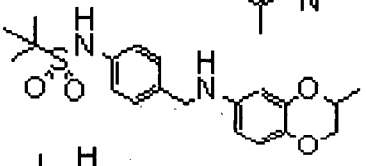
Ig-122 

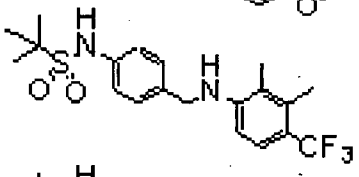
Ig-123 

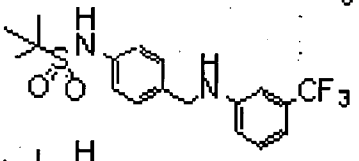
Ig-124 

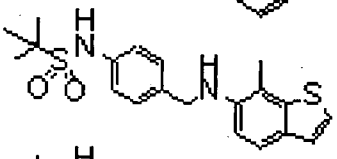
Ig-125 

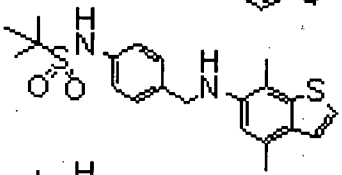
Ig-126 

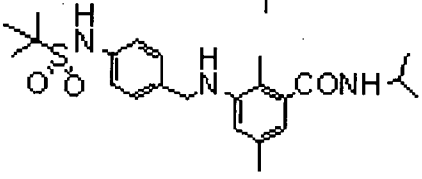
Ig-127 

Ig-128 

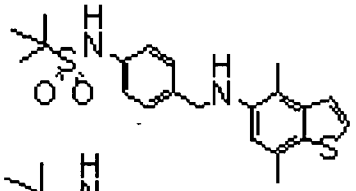
Ig-129 

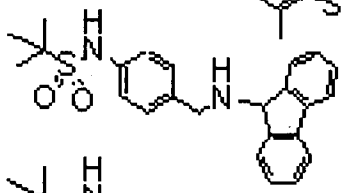
Ig-130 

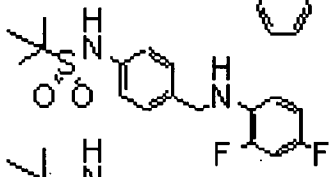
Ig-131 

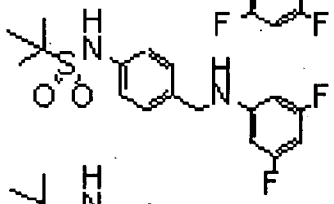
Ig-132 

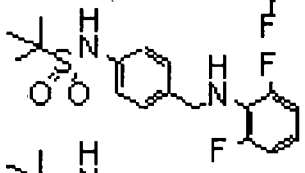
[Formula 151]

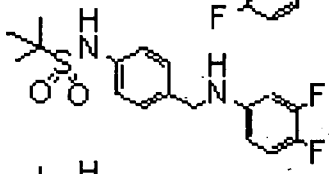
Ig-133 

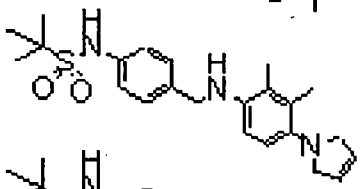
Ig-134 

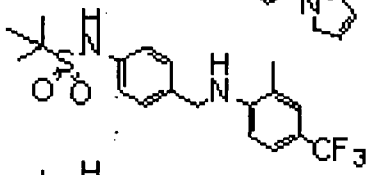
Ig-135 

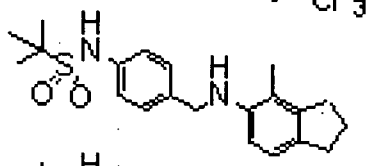
Ig-136 

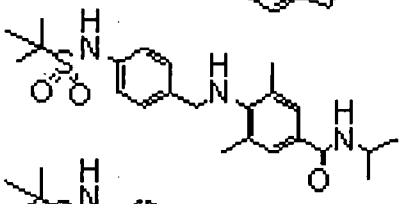
Ig-137 

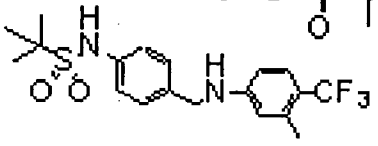
Ig-138 

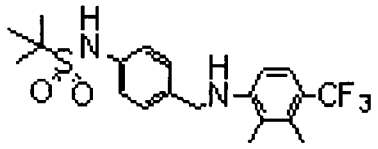
Ig-139 

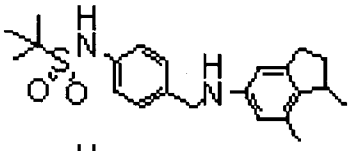
Ig-140 

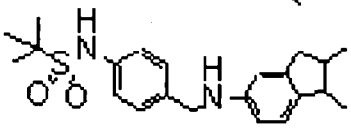
Ig-141 

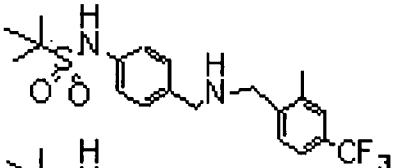
Ig-142 

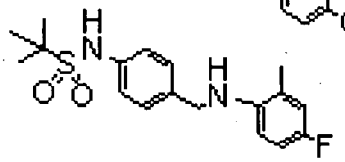
Ig-143 

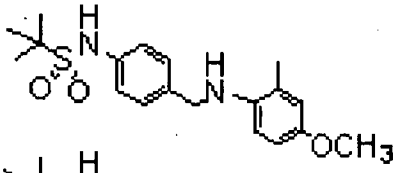
Ig-144 

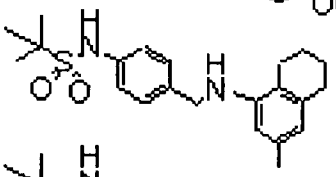
Ig-145 

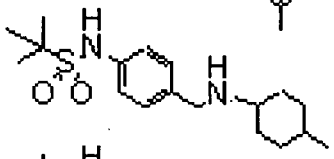
Ig-146 

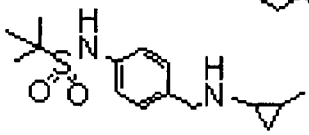
Ig-147 

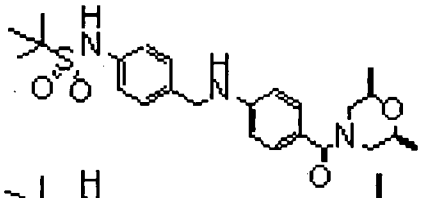
Ig-148 

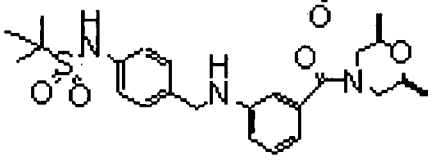
Ig-149 

Ig-150 

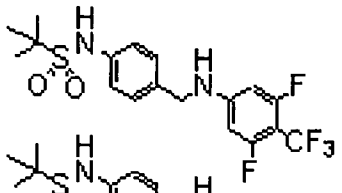
Ig-151 

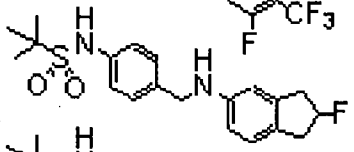
Ig-152 

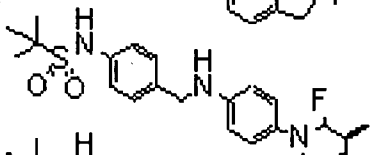
Ig-153 

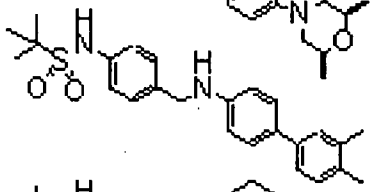
Ig-154 

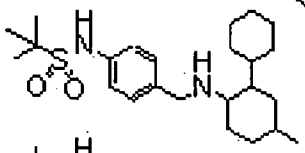
[Formula 152]

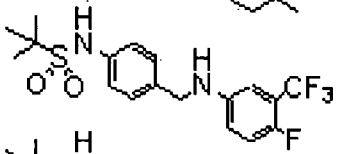
Ig-155 

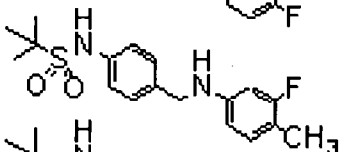
Ig-156 

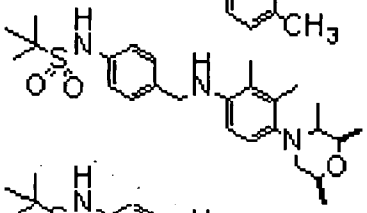
Ig-157 

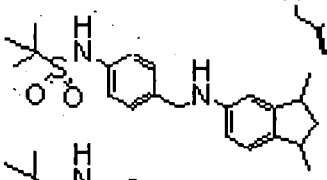
Ig-158 

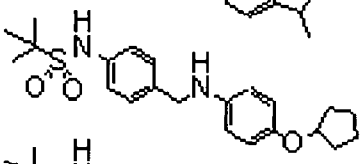
Ig-159 

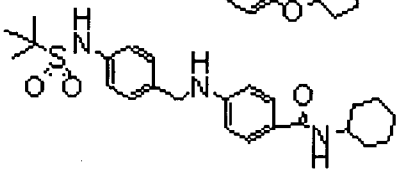
Ig-160 

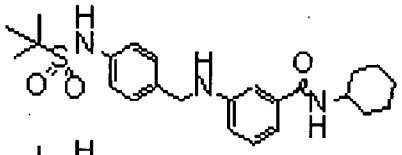
Ig-161 

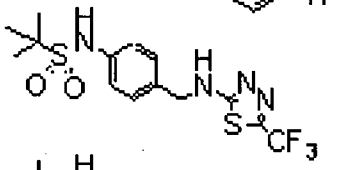
Ig-162 

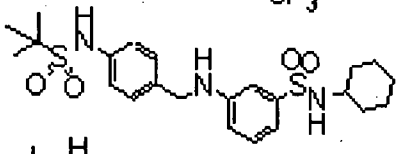
Ig-163 

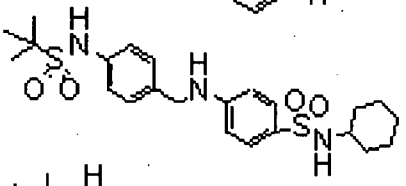
Ig-164 

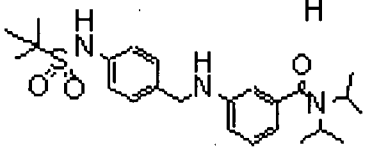
Ig-165 

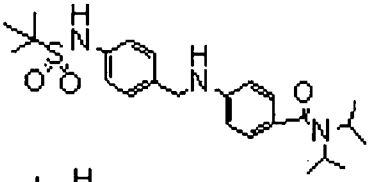
Ig-166 

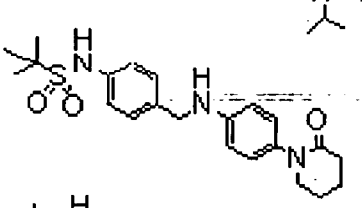
Ig-167 

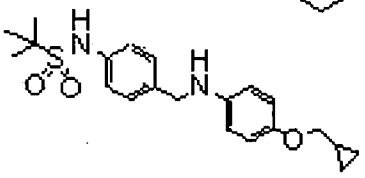
Ig-168 

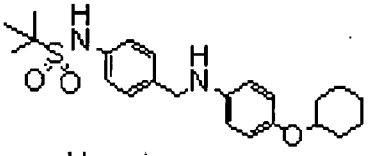
Ig-169 

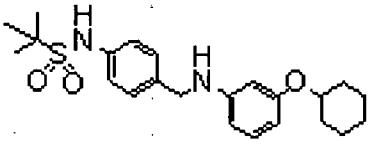
Ig-171 

Ig-172 

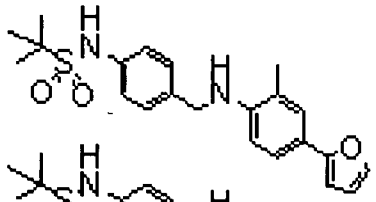
Ig-173 

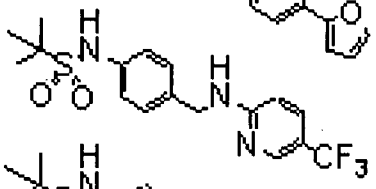
Ig-174 

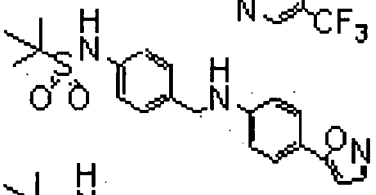
Ig-175 

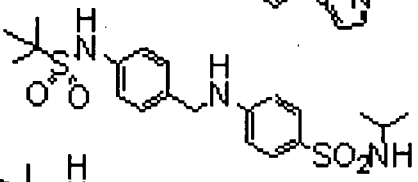
Ig-176 

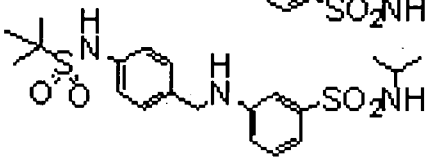
[Formula 153]

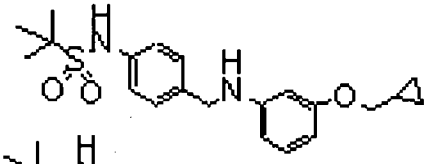
Ig-177 

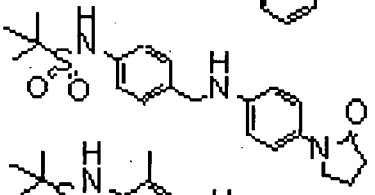
Ig-178 

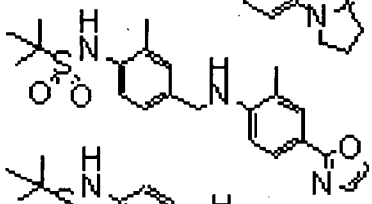
Ig-179 

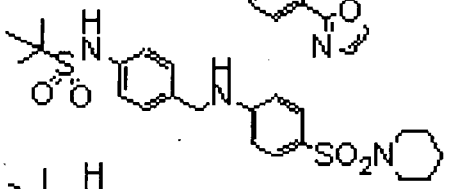
Ig-180 

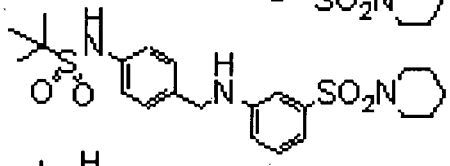
Ig-181 

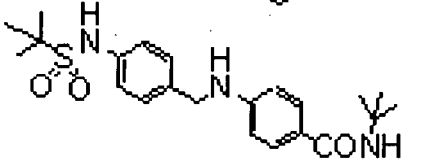
Ig-182 

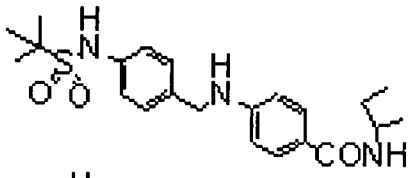
Ig-183 

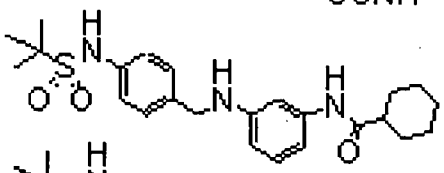
Ig-184 

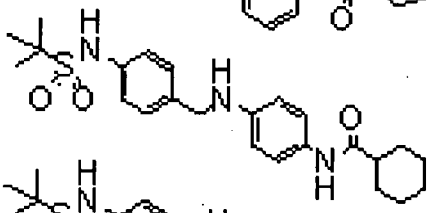
Ig-185 

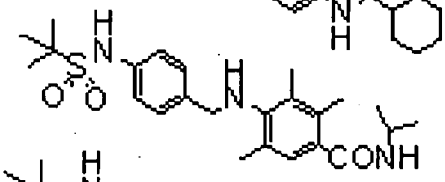
Ig-186 

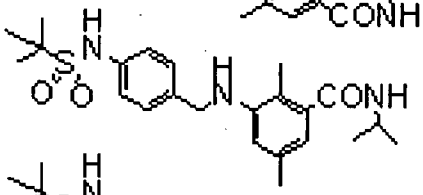
Ig-187 

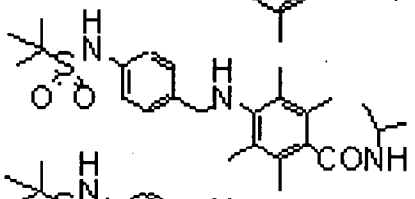
Ig-188 

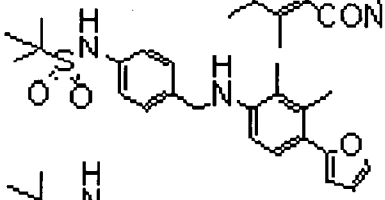
Ig-189 

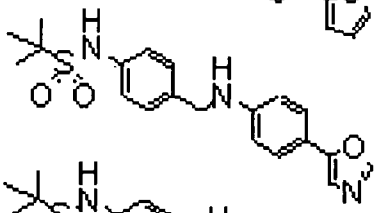
Ig-190 

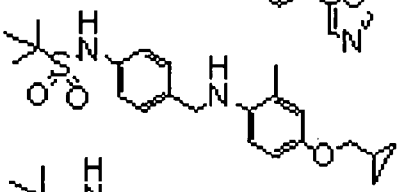
Ig-191 

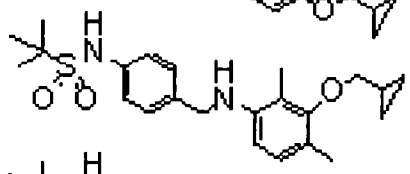
Ig-192 

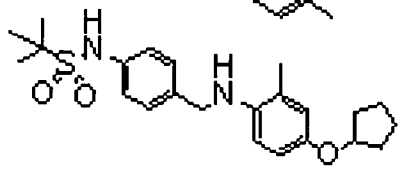
Ig-193 

Ig-194 

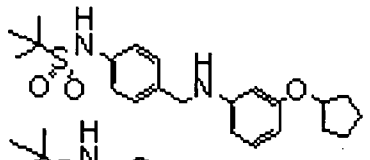
Ig-195 

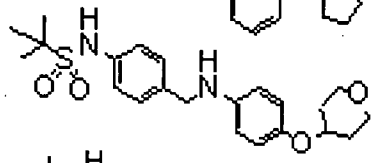
Ig-196 

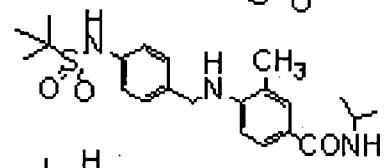
Ig-197 

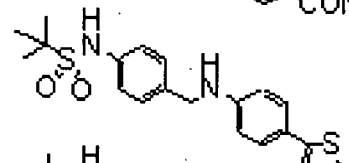
Ig-198 

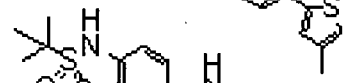
[Formula 154]

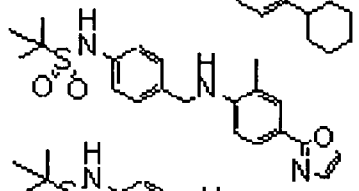
Ig-199 

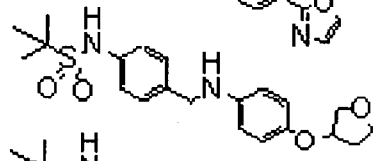
Ig-200 

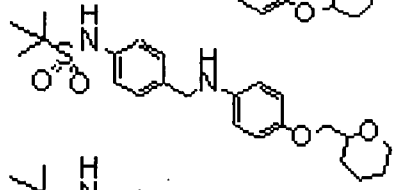
Ig-201 

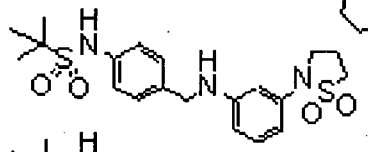
Ig-202 

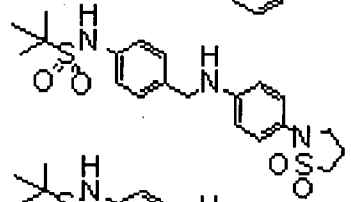
Ig-203 

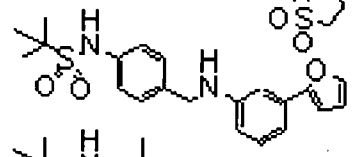
Ig-204 

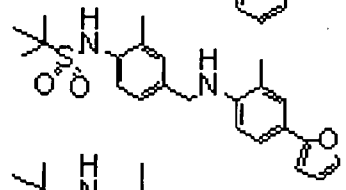
Ig-205 

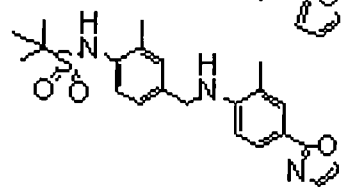
Ig-206 

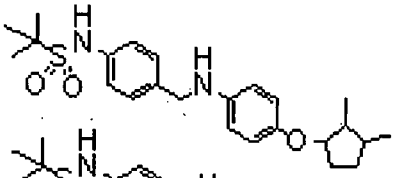
Ig-207 

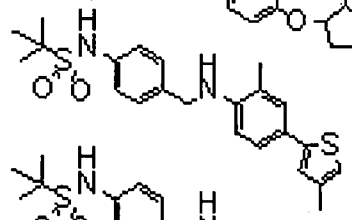
Ig-208 

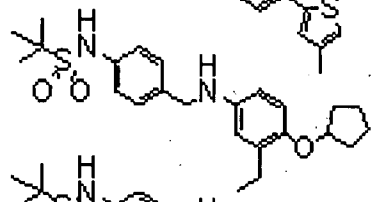
Ig-209 

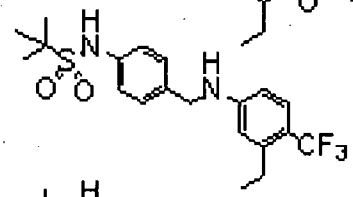
Ig-210 

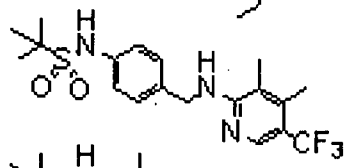
Ig-211 

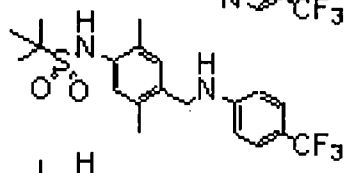
Ig-212 

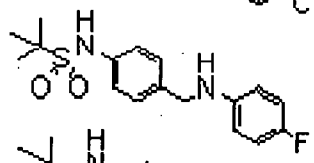
Ig-213 

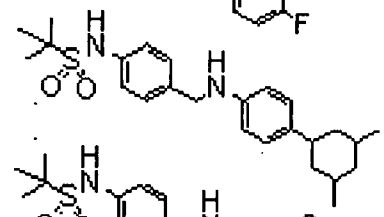
Ig-214 

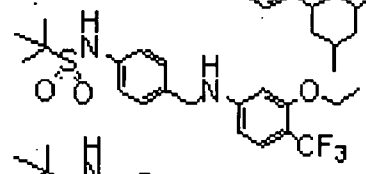
Ig-215 

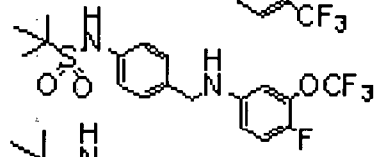
Ig-216 

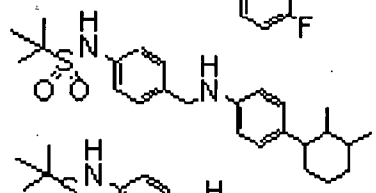
Ig-217 

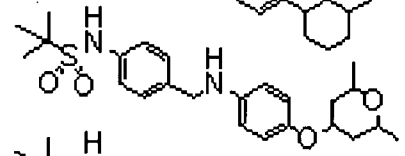
Ig-220 

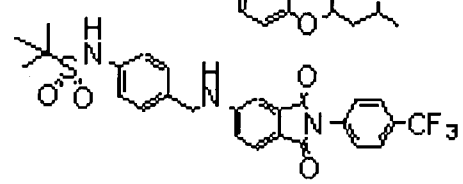
Ig-221 

Ig-222 

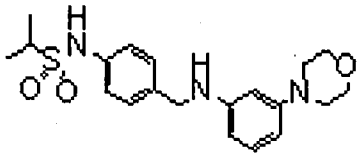
Ig-223 

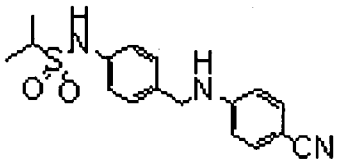
Ig-224 

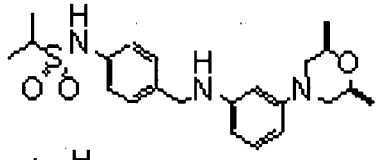
Ig-225 

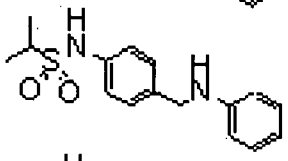
Ig-226 

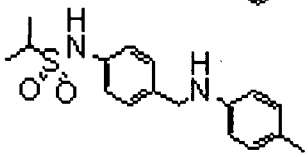
[Formula 155]

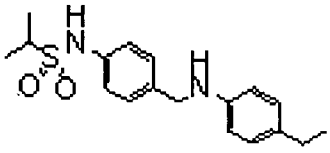
Ih-1 

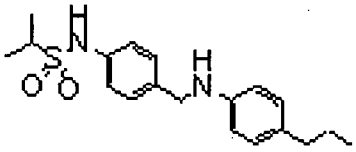
Ih-2 

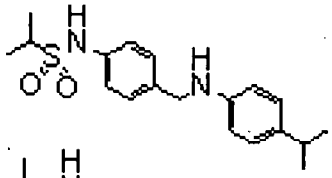
Ih-4 

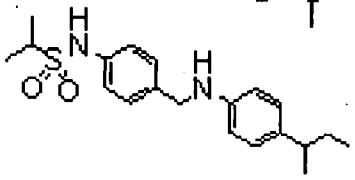
Ih-7 

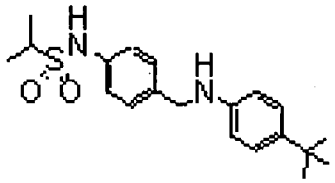
Ih-8 

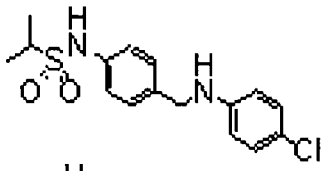
Ih-9 

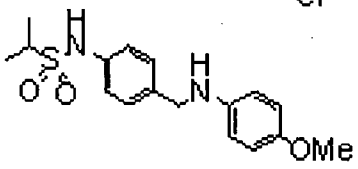
Ih-10 

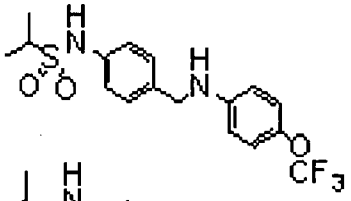
Ih-11 

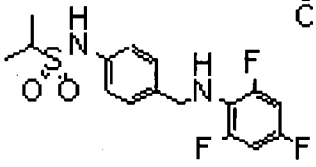
Ih-12 

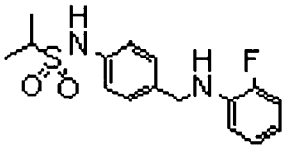
Ih-13 

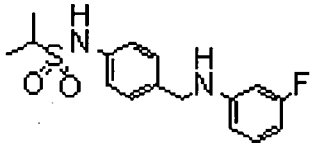
Ih-14 

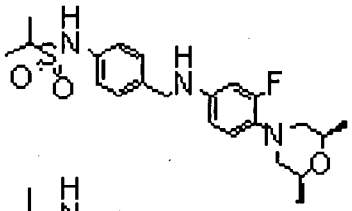
Ih-16 

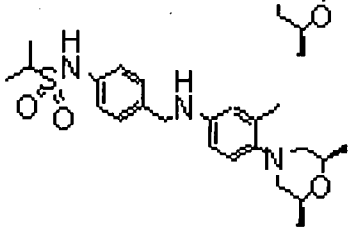
Ih-17 

Ih-18 

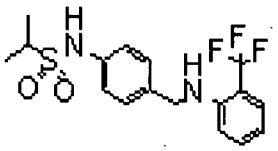
Ih-19 

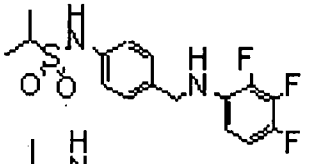
Ih-20 

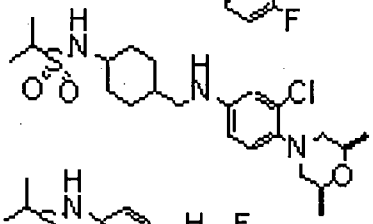
Ih-21 

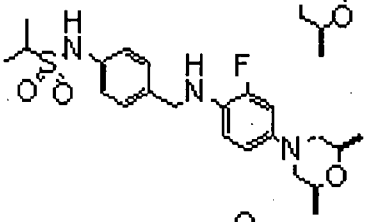
Ih-22 

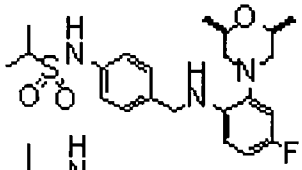
[Formula 156]

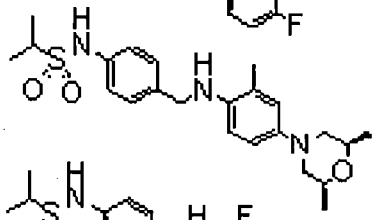
Ih-23 

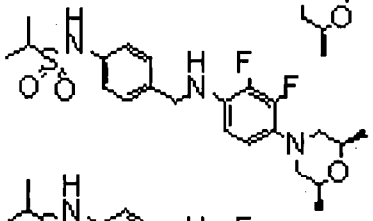
Ih-24 

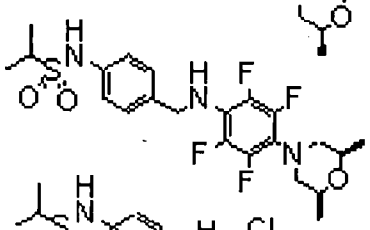
Ih-25 

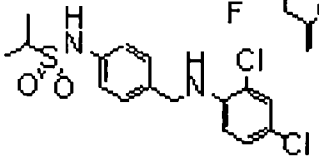
Ih-26 

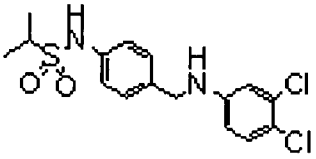
Ih-27 

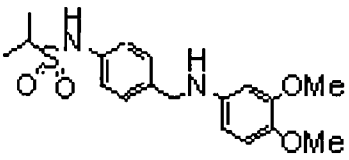
Ih-28 

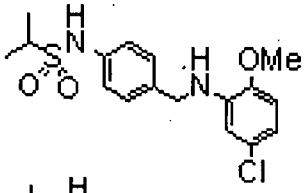
Ih-29 

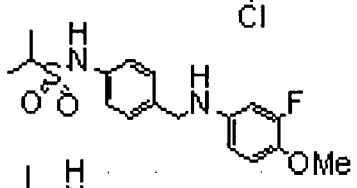
Ih-30 

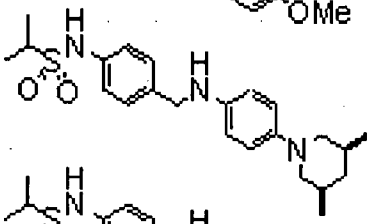
Ih-31 

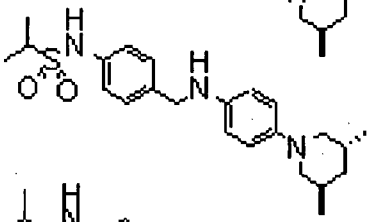
Ih-32 

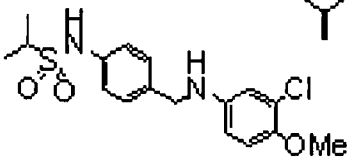
Ih-33 

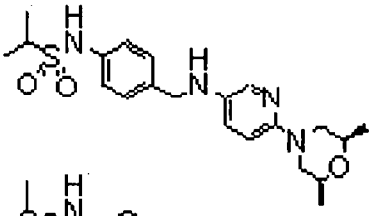
Ih-35 

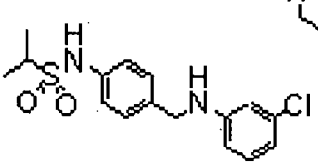
Ih-36 

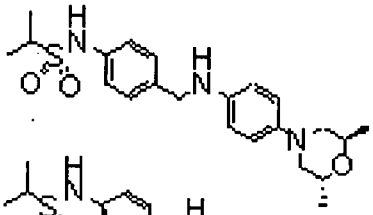
Ih-37 

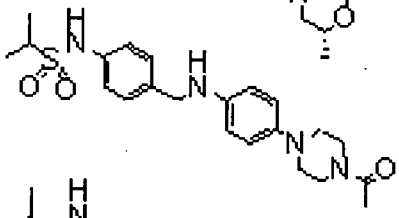
Ih-38 

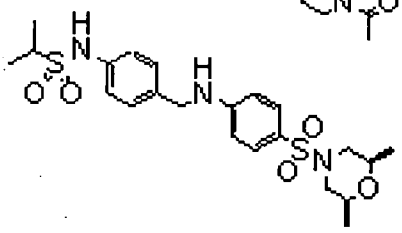
Ih-39 

Ih-40 

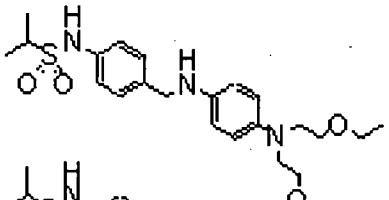
Ih-41 

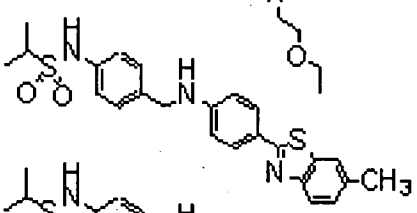
Ih-42 

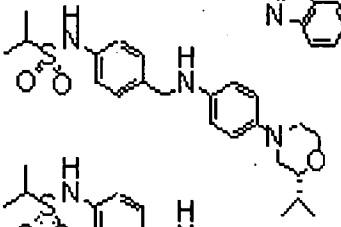
Ih-43 

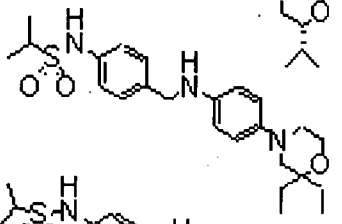
Ih-44 

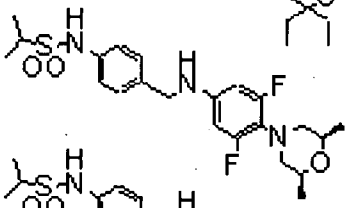
[Formula 157]

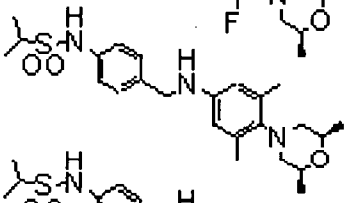
Ih-45 

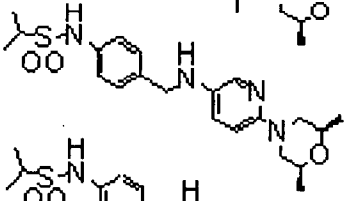
Ih-46 

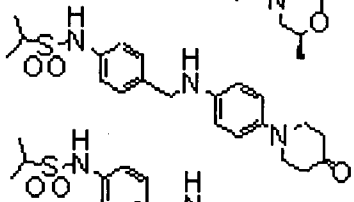
Ih-47 

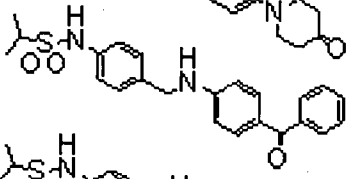
Ih-48 

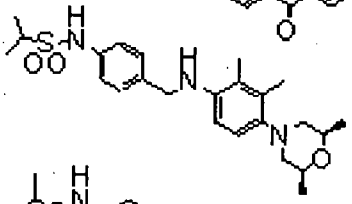
Ih-49 

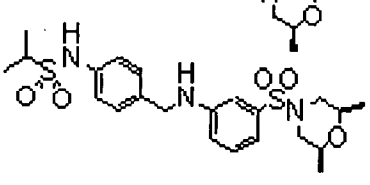
Ih-50 

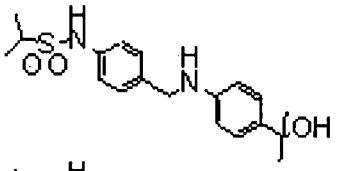
Ih-51 

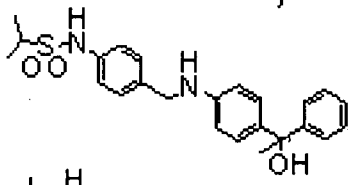
Ih-52 

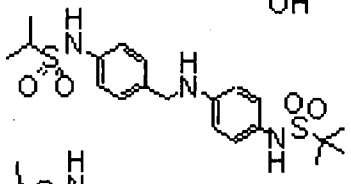
Ih-53 

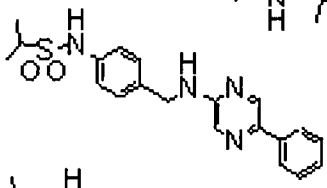
Ih-54 

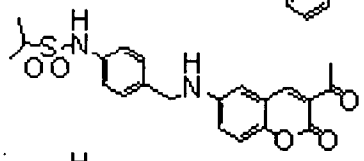
Ih-55 

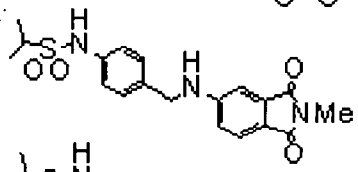
Ih-56 

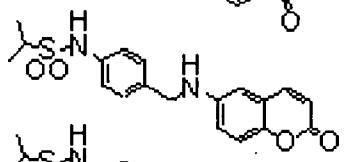
Ih-57 

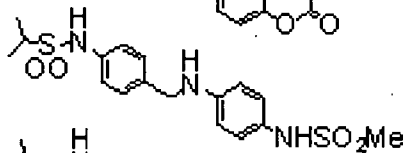
Ih-58 

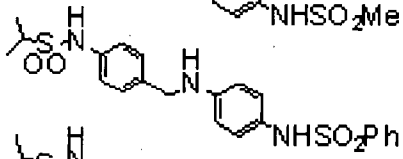
Ih-59 

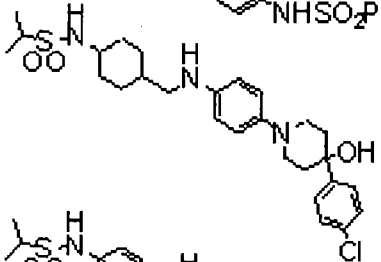
Ih-60 

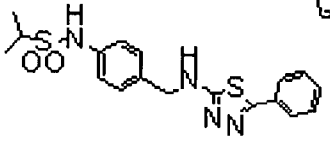
Ih-61 

Ih-62 

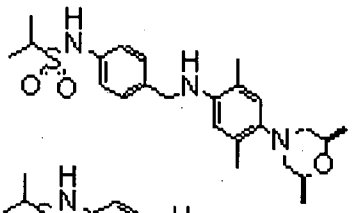
Ih-63 

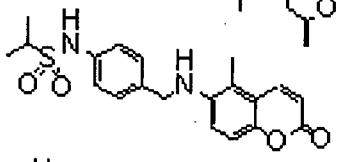
Ih-64 

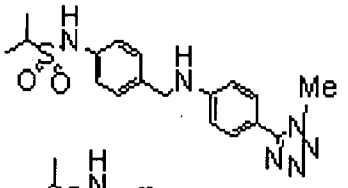
Ih-65 

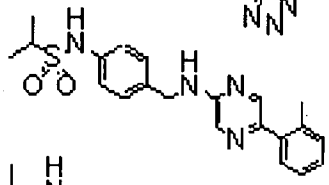
Ih-66 

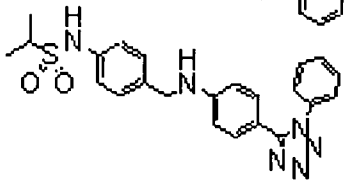
[Formula 158]

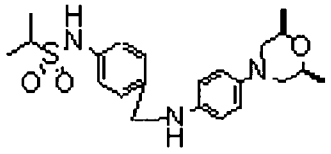
Ih-67 

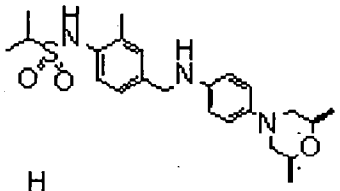
Ih-68 

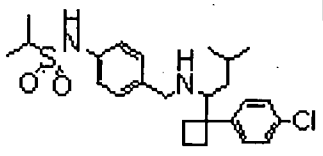
Ih-69 

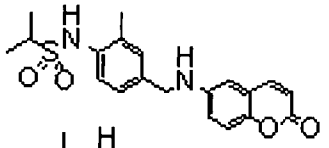

Ih-70 

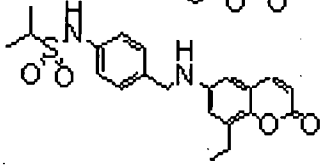
Ih-71 

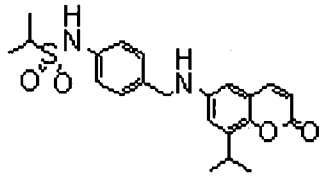
Ih-72 

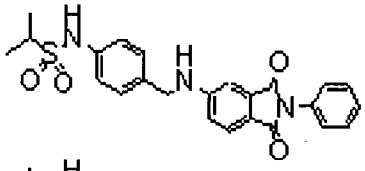
Ih-74 

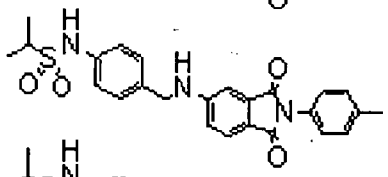
Ih-75 

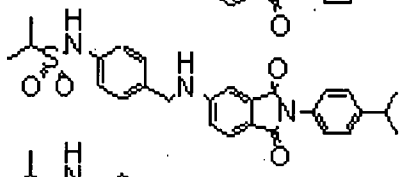

Ih-76 

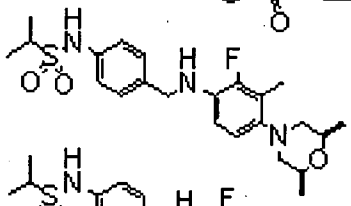
Ih-77 

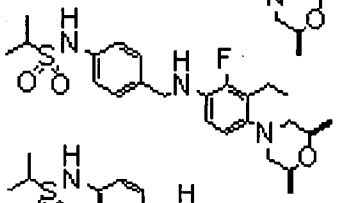
Ih-78 

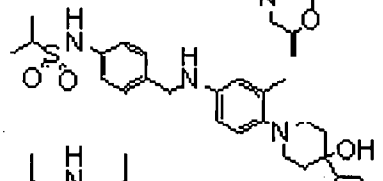
Ih-79 

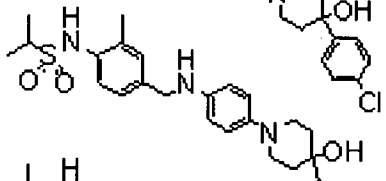
Ih-80 

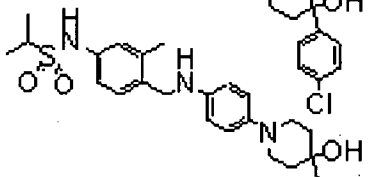
Ih-81 

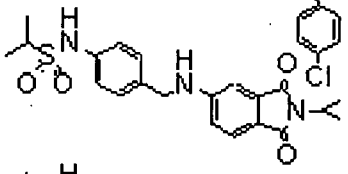
Ih-82 

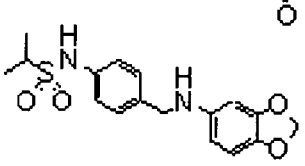

Ih-83 


Ih-84 

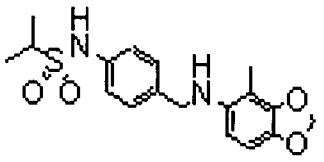

Ih-85 

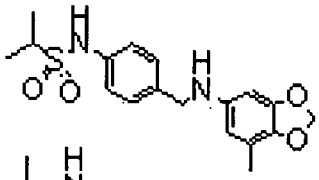

Ih-86 

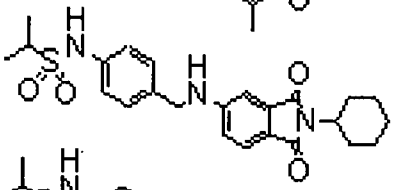

Ih-87 

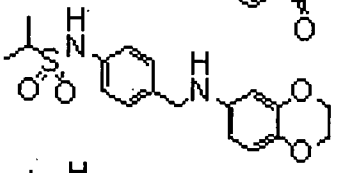

Ih-88 

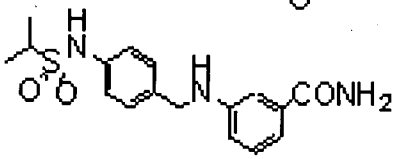
[Formula 159]

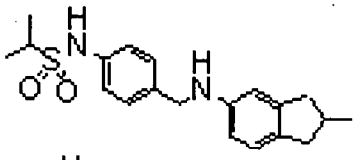
Ih-89 

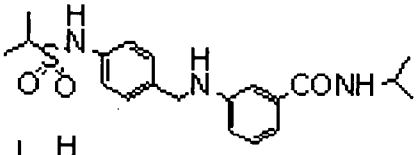
Ih-90 

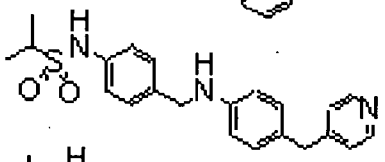
Ih-91 

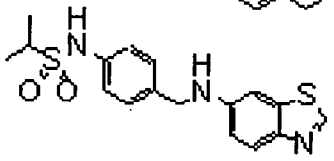
Ih-92 

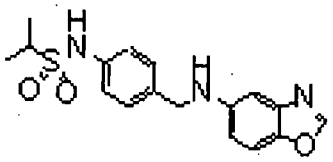
Ih-93 

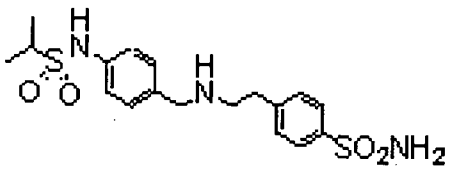
Ih-94 

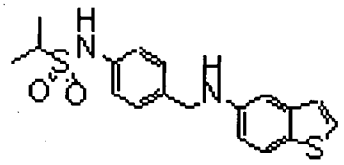
Ih-95 

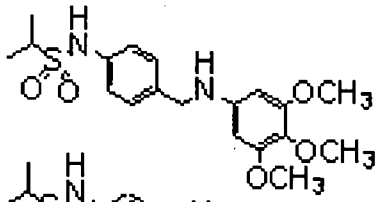
Ih-96 

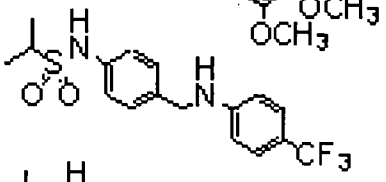
Ih-97 

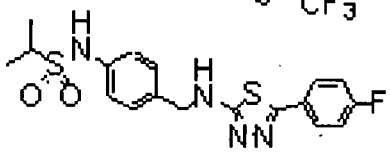
Ih-98 

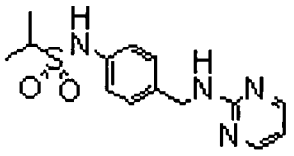
Ih-99 

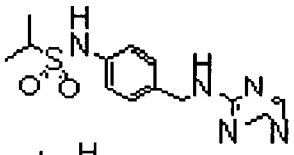
Ih-100 

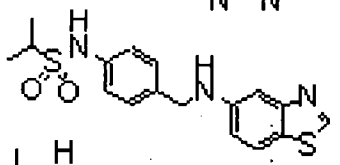
Ih-101 

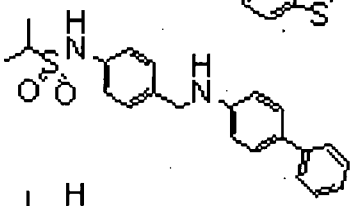
Ih-102 

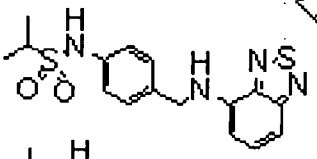
Ih-103 

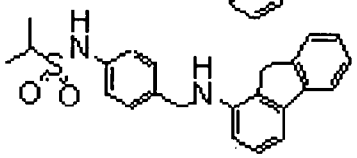
Ih-104 

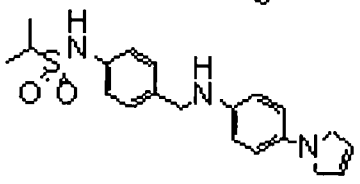
Ih-105 

Ih-106 

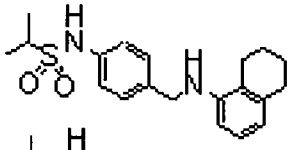
Ih-107 

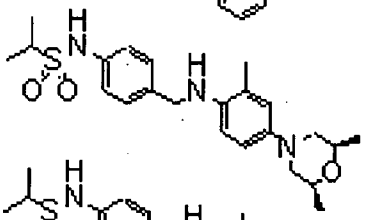
Ih-108 

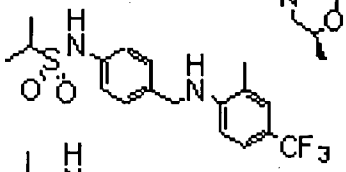
Ih-109 

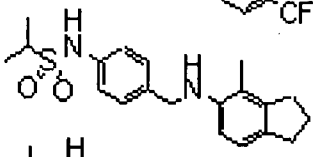
Ih-110 

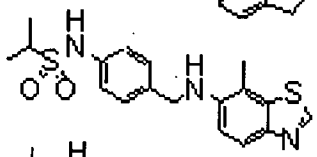
[Formula 160]

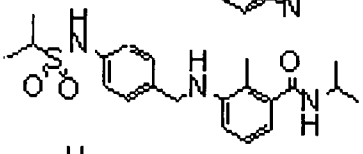
Ih-111 

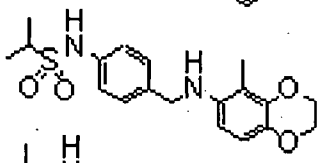
Ih-112 

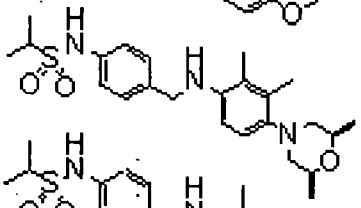
Ih-113 

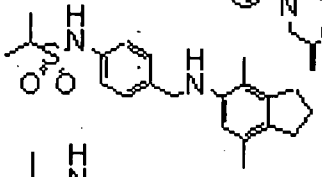
Ih-114 

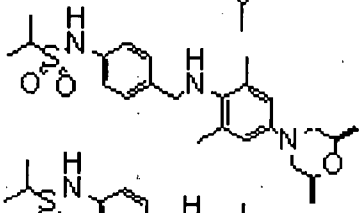
Ih-115 

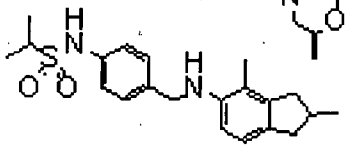
Ih-116 

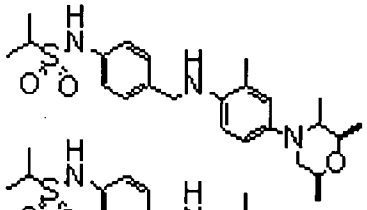
Ih-117 

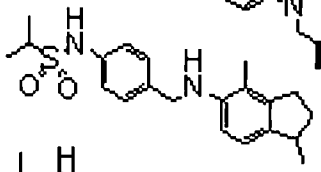
Ih-118 

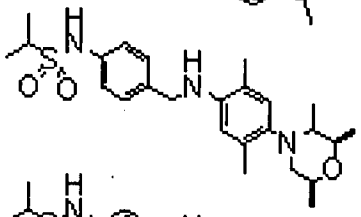
Ih-119 

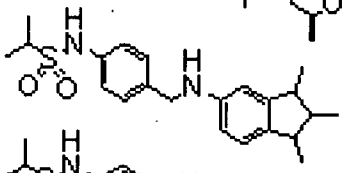
Ih-120 

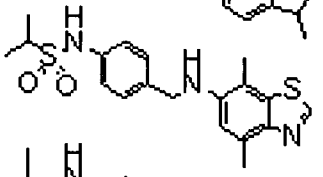
Ih-121 

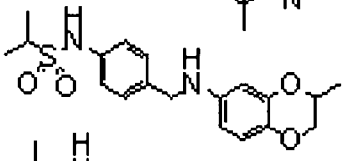
Ih-122 

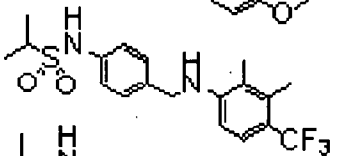
Ih-123 

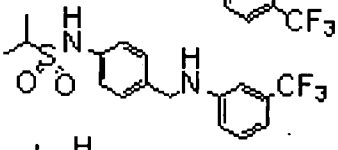
Ih-124 

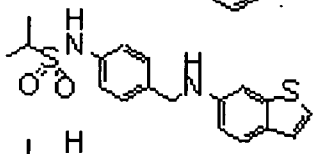
Ih-125 

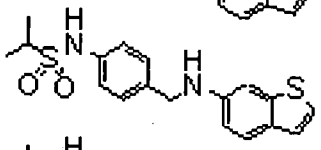
Ih-126 

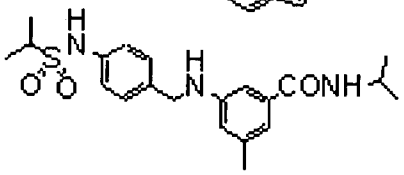
Ih-127 

Ih-128 

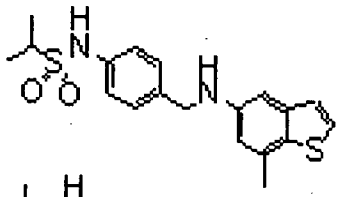
Ih-129 

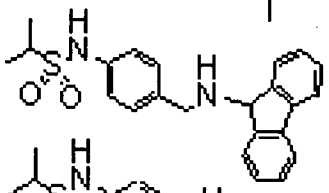
Ih-130 

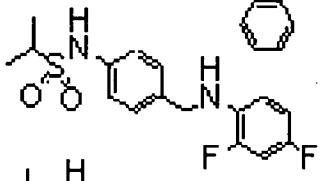
Ih-131 

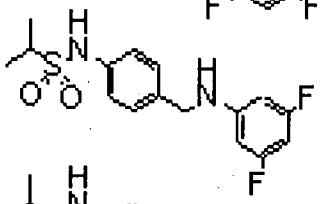
Ih-132 

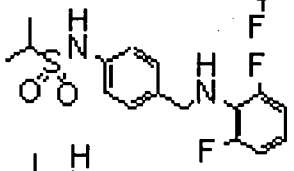
[Formula 161]

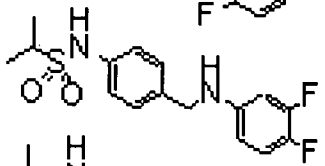
Ih-133 

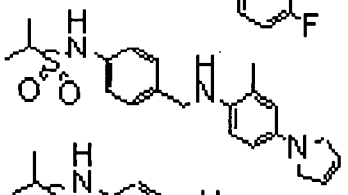
Ih-134 

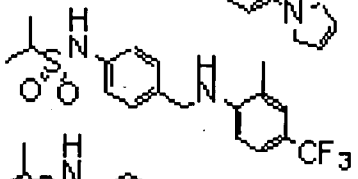
Ih-135 

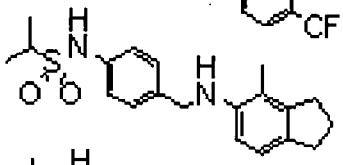
Ih-136 

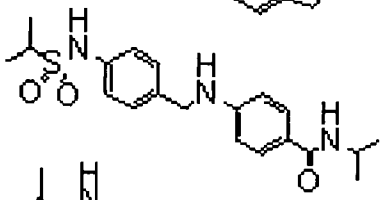
Ih-137 

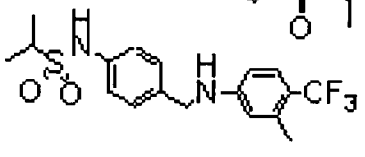
Ih-138 

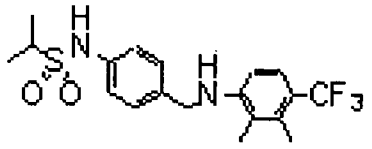
Ih-139 

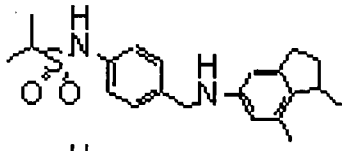
Ih-140 

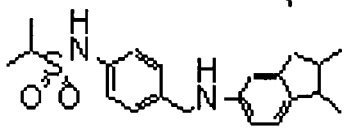
Ih-141 

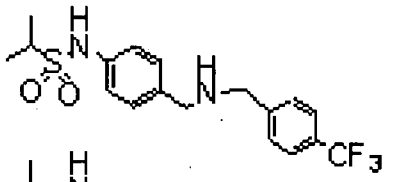
Ih-142 

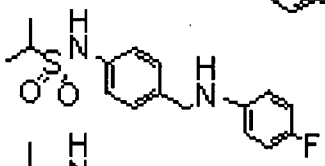
Ih-143 

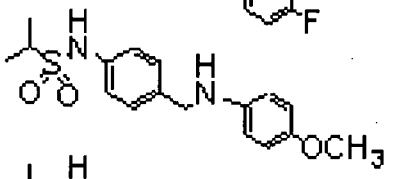
Ih-144 

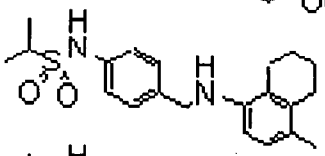
Ih-145 

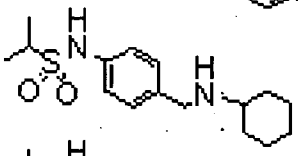
Ih-146 

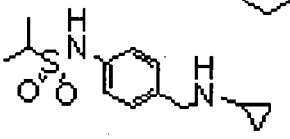
Ih-147 

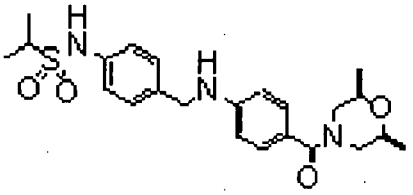
Ih-148 

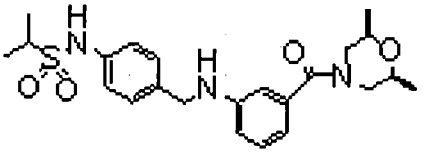
Ih-149 

Ih-150 

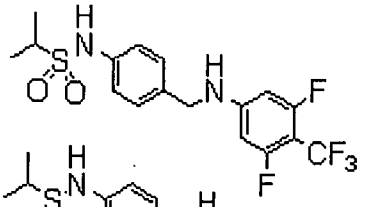
Ih-151 

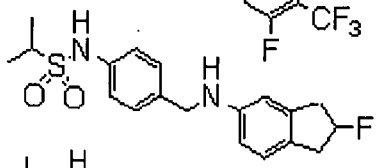
Ih-152 

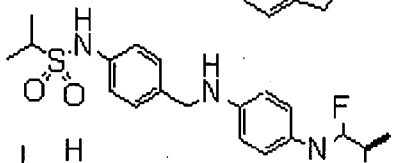
Ih-153 

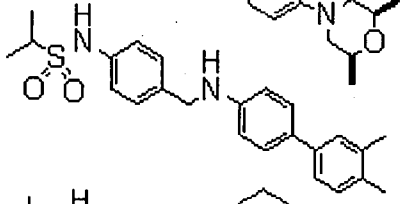
Ih-154 

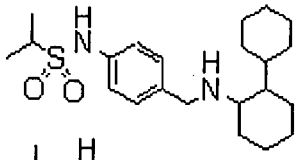
[Formula 162]

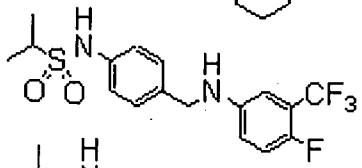
Ih-155 

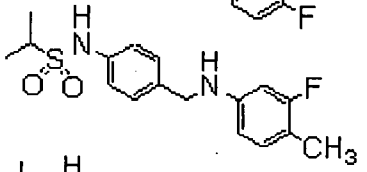
Ih-156 

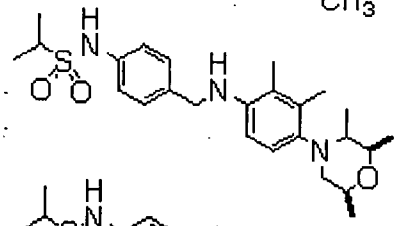
Ih-157 

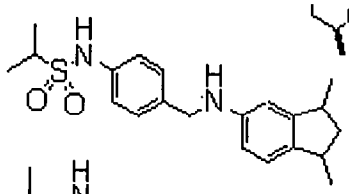
Ih-158 

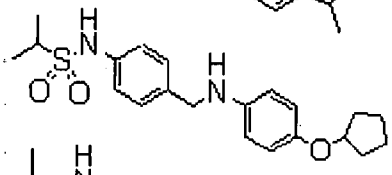
Ih-159 

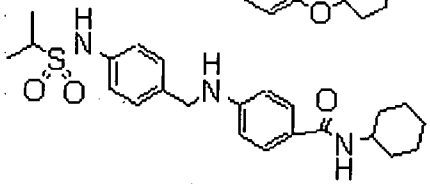
Ih-160 

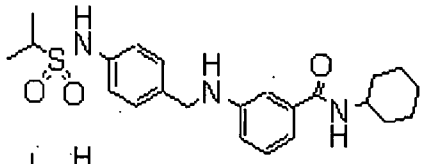
Ih-161 

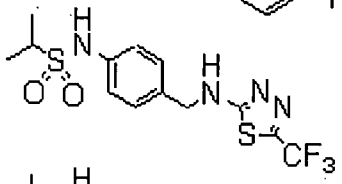
Ih-162 

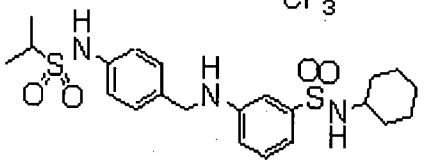
Ih-163 

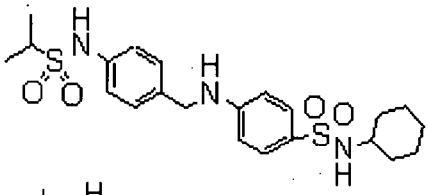
Ih-164 

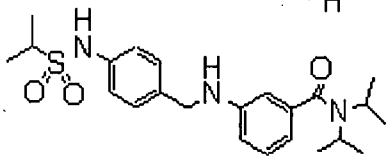
Ih-165 

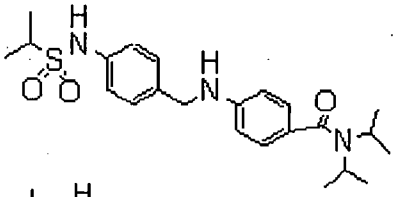
Ih-166 

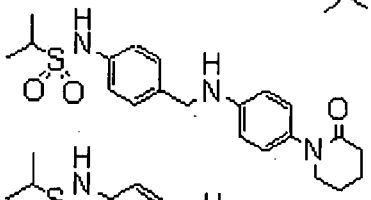
Ih-167 

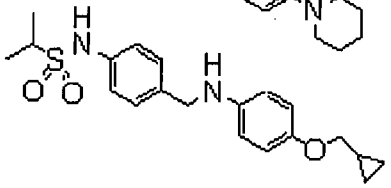
Ih-168 

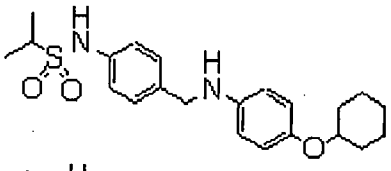
Ih-169 

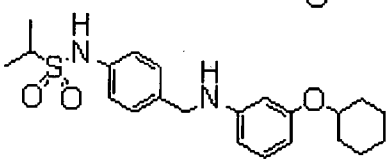
Ih-171 

Ih-172 

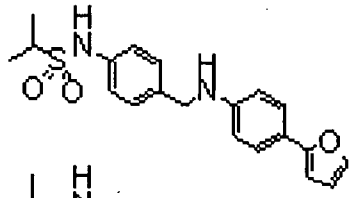
Ih-173 

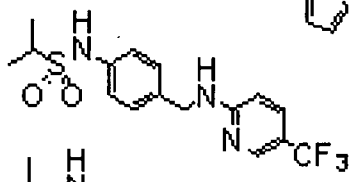
Ih-174 

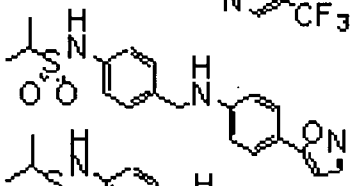
Ih-175 

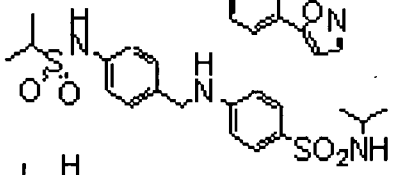
Ih-176 

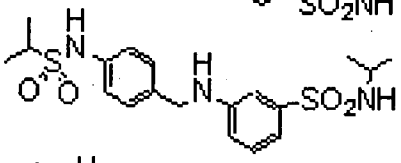
[Formula 163]

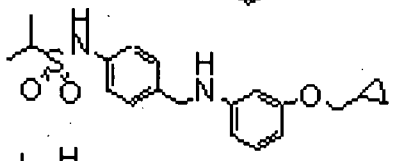
Ih-177 

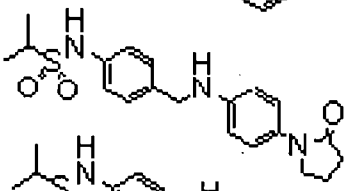
Ih-178 

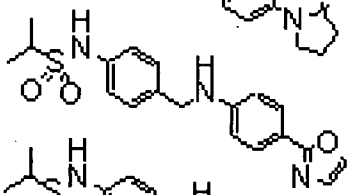
Ih-179 

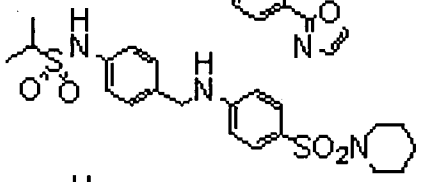
Ih-180 

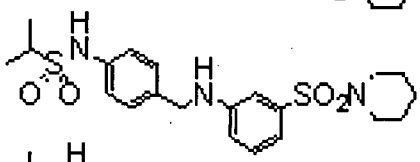
Ih-181 

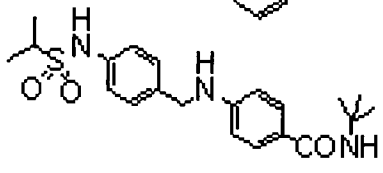
Ih-182 

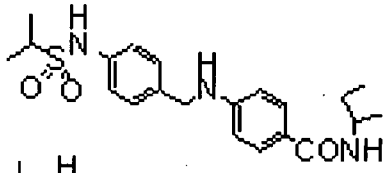
Ih-183 

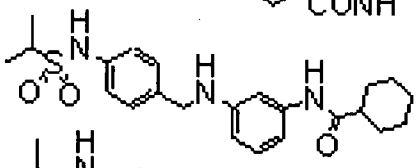
Ih-184 

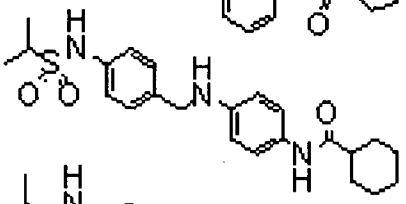
Ih-185 

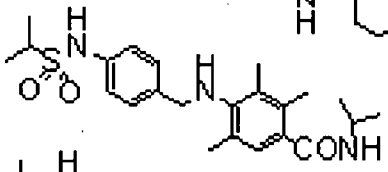
Ih-186 

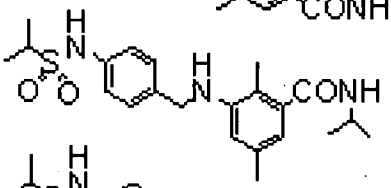
Ih-187 

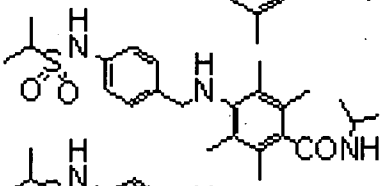
Ih-188 

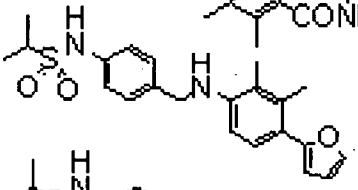
Ih-189 

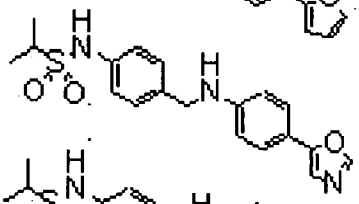
Ih-190 

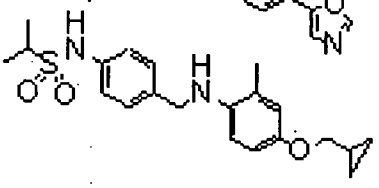
Ih-191 

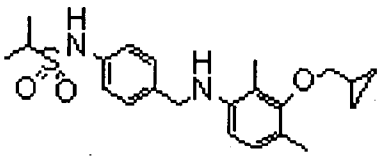
Ih-192 

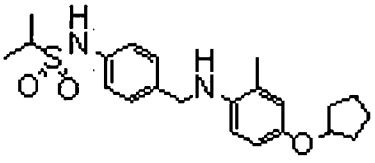
Ih-193 

Ih-194 

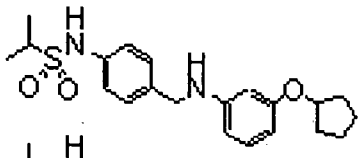
Ih-195 

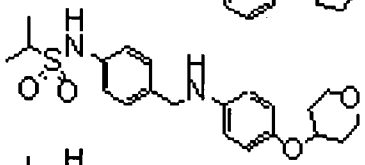
Ih-196 

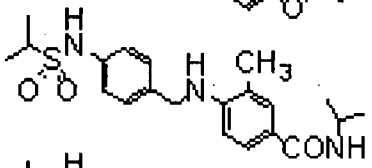
Ih-197 

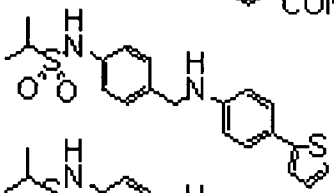
Ih-198 

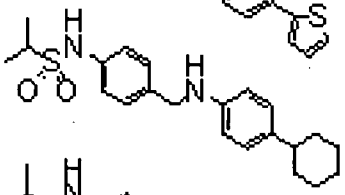
[Formula 164]

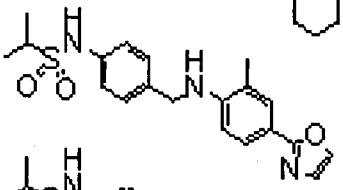
Ih-199 

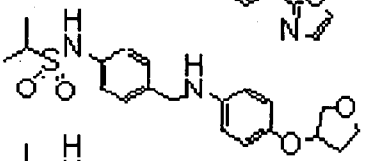
Ih-200 

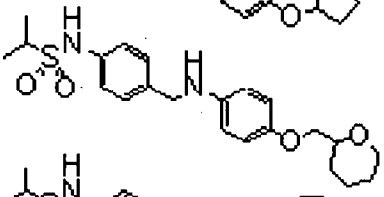
Ih-201 

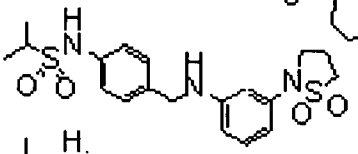
Ih-202 

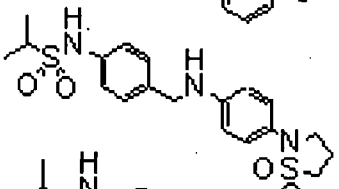
Ih-203 

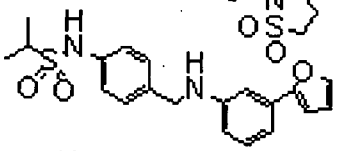
Ih-204 

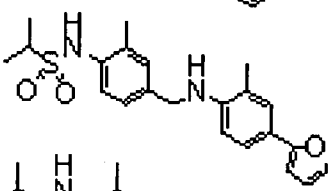
Ih-205 

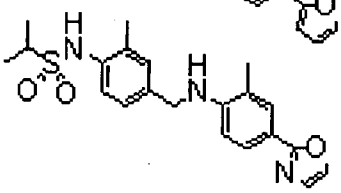
Ih-206 

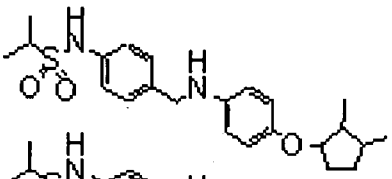
Ih-207 

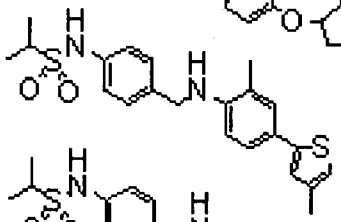
Ih-208 

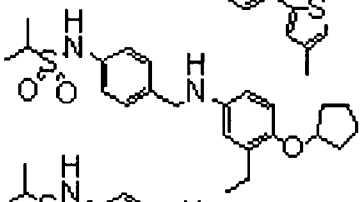
Ih-209 

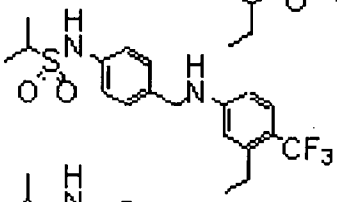
Ih-210 

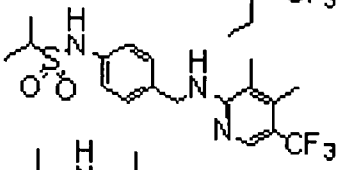
Ih-211 

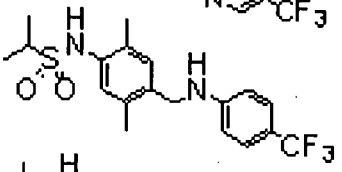
Ih-212 

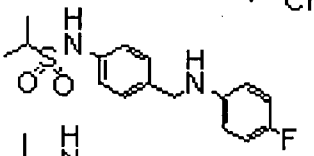
Ih-213 

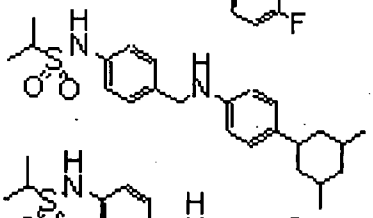
Ih-214 

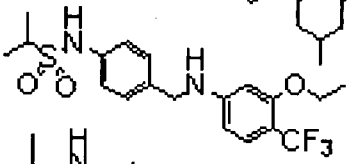
Ih-215 

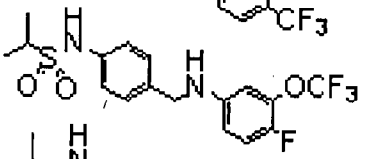
Ih-216 

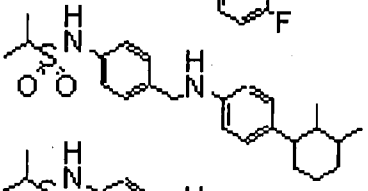
Ih-219 

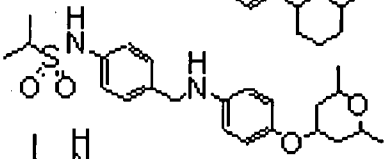
Ih-220 

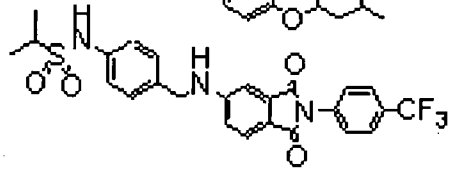
Ih-221 

Ih-222 

Ih-223 

Ih-224 

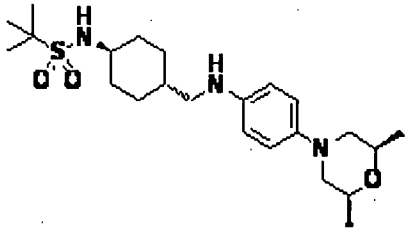
Ih-225 

Ih-226 

[0082]

Compound I-72

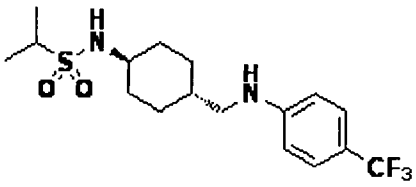
[Formula 165]



1H-NMR (DMSO-d6) δ: 0.90-1.05 (m, 2 H), 1.05-1.15 (m, 6H), 1.25 (s, 9H,), 1.15-1.32 (m, 3H), 1.41 (m, 1H), 1.75-1.98 (m, 4H), 2.11 (m, 1H), 2.58-3.38 (m, 5H), 3.58-3.76 (m, 2H), 5.17 (m, 1H), 6.25-6.92 (m, 5H) Melting point: 147 to 149 °C

Compound Ia-140

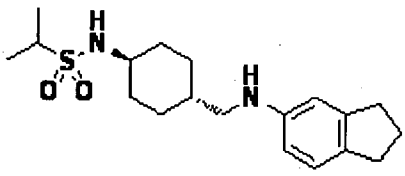
[Formula 166]



1H-NMR (CDCl3) δ: 1.02-1.20 (m, 2 H), 1.17-1.32 (m, 2 H), 1.37 (d, 6H, J = 6.9 Hz), 1.46-1.70 (m, 4H), 1.86-1.95 (m, 2H), 2.08-2.18 (m, 2H), 3.01 (d, 2H, J = 6.9 Hz), 3.13 (m, 1H), 3.25 (m, 1H), 3.87 (d, 1H, J = 8.4 Hz), 6.61(d, 2H, J = 8.7 Hz), 7.39 (d, 2H, J = 8.7 Hz)

Compound Ia-141

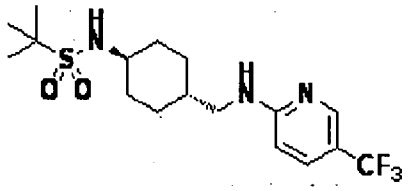
[Formula 167]



1H-NMR (CDCl3) δ: 1.00-1.30 (m, 4 H), 1.37 (d, 6H, J = 6.9 Hz), 1.59 (m, 1H), 1.87-1.98 (m, 2H), 1.99-2.18 (m, 5H), 2.85 (q, 3H, J = 7.5 Hz), 2.97 (d, 2H, J = 6.9 Hz), 3.12 (m, 1H), 3.23 (m, 1H), 3.88 (d, 1H, J = 8.1 Hz), 6.53 (d, 1H, J = 7.8 Hz), 6.63 (brs, 1H), 7.04 (d, 1H, J = 7.8 Hz) Mass: 351[M+H]

Compound Ia-178

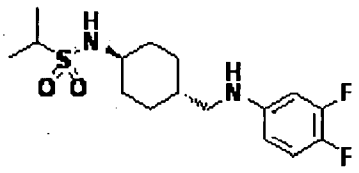
[Formula 168]



1H-NMR (CDCl3) δ: 1.08-1.36 (m, 4 H), 1.39 (s, 9H), 1.59 (m, 1H), 1.90-1.99 (m, 2H), 2.16-2.26 (m, 2H), 3.17-3.34 (m,3H), 3.69 (d, 1H, J = 9.3 Hz), 6.68 (d, 1H, J = 9.3 Hz), 7.77 (dd, 1H, J = 2.1 Hz and 9.3 Hz), 8.49 (brs, 1H) Mass:394[M+H]+

Compound Ib-138

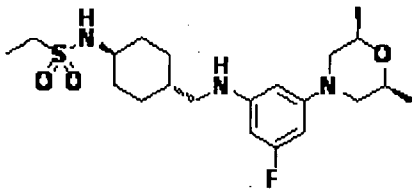
[Formula 169]



1H-NMR (CDCl3) δ: 1.02-1.34 (m, 4 H), 1.37 (d, 6H, J = 6.6 Hz), 1.57 (m, 1H), 1.87-1.97 (m, 2H), 2.07-2.18 (m, 2H), 2.93 (d, 2H, J = 6.6 Hz), 3.13 (m, 1H), 3.25 (m, 1H), 3.99 (d, 1H, J = 8.4 Hz), 6.38 (m, 1H), 6.49 (brs, 1H), 6.97 (q, 1H, J = 9.3 Hz) Mass:347[M+H]

Compound Ii-2

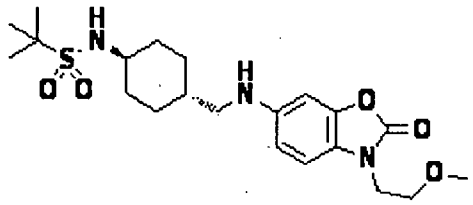
[Formula 170]



1H-NMR (DMSO-d6) δ: 0.91-1.06 (m, 2H), 1.12-1.28 (m, 11H), 1.31-1.47 (m, 1H), 1.75-1.94 (m, 4H), 2.19 (t, 2H, J = 11.3 Hz), 2.79 (t, 2H, J = 6.0 Hz), 2.93-3.08 (m, 1H), 2.97 (q, 2H, J = 7.42 Hz), 3.46 (m, 2H), 3.57-3.69 (m, 2H), 5.71 (t, 1H, J = 5.2 Hz), 5.77 (d, 1H, J = 11.5 Hz), 5.88-5.96 (m, 2H), 7.01 (d, 1H, J = 7.4 Hz).

Compound Ii-3

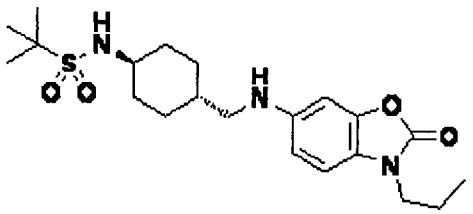
[Formula 171]



1H-NMR (DMSO-d6) δ: 0.90-1.07 (m, 2 H), 1.15-1.21 (m, 1H), 1.27 (s, 9H), 1.40-1.49 (m, 2H), 1.82 (d, 2H, J = 11.6 Hz), 1.92 (d, 2H, J = 11.6 Hz), 2.79-2.84 (m, 2H), 2.97-3.10 (m, 1H), 3.24 (s, 3H), 3.55-3.62 (m, 2H), 3.84-3.91 (m, 2H), 5.50-5.59 (m, 1H), 6.40 (d, 1H, J = 8.0 Hz), 6.56 (s, 1H), 6.72 (d, 1H, J = 8.4 Hz), 6.97 (d, 1H, J = 8.4 Hz). Melting point: 166 to 168 °C

Compound Ii-4

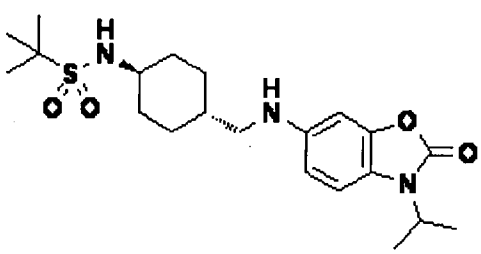
[Formula 172]



1H-NMR (DMSO-d6) δ: 0.87 (t, 3H, J = 7.2 Hz), 0.93-1.06 (m, 2H), 1.13-1.21 (m, 1H), 1.26 (s, 9H), 1.37-1.49 (m, 2H), 1.61-1.72 (m, 2H), 1.82 (d, 2H, J = 12.0 Hz), 1.91 (d, 2H, J = 12.0 Hz), 2.78-2.84 (m, 2H), 2.97-3.08 (m, 1H), 3.61-3.71 (m, 2H), 5.52-5.60 (m, 1H), 6.40 (d, 1H, J = 8.4 Hz), 6.56 (s, 1H), 6.73 (d, 1H, J = 8.8 Hz), 6.97 (d, 1H, J = 8.8 Hz). Melting point: 185 to 186 °C

Compound Ii-5

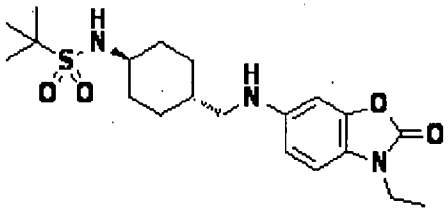
[Formula 173]



1H-NMR (DMSO-d6) δ: 0.90-1.05 (m, 2H), 1.26 (s, 9H), 1.28-1.31 (m, 1H), 1.35-1.47 (m, 8H), 1.81 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.4 Hz), 2.77-2.84 (m, 2H), 2.96-3.07 (m, 1H), 4.30-4.42 (m, 1H), 5.51-5.64 (m, 1H), 6.39 (d, 1H, J = 8.0 Hz), 6.55 (s, 1H), 6.72 (d, 1H, J = 8.8 Hz), 7.07 (d, 1H, J = 8.8 Hz). Melting point: 156 to 157 °C

Compound Ii-6

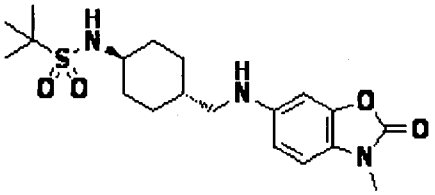
[Formula 174]



1H-NMR (DMSO-d6) δ: 0.91-1.07 (m, 2H), 1.19-1.25 (m, 4H), 1.26 (s, 9H), 1.38-1.49 (m, 2H), 1.82 (d, 2H, J = 8.8 Hz), 1.91 (d, 2H, J = 8.8 Hz), 2.79-2.84 (m, 2H), 2.97-3.07 (m, 1H), 3.69-3.80 (m, 2H), 5.51-5.63 (m, 1H), 6.41 (d, 1H, J = 8.0 Hz), 6.56 (s, 1H), 6.72 (d, 1H, J = 8.8 Hz), 6.97 (d, 1H, J = 8.8 Hz). Melting point: 178 to 179 °C

Compound Ii-7

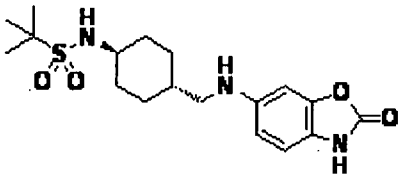
[Formula 175]



1H-NMR (DMSO-d6) δ: 0.92-1.07 (m, 2H), 1.19-1.22 (m, 1H), 1.26 (s, 9H), 1.38-1.48 (m, 2H), 1.82 (d, 2H, J = 11.6 Hz), 1.91 (d, 2H, J = 11.6 Hz), 2.79-2.84 (m, 2H), 2.95-3.09 (m, 1H), 3.25 (s, 3H), 5.52-5.60 (m, 1H), 6.41 (d, 1H, J = 8.4 Hz), 6.56 (s, 1H), 6.72 (d, 1H, J = 8.4 Hz), 6.92 (d, 1H, J = 8.4 Hz). Melting point: 206 to 207 °C

Compound Ii-8

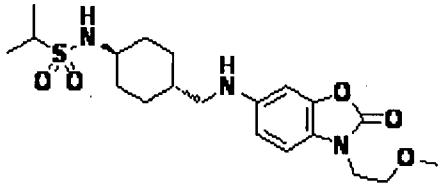
[Formula 176]



1H-NMR (DMSO-d6) δ: 0.91-1.05 (m, 2H), 1.16-1.24 (m, 1H), 1.26 (s, 9H), 1.37-1.47 (m, 2H), 1.81 (d, 2H, J = 12.8 Hz), 1.90 (d, 2H, J = 12.8 Hz), 2.75-2.81 (m, 2H), 2.96-3.08 (m, 1H), 5.45-5.52 (m, 1H), 6.33 (d, 1H, J = 8.4 Hz), 6.50 (s, 1H), 6.68-6.80 (m, 2H), 11.02 (brs, 1H). Melting point: 213 to 214 °C

Compound Ii-9

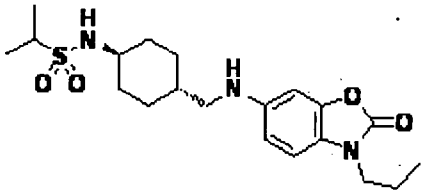
[Formula 177]



1H-NMR (DMSO-d6) δ: 0.91-1.08 (m, 2 H), 1.17-1.30 (m, 8H), 1.44 (brs, 1H), 1.82 (d, 2H, J = 12.4 Hz), 1.89 (d, 2H, J = 12.4 Hz), 2.78-2.82 (m, 2H), 2.97-3.15 (m, 2H), 3.23 (s, 3H), 3.55-3.62 (m, 2H), 3.83-3.90 (m, 2H), 5.52-5.59 (m, 1H), 6.40 (d, 1H, J = 8.0 Hz), 6.55 (s, 1H), 6.92 (d, 1H, J = 8.0 Hz), 6.97 (d, 1H, J = 8.4 Hz). Melting point: 120 to 121 °C

Compound Ii-10

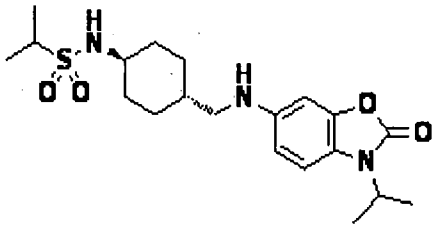
[Formula 178]



1H-NMR (DMSO-d6) δ: 0.88 (t, 3H, J = 7.2 Hz), 0.93-1.08 (m, 2H), 1.17-1.30 (m, 8H), 1.44 (brs, 1H), 1.52-1.61 (m, 2H), 1.83 (d, 2H, J = 12.0 Hz), 1.90 (d, 2H, J = 12.0 Hz), 2.78-2.84 (m, 2H), 2.98-3.15 (m, 2H), 3.62-3.71 (m, 2H), 5.52-5.60 (m, 1H), 6.41 (d, 1H, J = 8.4 Hz), 6.57 (s, 1H), 6.92 (d, 1H, J = 8.0 Hz), 6.97 (d, 1H, J = 8.4 Hz). Melting point: 144 to 145 °C

Compound Ii-11

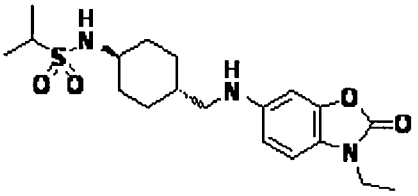
[Formula 179]



1H-NMR (DMSO-d6) δ: 0.90-1.08 (m, 2H), 1.15-1.30 (m, 8H), 1.33-1.50 (m, 7H), 1.82 (d, 2H, J = 12.0 Hz), 1.89 (d, 2H, J = 12.0 Hz), 2.78-2.86 (m, 2H), 2.96-3.14 (m, 2H), 4.30-4.45 (m, 1H), 5.50-5.61 (m, 1H), 6.40 (d, 1H, J = 7.6 Hz), 6.55 (s, 1H), 6.92 (d, 1H, J = 7.2 Hz), 7.07 (d, 1H, J = 7.6 Hz). Melting point: 137 to 138 °C

Compound Ii-12

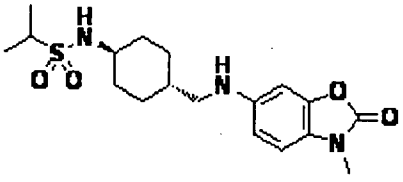
[Formula 180]



1H-NMR (DMSO-d6) δ: 0.92-1.07 (m, 2H), 1.14-1.30 (m, 11H), 1.36-1.50 (m, 1H), 1.82 (d, 2H, J = 12.0 Hz), 1.89 (d, 2H, J = 12.0 Hz), 2.78-2.85 (m, 2H), 2.97-3.15 (m, 2H), 3.69-3.79 (m, 2H), 5.52-5.60 (m, 1H), 6.41 (d, 1H, J = 8.4 Hz), 6.56 (s, 1H), 6.92 (d, 1H, J = 7.2 Hz), 6.98 (d, 1H, J = 8.4 Hz). Melting point: 158 to 159 °C

Compound Ii-13

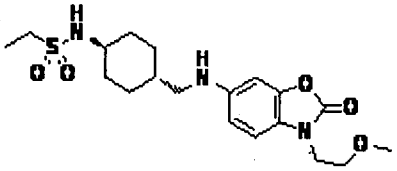
[Formula 181]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.12-1.30 (m, 8H), 1.34-1.51 (m, 1H), 1.82 (d, 2H, J = 12.0 Hz), 1.88 (d, 2H, J = 12.0 Hz), 2.77-2.83 (m, 2H), 2.95-3.12 (m, 2H), 3.25 (s, 3H), 5.51-5.59 (m, 1H), 6.41 (d, 1H, J = 8.8 Hz), 6.56 (s, 1H), 6.86-6.97 (m, 2H). Melting point:157 to 158 °C

Compound Ii-14

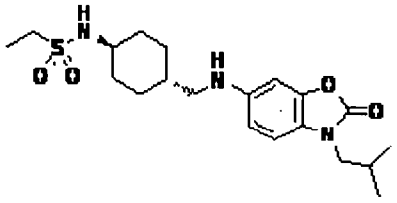
[Formula 182]



1H-NMR (DMSO-d6) δ: 0.91-1.08 (m, 2 H), 1.12-1.30 (m, 5H), 1.38-1.50 (m, 1H), 1.82 (d, 2H, J = 12.0 Hz), 1.88 (d, 2H, J = 12.0 Hz), 2.77-2.85 (m, 2H), 2.90-3.09 (m, 3H), 3.23 (s, 3H), 3.55-3.61 (m, 2H), 3.84-3.91 (m, 2H), 5.52-5.60 (m, 1H), 6.40 (d, 1H, J = 8.4 Hz), 6.55 (s, 1H), 6.89-7.00 (m, 2H). Melting point:150 to 151 °C

Compound Ii-15

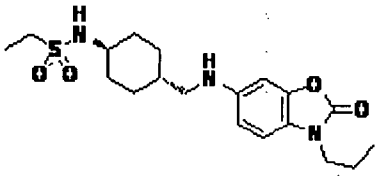
[Formula 183]



1H-NMR (DMSO-d6) δ: 0.88 (s, 3H), 0.90 (s, 3H), 0.92-1.08 (m, 2H), 1.12-1.30 (m, 5H), 1.35-1.51 (m, 1H), 1.83 (d, 2H, J = 12.4 Hz), 1.89 (d, 2H, J = 12.4 Hz), 2.00-2.16 (m, 1H), 2.77-2.84 (m, 2H), 2.90-3.10 (m, 3H), 3.42-3.55 (m, 2H), 5.50-5.65 (m, 1H), 6.40 (d, 1H, J = 8.4 Hz), 6.56 (s, 1H), 6.88-7.01 (m, 2H) Melting point: 132 to 133 °C

Compound Ii-16

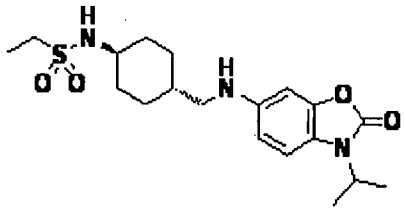
[Formula 184]



1H-NMR (DMSO-d6) δ: 0.87 (t, 3H, J = 6.8 Hz), 0.90-1.08 (m, 2H), 1.10-1.28 (m, 5H), 1.35-1.50 (m, 1H), 1.59-1.72 (m, 2H), 1.82 (d, 2H, J = 12.0 Hz), 1.89 (d, 2H, J = 12.0 Hz), 2.77-2.85 (m, 2H), 2.90-3.09 (m, 3H), 3.61-3.71 (m, 2H), 5.52-5.61 (m, 1H), 6.40 (d, 1H, J = 8.0 Hz), 6.56 (s, 1H), 6.97 (d, 2H, J = 8.0 Hz). Melting point: 136 to 137 °C

Compound Ii-17

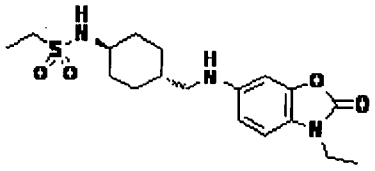
[Formula 185]



1H-NMR (DMSO-d6) δ: 0.92-1.06 (m, 2H), 1.12-1.28 (m, 5H), 1.33-1.50 (m, 7H), 1.81 (d, 2H, J = 12.0 Hz), 1.88 (d, 2H, J = 12.0 Hz), 2.78-2.84 (m, 2H), 2.90-3.08 (m, 3H), 4.28-4.44 (m, 1H), 5.49-5.79 (m, 1H), 6.39 (d, 1H, J = 8.0 Hz), 6.55 (s, 1H), 6.97 (d, 1H, J = 7.6 Hz), 7.07 (d, 1H, J = 8.0 Hz). Melting point: 124 to 125 °C

Compound Ii-18

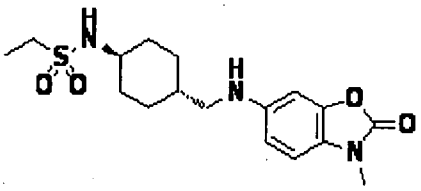
[Formula 186]



1H-NMR (DMSO-d6) δ: 0.90-1.07 (m, 2H), 1.12-1.29 (m, 8H), 1.36-1.51 (m, 1H), 1.82 (d, 2H, J = 12.0 Hz), 1.89 (d, 2H, J = 12.0 Hz), 2.78-2.86 (m, 2H), 2.90-3.09 (m, 3H), 3.68-3.80 (m, 2H), 5.51-5.61 (m, 1H), 6.41 (d, 1H, J = 8.4 Hz), 6.57 (s, 1H), 6.97 (d, 2H, J = 8.4 Hz). Melting point:163 to 164 °C

Compound Ii-19

[Formula 187]

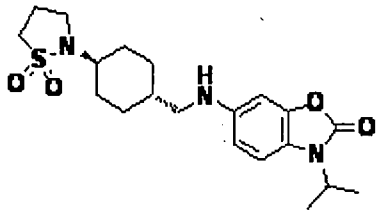


1H-NMR (DMSO-d6) δ: 0.89-1.08 (m, 2H), 1.11-1.30 (m, 5H), 1.35-1.51 (m, 1H), 1.82 (d, 2H, J = 10.8 Hz), 1.89 (d, 2H, J = 10.8 Hz), 2.75-2.88 (m, 2H), 2.89-3.10 (m, 3H), 3.25 (s, 3H), 5.48-5.60 (m, 1H), 6.42 (d, 1H, J = 7.6 Hz), 6.56 (s, 1H), 6.92 (d, 1H, J = 7.6 Hz),

6.98 (d, 1H, J = 5.6 Hz). Melting point: 189 to 190 °C

Compound Ii-20

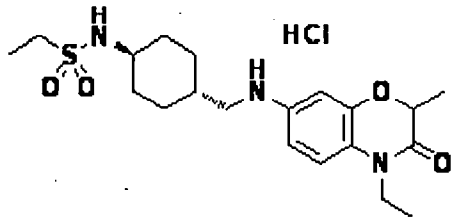
[Formula 188]



1H-NMR (DMSO-d6) δ: 0.95-1.13 (m, 2H), 1.31-1.59 (m, 10H), 1.73-1.92 (m, 4H), 2.12-2.26 (m, 2H), 2.84 (d, 2H, J = 6.0 Hz), 3.07-3.30 (m, 4H), 4.30-4.46 (m, 1H), 5.64 (brs, 1H), 6.41 (d, 1H, J = 8.4 Hz), 6.57 (s, 1H), 7.08 (d, 1H, J = 8.4 Hz). Melting point: 165 to 166 °C

Compound Ii-21

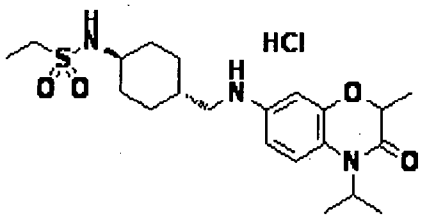
[Formula 189]



1H-NMR (DMSO-d6) δ: 0.86-1.25 (m, 10H), 1.40 (d, 3H, J = 6.9Hz), 1.52 (m, 1H), 1.82-1.93 (m, 4H), 2.95-3.00 (m, 5H), 3.63-3.91 (m, 2H), 4.61-4.68 (m, 1H), 6.73 (brs, 2H), 7.01 (d, 2H, J = 7.8Hz), 7.11 (d, 1H, J = 8.1Hz,).

Compound Ii-22

[Formula 190]

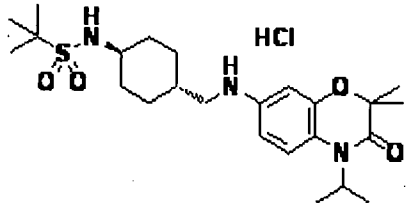


1H-NMR (DMSO-d6) δ: 0.98-1.10 (m, 2 H), 1.15-1.34 (m, 5H), 1.36-1.43 (m, 9H), 1.53 (m, 1H), 1.82.1-93 (m, 4H), 2.94-3.01 (m, 6H), 4.52 (m, 1H), 4.63 (m, 1H), 6.73 (brs, 2H), 7.02

(d, 1H, J = 7.5Hz), 7.21-7.25 (m, 1H).

Compound Ii-23

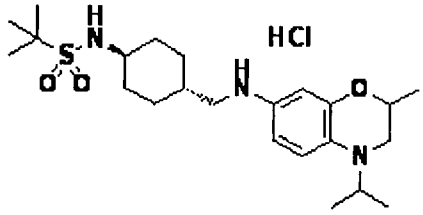
[Formula 191]



1H-NMR (DMSO-d6) δ: 0.86-1.04 (m, 4 H), 1.25 (s, 10H), 1.30 (s, 6H), 1.38 (s, 3H), 1.40 (s, 3H), 178-1.92 (m 4H), 2.76-2.80 (m, 2H), 3.03 (m, 1H), 4.54-4.63 (m, 1H), 5.57 (m, 1H), 6.16 (s, 1H), 6.22 (d, 1H, J = 8.4Hz), 6.76 (d, 1H, J = 8.4Hz), 6.98 (d, 1H, J = 8.4Hz).

Compound Ii-24

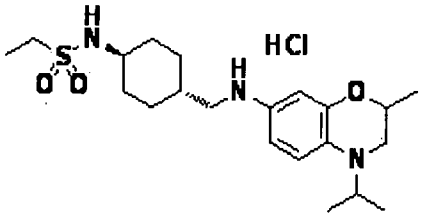
[Formula 192]



1H-NMR (DMSO-d6) δ: 0.98-1.11 (m, 5 H), 1.15-1.31 (m, 20H), 1.57 (m, 1H), 1.82.1-93 (m, 4H), 2.74-2.81 (m, 1H), 3.01-3.06 (m, 2H), 3.35 (m, 1H), 3.40 (m, 1H), 4.04-4.17 (m, 3H), 6.77 (d, 1H, J = 9.0Hz),

Compound Ii-25

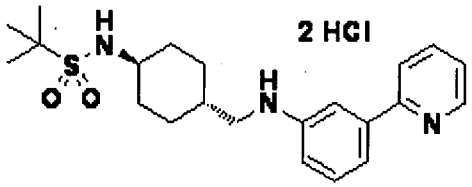
[Formula 193]



1H-NMR (DMSO-d6) δ: 0.98-1.20 (m, 13 H), 1.30 (d, 3H, J = 3H), 1.59 (m, 1H), 1.81-1.91 (m, 4H), 2.73-2.83 (m, 1H), 2.94-3.04 (m, 4H), 3.35-3.45 (m, 2H), 4.08-4.19 (m, 3H), 6.88 (brs, 3H), 7.03 (d, 1H, J = 8.4Hz).

Compound Ii-26

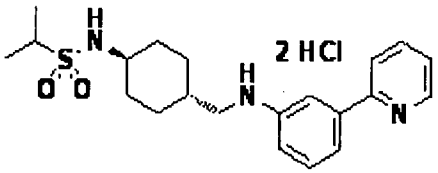
[Formula 194]




1H-NMR (DMSO-d6) δ: 1.02-1.10 (m, 2H), 1.19-1.32 (m, 2H), 1.26 (s, 9H), 1.55 (m, 1H), 1.86-1.93 (m, 4H), 3.01-3.04 (m, 3H), 6.76 (d, 1H, J = 8.7 Hz), 7.03 (m, 1H), 7.37-7.43 (m, 3H), 7.76-7.80 (m, 1H), 8.20-8.23 (m, 1H), 8.34-8.40 (m, 1H), 8.78-8.79 (m, 1H)

Compound Ii-27

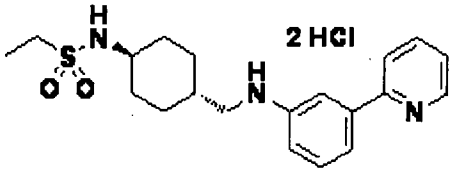
[Formula 195]




1H-NMR (DMSO-d6) δ: 1.03-1.10 (m, 2H), 1.20-1.30 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.53 (m, 1H), 1.88 (m, 4H), 2.99-3.15 (m, 3H), 7.33-7.35 (m, 3H), 7.71-7.75 (m, 1H), 8.16-8.18 (m, 1H), 829-8.32 (m, 1H), 8.76-8.78 (m, 1H)

Compound Ii-28

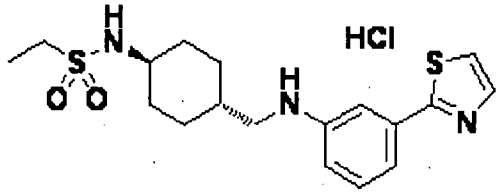
[Formula 196]




1H-NMR (DMSO-d6) δ: 1.04-1.11 (m, 2H), 1.15-1.28 (m, 2H), 1.19 (t, 3H, J =7.2 Hz), 1.59 (m, 1H), 1.87-1.91 (m, 4H), 2.93-3.08 (m, 2H), 2.97 (q, 2H, J =7.2 Hz), 3.06-3.08 (m, 2H), 7.01 (m, 1H), 7.17 (d, 1H, J =7.5Hz), 7.43 (d, 1H, J =7.5Hz), 7.50-7.57 (m, 2H), 7.80-7.84 (m, 1H), 8.25-8.27 (m, 1H), 8.39-8.44 (m, 1H), 8.80-8.82 (m, 1H)

Compound Ii-29

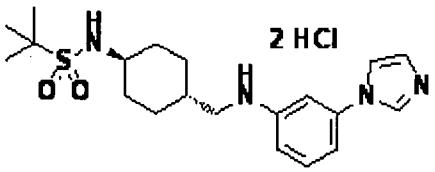
[Formula 197]




1H-NMR (DMSO-d6) δ: 0.99-1.10 (m, 2H), 1.15-1.28 (m, 2H), 1.19 (t, 3H, J =7.5 Hz), 1.52 (m, 1H), 1.84-1.91 (m, 4H), 2.94-3.01 (m, 5H), 6.88 (m, 1H), 7.00 (d, 1H, J =7.8 Hz), 7.26-7.28 (m, 2H), 7.38 (m, 1H), 7.76 (d, 1H, J = 3.3. Hz), 7.90 (d, 1H, J =3.3 Hz)

Compound Ii-30

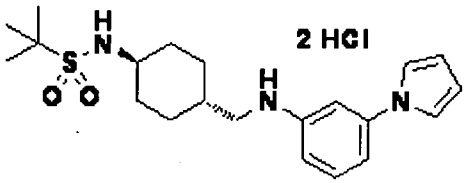
[Formula 198]




1H-NMR (DMSO-d6) δ: 0.93-1.08 (m, 2 H), 1.18-1.33 (m, 2H), 1.26 (s, 9H), 1.45 (m, 1H), 1.78-1.97 (m, 4 H), 2.86-2.94 (m, 2H), 2.95-3.10 (m, 1H), 5.91 (m, 1H), 6.55 (d, 1H, J = 7.6 Hz), 6.63-6.71 (m, 2H), 6.73 (d, 1H, J = 8.0 Hz), 7.06 (s, 1H), 7.15 (t, 1H, J = 8.0 Hz), 7.60 (s, 1H), 8.11 (s, 1H), 8.31 (s, 1H)

Compound Ii-31

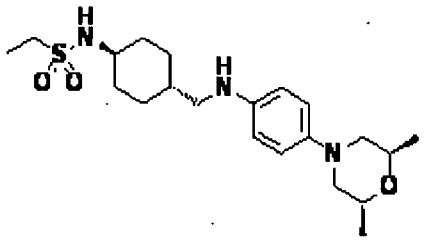
[Formula 199]




1H-NMR (DMSO-d6) δ: 0.93-1.08 (m, 2 H), 1.13-1.28 (m, 2H), 1.26 (s, 9H), 1.43 (m, 1H), 1.76-1.97 (m, 4 H), 2.83-3.18 (m, 3H), 5.79 (m, 1H), 6.21 (s, 2H), 6.44 (d, 1H, J = 6.8 Hz), 6.58-6.67 (m, 2H), 6.73 (d, 1H, J = 8.0 Hz), 7.10 (t, 1H, J = 8.0 Hz), 7.21 (s, 2H) Melting point: 205 to 206 °C

Compound Ii-32

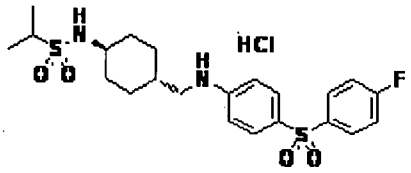
[Formula 200]



1H-NMR (DMSO-d6) δ: 0.90-1.05 (m, 2 H), 1.05-1.28 (m, 11H), 1.41 (m, 1H), 1.75-1.92 (m, 4 H), 2.11 (t, 2H, J = 10.0 Hz), 2.73-2.82 (m, 2H), 2.91-3.08 (m, 3H), 3.24 (d, 2H, J = 11.2 Hz), 3.62-3.72 (m, 2H), 5.07 (m, 1H), 6.47 (d, 2H, J = 7.2 Hz), 6.72 (d, 2H, J = 7.2 Hz), 6.97 (d, 1H, J = 7.6 Hz) Melting point: 165 to 166 °C

Compound Ii-33

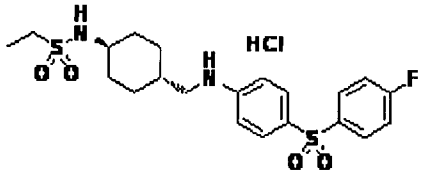
[Formula 201]



1H-NMR (DMSO-d6) δ: 0.91-1.06 (m, 2H), 1.15-1.26 (m, 8H), 1.33-1.48 (m, 1H), 1.71-1.93 (m, 4H), 2.88 (d, 2H, J = 6.5 Hz), 2.93-3.15 (m, 2H), 5.70 (brs, 2H), 6.63 (d, 2H, J = 9.1 Hz), 6.93-6.96 (m, 1H), 7.38-7.42 (m, 2H), 7.57 (d, 2H, J = 9.1 Hz), 7.88-7.93 (m, 2H)

Compound Ii-34

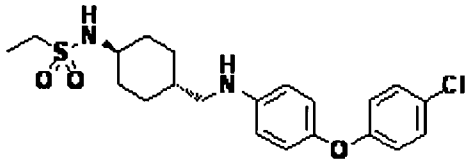
[Formula 202]



1H-NMR (DMSO-d6) δ: 0.98-1.02 (m, 2H), 1.16-1.18 (m, 5H), 1.42 (s, 1H), 1.75-1.91 (m, 4H), 2.88 (d, 2H, J = 6.6 Hz), 2.96 (q, 3H, J = 7.3 Hz), 6.63 (d, 2H, J = 8.9 Hz), 6.99-7.02 (m, 1H), 7.38-7.41 (m, 2H), 7.57 (d, 2H, J = 8.9 Hz), 7.89-7.92 (m, 2H).

Compound Ii-35

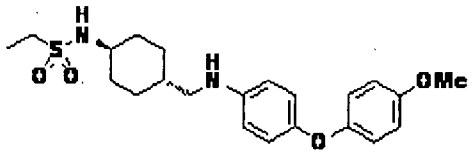
[Formula 203]



1H-NMR (DMSO-d6) δ: 0.90-1.52 (m, 5H), 1.19 (t, 3H, J = 7.2 Hz), 1.75-1.96 (m, 4H), 2.50-3.10 (m, 3H), 2.62 (q, 2H, J = 7.2 Hz), 5.55-5.70 (m, 1H ), 6.57 (d, 2H, J = 8.7 Hz), 6.80-7.04 (m, 4H), 7.01 (d, 1H, J = 7.8 Hz), 7.34 (d, 2H, J = 8.7 Hz)

Compound Ii-36

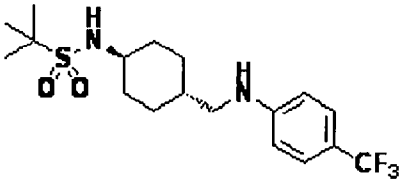
[Formula 204]



1H-NMR (DMSO-d6) δ: 0.90-1.50 (m, 5H), 1.19 (t, 3H, J = 7.2 Hz), 1.75-1.95 (m, 4H), 2.70-3.10 (m, 3H), 2.97 (q, 2H, J = 7.2 Hz), 3.70 (s, 3H), 5.40-5.50 (m, 1H ), 6.53 (d, 2H, J = 8.7 Hz), 6.74 (d, 2H, J = 8.7 Hz), 6.78-6.90 (m, 4H), 6.99 (d, 1H, J = 7.8 Hz)

Compound Ii-37

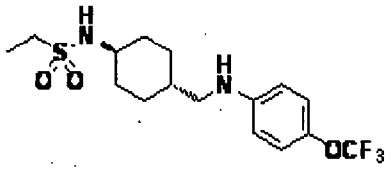
[Formula 205]



1H-NMR (CDCl3) δ: 1.02-1.32 (m, 4 H), 139 (s, 9H,), 1.58 (m, 1H), 1.86-1.96 (m, 2H), 2.12-2.22 (m, 2H), 3.02 (d, 2H, J = 6.6 Hz), 3.25 (m, 1H), 3.67 (d, 1H, J = 9.3 Hz), 6.67(d, 2H, J = 8.7 Hz), 7.41 (d, 2H, J = 8.7 Hz) Mass:393[M+H]

Compound Ii-38

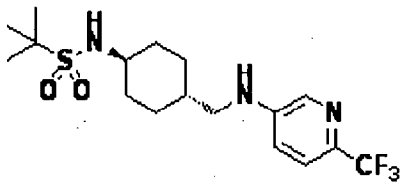
[Formula 206]



1H-NMR (DMSO-d6) δ: 0.93-1.07 (m, 2H), 1.17-1.26 (m, 2H), 1.19 (t, 3H, J = 7.1 Hz), 1.43 (s, 1H), 1.77-1.85 (m, 2H), 1.85-1.94 (m, 2H), 2.82 (t, 1H, J = 5.8 Hz), 2.98 (m, 1H), 2.97 (q, 2H, J = 7.1 Hz), 5.87 (m, 1H), 6.56 (d, 2H, J = 8.6 Hz), 6.98 (d, 1H, J = 7.6 Hz), 7.02 (d, 2H, J = 8.6 Hz).

Compound Ii-39

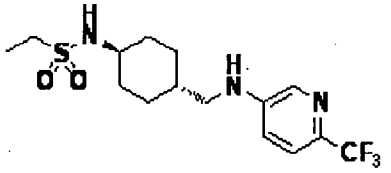
[Formula 207]



1H-NMR (DMSO-d6) δ: 0.98-1.10 (m, 2H), 1.19-1.35 (m, 2H), 1.29 (s, 9H), 1.46 (s, 1H), 1.73-1.98 (m, 4H), 2.93 (m, 1H), 3.04 (m, 1H), 6.60-6.69 (m, 2H), 6.75 (d, 1H, J = 8.8 Hz), 6.97 (d, 1H, J = 7.6 Hz), 7.49 (d, 1H, J = 8.8 Hz), 8.05 (s, 1H).

Compound Ii-40

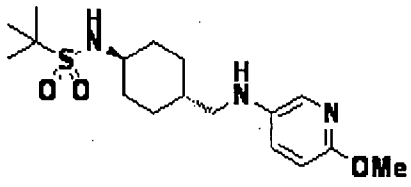
[Formula 208]



1H-NMR (DMSO-d6) δ: 0.96-1.09 (m, 2H), 1.16-1.29 (m, 2H), 1.19 (t, 3H, J = 7.3 Hz), 1.45 (s, 1H), 1.76-1.94 (m, 4H), 1.76 (s, 2H), 2.93 (t, 2H, J = 5.8 Hz), 2.97 (q, 2H, J = 7.3 Hz), 6.66 (s, 1H), 6.94-7.01 (m, 2H), 7.49 (d, 1H, J = 8.6 Hz), 8.04 (s, 1H).

Compound Ii-41

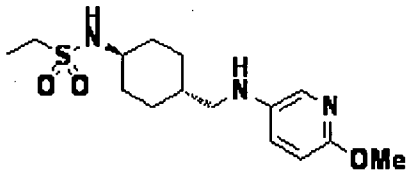
[Formula 209]



1H-NMR (DMSO-d6) δ: 0.91-1.05 (m, 2H), 1.17-1.33 (m, 2H), 1.26 (s, 9H), 1.35-1.48 (m, 1H), 1.76-1.86 (m, 2H), 1.86-1.95 (m, 2H), 2.76-2.82 (m, 1H), 2.96-3.08 (m, 1H), 3.71 (s, 3H), 5.21-5.30 (m, 1H), 6.57 (d, 1H, J = 8.6 Hz), 6.73 (d, 1H, J = 8.6 Hz), 7.02 (dd, 1H, J = 8.6, 2.3 Hz), 7.44 (d, 1H, J = 2.3 Hz).

Compound Ii-42

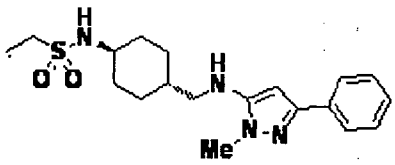
[Formula 210]



1H-NMR (DMSO-d6) δ: 0.98-1.01 (m, 2H), 1.18-1.28 (m, 2H), 1.19 (t, 3H, J = 7.1 Hz), 1.42 (s, 1H), 1.76-1.85 (m, 2H), 1.85-1.93 (m, 2H), 2.79 (t, 2H, J = 5.9 Hz), 2.97 (q, 2H, J = 7.1 Hz), 3.02 (m, 1H), 3.71 (s, 3H), 5.26 (m, 1H), 6.58 (d, 1H, J = 8.6 Hz), 6.98 (d, 2H, J = 7.8 Hz), 7.02 (d, 2H, J = 8.6 Hz), 7.44 (br s, 1H).

Compound Ii-43

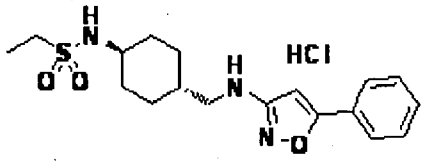
[Formula 211]



1H-NMR (DMSO-d6) δ: 0.98-1.06 (m, 2H), 1.16-1.25 (m, 2H), 1.18 (t, 3H, J =7.5 Hz), 1.51 (m, 1H), 1.83-1.91 (m, 4H), 2.85 (t, 2H, J = 6.3 Hz), 2.97 (q, 2H, J = 7.5 Hz), 3.04(m, 1H), 3.56 (s, 3H), 5.46 (t, 1H, J = 6.3 Hz), 5.76 (s, 1H), 6.49 (d, 1H, J = 7.8 Hz), 7.21 (t, 1H, J = 7.5Hz), 7.32 (t, 2H, J = 7.5 Hz), 7.68 (d, 2H, J = 7.5 Hz)

Compound Ii-44

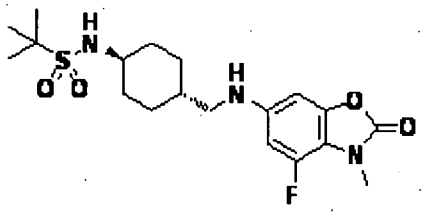
[Formula 212]



1H-NMR (DMSO-d6)δ: 0.96-1.05 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.24 (m, 2H), 1.48 (m, 1H), 1.76-1.91 (m, 4H), 2.91 (d, 2H, J = 6.6 Hz), 2.97 (q, 2H, J = 7.2 Hz), 6.35 (s, 1H), 6.99 (d, 1H, J = 7.8 Hz), 7.46-7.49 (m, 3H), 7.73-7.76 (m, 2H)

Compound Ii-45

[Formula 213]

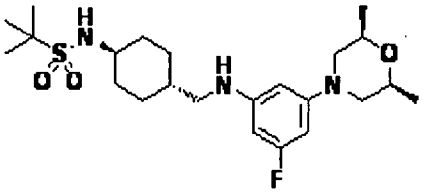


1H-NMR (DMSO-d6) δ: 0.92-1.08 (m, 2H), 1.15-1.22 (m, 1H), 1.26 (s, 9H), 1.37-1.51 (m, 2H), 1.81 (d, 2H, J = 11.6 Hz), 1.91 (d, 2H, J = 11.6 Hz), 2.76-2.86 (m, 2H), 2.97-3.08 (m, 1H), 3.35 (s, 3H), 5.82-5.91 (m, 1H), 6.26 (d, 1H, J = 13.6 Hz), 6.39 (s, 1H), 6.73 (brs, 1H).

Melting point: 215 to 216 °C

Compound Ii-46

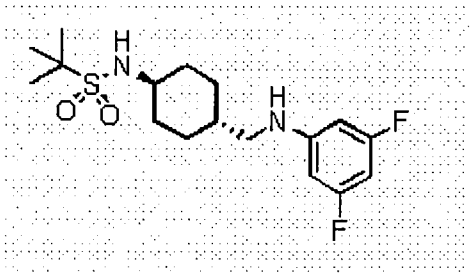
[Formula 214]



1H-NMR (CDCl3) δ: 1.02-1.32 (m, 4H), 1.24 (d, 6H, J = 6.0 Hz), 1.39 (s, 9H), 1.54 (m, 1H), 1.84-1.94 (m, 2H), 2.12-2.22 (m, 2H), 2.39 (t, 2H, J = 10.5 Hz), 2.94 (d, 2H, J = 6.9 Hz), 3.24 (m, 1H), 3.38 (d, 1H, J = 9.6 Hz), 3.61 (d, 1H, J = 9.6 Hz), 3.72-4.00 (m, 2H), 5.83-5.94 (m, 1H), 5.96-6.10 (m, 2H).

Compound Ii-47

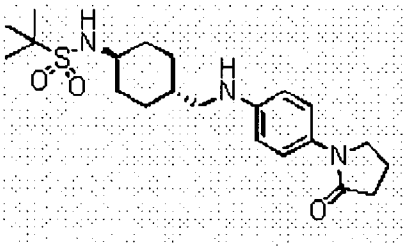
[Formula 215]



1H-NMR (DMSO-d6) δ: 0.91-1.07 (m, 2H), 1.16-1.34 (m, 11H), 1.40 (m, 1H), 1.79 (d, 2H, J = 12.5 Hz), 1.90 (d, 2H, J = 11.9 Hz), 2.82 (t, 2H, J = 5.5 Hz), 3.01 (m, 1H), 6.12-6.18 (m, 3H), 6.30 (t, 1H, J = 5.5 Hz), 6.76 (d, 1H, J = 8.7 Hz).

Compound Ii-48

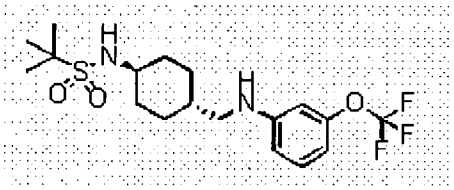
[Formula 216]



1H-NMR (CDCl3) δ: 1.00-1.28 (m, 4H), 1.39 (s, 9H), 1.56 (m, 1H), 1.91 (d, 2H, J = 12.4 Hz), 2.08-2.21 (m, 4H), 2.58 (t, 2H, J = 8.1 Hz), 2.97 (d, 2H, J = 6.0 Hz), 3.23 (m, 1H), 3.70 (d, 1H, J = 9.4 Hz), 3.80 (t, 2H, J = 7.1 Hz), 6.66 (d, 2H, J = 8.7 Hz), 7.36 (d, 2H, J = 8.7 Hz).

Compound Ii-49

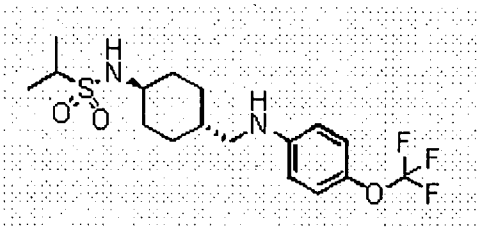
[Formula 217]



1H-NMR (DMSO-d6) δ: 0.92-1.06 (m, 2H), 1.17-1.33 (m, 11H), 1.41 (m, 1H), 1.80 (d, 2H, J = 12.9 Hz), 1.90 (d, 2H, J = 11.4 Hz), 2.82 (t, 2H, J = 6.1 Hz), 3.01 (m, 1H), 6.07 (t, 1H, J = 5.3 Hz), 6.34-6.43 (m, 2H), 6.51 (dd, 1H, J1 = 8.2 Hz, J2 = 1.8 Hz), 6.75 (d, 1H, J = 8.5 Hz), 7.11 (t, 1H, 8.2 Hz).

Compound Ii-50

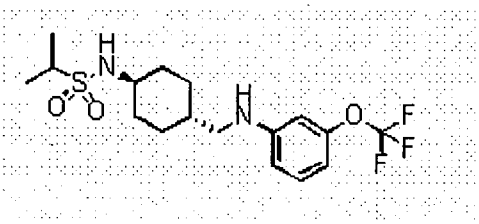
[Formula 218]



1H-NMR (DMSO-d6) δ: 0.92-1.08 (m, 2H), 1.14-1.31 (m, 8H), 1.43 (m, 1H), 1.76-1.94 (m, 4H), 2.82 (t, 2H, J = 6.0 Hz), 2.95-3.16 (m, 2H), 5.90 (t, 1H, J = 5.5 Hz), 6.56 (d, 2H, J = 8.7 Hz), 6.95 (d, 1H, J = 7.9 Hz), 7.03 (d, 2H, J = 8.6 Hz).

Compound Ii-51

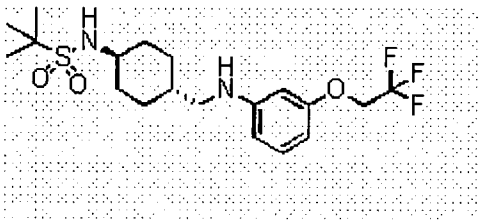
[Formula 219]



1H-NMR (DMSO-d6) δ: 0.90-1.08 (m, 2H), 1.13-1.31 (m, 8H), 1.42 (m, 1H), 1.76-1.94 (m, 4H), 2.83 (t, 2H, J = 6.0 Hz), 2.95-3.16 (m, 2H), 6.07 (t, 1H, J = 5.4 Hz), 6.36-6.46 (m, 2H), 6.53 (dd, 1H, J1 = 8.1 Hz, J2 = 1.9 Hz), 6.95 (d, 1H, J = 7.9 Hz), 7.12 (d, 1H, J = 8.1 Hz).

Compound Ii-52

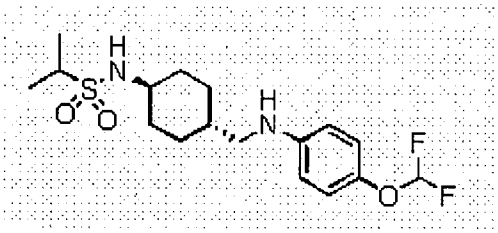
[Formula 220]



1H-NMR (DMSO-d6) δ: 0.91-1.10 (m, 2H), 1.19-1.37 (m, 11H), 1.45 (m, 1H), 1.78-1.90 (m, 4H), 2.84 (t, 2H, J = 6.0 Hz), 3.04 (m, 1H), 4.64 (q, 2H, J = 9.0 Hz), 5.73 (t, 1H, J = 5.4 Hz), 6.13-6.21 (m, 2H), 6.26 (d, 1H, J = 7.2 Hz), 6.78 (d, 1H, J = 8.4 Hz), 6.99 (t, 1H, 8.0 Hz).

Compound Ii-53

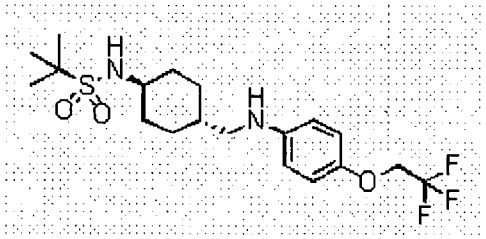
[Formula 221]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.13-1.30 (m, 8H), 1.42 (m, 1H), 1.75-1.93 (m, 4H), 2.80 (t, 2H, J = 6.2 Hz), 2.93-3.16 (m, 2H), 5.66 (t, 1H, J = 5.5 Hz), 6.53 (d, 2H, J = 9.1 Hz), 6.89 (d, 2H, J = 8.8 Hz), 6.92 (t, 1H, JH-F = 75 Hz), 6.94 (d, 1H, J = 8.0 Hz).

Compound Ii-54

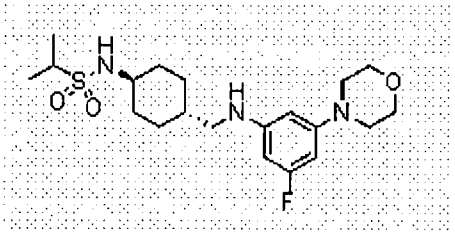
[Formula 222]



1H-NMR (DMSO-d6) δ: 0.88-1.05 (m, 2H), 1.14-1.32 (m, 11H), 1.41 (m, 1H), 1.75-1.94 (m, 4H), 2.77 (t, 2H, J = 6.0 Hz), 3.01 (m, 1H), 4.54 (q, 2H, J = 9.0 Hz), 5.33 (t, 1H, J = 5.8 Hz), 6.49 (d, 2H, J = 8.8 Hz), 6.75 (d, 1H, J = 8.8 Hz), 6.80 (d, 2H, J = 8.8 Hz).

Compound Ii-55

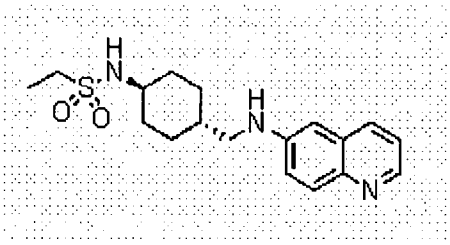
[Formula 223]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.14-1.31 (m, 8H), 1.40 (m, 1H), 1.74-1.93 (m, 4H), 2.79 (t, 2H, J = 5.9 Hz), 2.94-3.15 (m, 6H), 3.69 (t, 4H, J = 4.8 Hz), 5.70-5.94 (m, 4H), 6.94 (d, 1H, J = 8.0 Hz).

Compound Ii-56

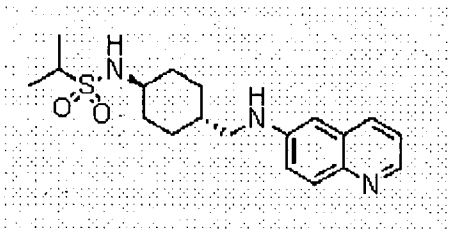
[Formula 224]



1H-NMR (DMSO-d6) δ: 0.98-1.14 (m, 2H), 1.15-1.32 (m, 5H), 1.54 (m, 1H), 1.83-1.96 (m, 4H), 2.89-3.10 (m, 5H), 6.17 (t, 1H, J = 5.2 Hz), 6.63 (d, 1H, J = 2.2 Hz), 7.02 (d, 1H, J = 7.7 Hz), 7.21 (dd, 1H, J1 = 9.1 Hz, J2 = 2.5 Hz), 7.27 (dd, 1H, J1 = 8.2 Hz, J2 = 4.4 Hz), 7.67 (d, 1H, J = 9.1 Hz), 7.97 (d, 1H, J = 8.2 Hz), 8.45 (dd, 1H, J1 = 4.3 Hz, J2 = 1.5 Hz).

Compound Ii-57

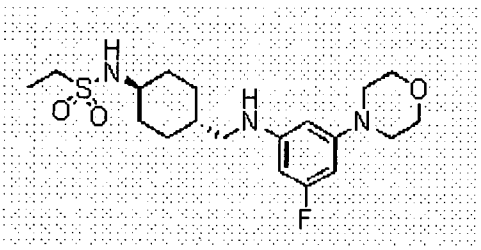
[Formula 225]



1H-NMR (DMSO-d6) δ: 0.97-1.14 (m, 2H), 1.17-1.34 (m, 8H), 1.54 (m, 1H), 1.83-1.96 (m, 4H), 2.94 (t, 2H, J = 6.0 Hz), 2.99-3.18 (m, 2H), 6.17 (t, 1H, J = 5.4 Hz), 6.63 (d, 1H, J = 2.5 Hz), 6.96 (d, 1H, J = 7.7 Hz), 7.21 (dd, 1H, J1 = 9.1 Hz, J2 = 2.5 Hz), 7.27 (dd, 1H, J1 = 8.2 Hz, J2 = 4.1 Hz), 7.67 (d, 1H, J = 9.1 Hz), 7.97 (d, 1H, J = 8.0 Hz), 8.45 (dd, 1H, J1 = 4.3 Hz, J2 = 1.5 Hz).

Compound Ii-58

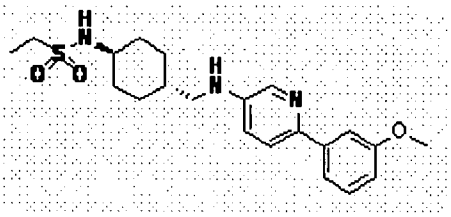
[Formula 226]



1H-NMR (DMSO-d6) δ: 0.90-1.07 (m, 2H), 1.12-1.29 (m, 5H), 1.40 (m, 1H), 1.74-1.93 (m, 4H), 2.80 (t, 2H, J = 5.9 Hz), 2.92-3.07 (m, 7H), 3.69 (t, 4H, J = 4.8 Hz), 5.69-5.95 (m, 4H), 6.99 (d, 1H, J = 7.7 Hz).

Compound Ii-59

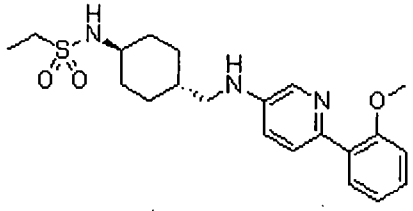
[Formula 227]



1H-NMR (DMSO-d6) δ: 0.94-1.11 (m, 2H), 1.14-1.30 (m, 5H), 1.47 (m, 1H), 1.78-1.95 (m, 4H), 2.88-3.09 (m, 5H), 3.80 (s, 3H), 6.09 (t, 1H, J = 5.6 Hz), 6.81-6.86 (m, 1H), 6.96 (dd, 1H, J1 = 8.8 Hz, J2 = 2.8 Hz), 7.01 (d, 1H, J = 7.4 Hz), 7.29 (t, 1H, J = 8.0 Hz), 7.45-7.51 (m, 2H), 7.66 (d, 1H, J = 8.5 Hz), 8.04 (d, 1H, J = 2.8 Hz).

Compound Ii-60

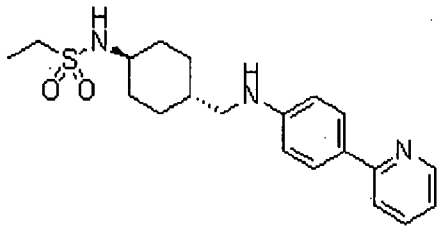
[Formula 228]



1H-NMR (DMSO-d6) δ: 1.03 (m, 2H), 1.19 (t, 2H, J = 7.8 Hz), 1.21 (m, 2H), 1.46 (m, 1H), 1.76-1.95 (m, 4H), 2.90 (t, 2H, J = 5.8 Hz), 2.97 (q, 2H, J = 7.3 Hz), 3.03 (m, 1H), 3.80 (s, 3H), 5.95 (m, 1H), 6.90 (m, 1H), 6.98 (d, 1H, J = 7.8 Hz), 6.98 (dd, 1H, J = 7.8, 7.8 Hz), 7.06 (d, 1H, J = 8.6 Hz), 7.26 (dd, 1H, J = 7.8, 7.8 Hz), 7.61 (d, 1H, J = 8.6 Hz), 7.69 (d, 1H, J = 7.8 Hz), 8.03 (s, 1H).

Compound Ii-61

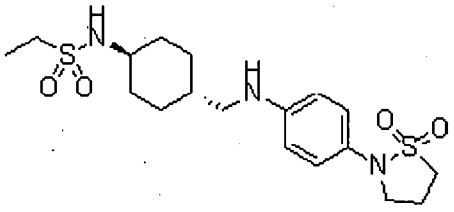
[Formula 229]



1H-NMR (DMSO-d6) δ: 0.96-1.09 (m, 2H), 1.18-1.29 (m,2H), 1.19 (t, 3H, J = 7.6 Hz), 1.47 (m, 1H), 1.87 (m, 5H), 2.90 (t, 2H, J = 6.3 Hz), 2.97 (q, 2H, J = 7.6 Hz), 3.02 (m, 1H), 5.98 (m, 1H), 6.63 (d, 2H, J = 8.3 Hz), 6.98 (d, 1H, J = 7.3 Hz), 7.14 (m, 1H), 7.73 (s, 2H), 7.83 (d, 2H, J = 8.3 Hz), 8.52 (d, 1H, J = 4.0 Hz).

Compound Ii-62

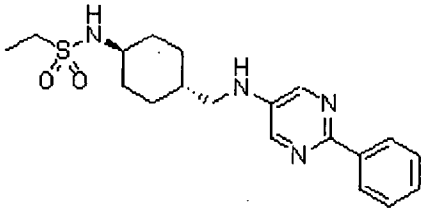
[Formula 230]



1H-NMR (DMSO-d6) δ: 0.98-1.01 (m, 2H), 1.20 (s, 9H), 1.20-1.37 (m, 2H), 1.42 (m, 1H), 1.76-1.96 (m, 4H), 2.28-2.37 (m, 2H), 2.75-2.85 (m, 2H), 3.02 (m, 1H), 3.36 (t, 2H, J = 7.8 Hz), 3.57 (t, 2H, J = 6.3 Hz), 5.66 (m, 1H), 6.54 (d, 2H, J = 8.0 Hz), 6.73 (d, 1H, J = 8.6 Hz), 7.00 (d, 1H, J = 8.0 Hz).

Compound Ii-63

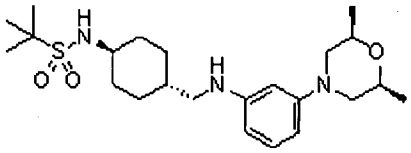
[Formula 231]



1H-NMR (DMSO-d6) δ: 0.96-1.14 (m, 2H), 1.14-1.32 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.50 (m, 1H), 1.76-1.96 (m, 4H), 2.91-3.10 (m, 3H), 2.97 (q, 2H, J = 7.2 Hz), 6.28 (m, 1H), 7.02 (d, 1H, J = 7.8 Hz), 7.32-7.46 (m, 3H), 8.20 (d, 1H, J = 6.9 Hz), 8.22 (s, 2H).

Compound Ii-64

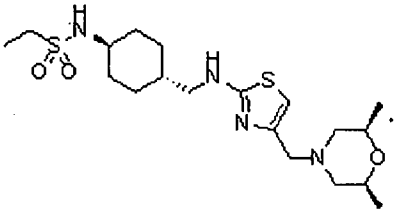
[Formula 232]



1H-NMR (DMSO-d6) δ: 1.03-1.15 (m, 2H), 1.18-1.29 (m, 2H), 1.24 (d, 6H, J = 6.3 Hz), 1.52 (m, 1H), 1.86-1.94 (m, 2H), 2.10-2.19 (m, 2H), 2.40 (t, 2H, J = 6.0 Hz), 2.95 (d, 2H, J = 6.0 Hz), 3.23 (m, 1H), 3.40 (d, 2H, J = 11.4 Hz), 3.75-3.85 (m, 2H), 3.86 (d, 1H, J = 9.3 Hz), 6.14 (d, 1H, J = 8.5 Hz), 6.15 (s, 1H), 6.29 (d, 1H, J = 8.5 Hz), 7.06 (d, 1H, J = 8.5 Hz).

Compound Ii-65

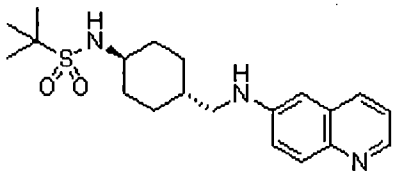
[Formula 233]



1H-NMR (CDCl3) δ:1.08-1.16 (m, 2H), 1.14 (d, 6H, J = 6.8 Hz), 1.21-1.30 (m, 2H), 1.29 (s, 9H), 1.78 (t, 2H, J = 10.6 Hz), 1.83-1.92 (m, 2H), 2.11-2.19 (m, 2H), 2.78 (d, 2H, J = 10.6 Hz), 3.06 (s, 2H), 3.23 (m, 1H), 3.38 (s, 2H), 3.70-3.80 (m, 2H), 4.02 (d, 1H, J = 9.9 Hz), 5.37 (s, 1H), 6.30 (s, 1H).

Compound Ii-66

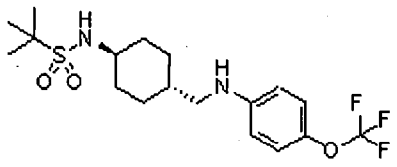
[Formula 234]



1H-NMR (DMSO-d6) δ: 1.01-1.12 (m, 2H), 1.20-1.34 (m, 2H), 1.27 (s, 9H), 1.54 (m, 1H), 1.82-1.99 (m, 4H), 2.91-2.98 (m, 2H), 3.06 (m ,1H), 6.17 (s, 1H), 6.63 (s, 1H), 6.78 (d, 1H, J = 9.0 Hz), 7.20 (m, 1H), 7.27 (m, 1H), 7.77 (d, 1H, J = 9.0 Hz), 7.98 (d, 1H, J = 9.0 Hz), 8.54 (s, 1H).

Compound Ii-67

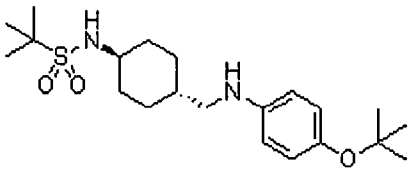
[Formula 235]



1H-NMR (DMSO-d6) δ: 0.92-1.06 (m, 2H), 1.20-1.32 (m, 2H), 1.26 (s, 9H), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 1.88-1.96 (m, 2H), 2.78-2.86 (m, 2H), 3.02 (m ,1H), 5.89 (s, 1H), 6.56 (d, 1H, J = 8.4 Hz), 6.76 (d, 1H, J = 8.4 Hz), 7.02 (d, 1H, J = 8.4 Hz).

Compound Ii-68

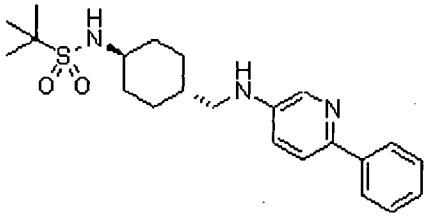
[Formula 236]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.19 (s, 9H), 1.20-1.32 (m, 2H), 1.26 (s, 9H), 1.42 (m, 1H), 1.80-1.96 (m, 4H), 2.77 (s, 2H), 3.04 (m, 1H), 5.29 (s, 1H), 6.44 (d, 1H, J = 7.2 Hz), 6.68 (d, 1H, J = 7.2 Hz), 6.75 (d, 1H, J = 8.4 Hz).

Compound Ii-69

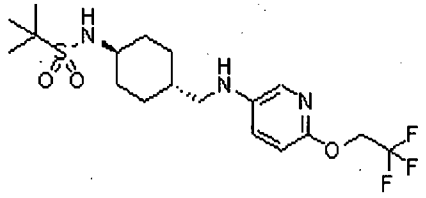
[Formula 237]



1H-NMR (DMSO-d6) δ: 0.95-1.10 (m, 2H), 1.20-1.32 (m, 2H), 1.26 (s, 9H), 1.47 (m, 1H), 1.80-1.88 (m, 2H), 1.88-1.95 (m, 2H), 2.88-2.95 (m, 2H), 3.02 (s, 1H), 6.07 (m, 1H), 6.77 (d, 1H, J = 8.4 Hz), 6.97 (d, 1H, J = 7.6 Hz), 7.26 (t, 1H, J = 7.6 Hz), 7.35-7.42 (m, 2H), 7.46 (d, 1H, J = 8.4 Hz), 7.91 (d, 1H, J = 7.6 Hz), 8.04 (s, 1H).

Compound Ii-70

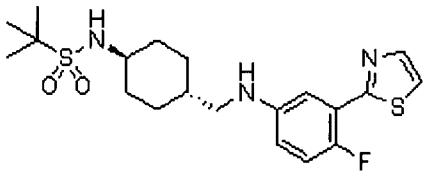
[Formula 238]



1H-NMR (DMSO-d6) δ: 0.93-1.05 (m, 2H), 1.10-1.32 (m, 2H), 1.26 (s, 9H), 1.42 (m, 1H), 1.78-1.86 (m, 2H), 1.86-1.95 (m, 2H), 2.78-2.83 (m, 2H), 3.03 (m, 1H), 4.80 (q, 2H, J = 9.2 Hz), 5.48 (t, 1H, J = 5.6 Hz), 6.69-6.76 (m, 2H), 7.08 (dd, 1H, J = 8.8, 2.4 Hz), 7.45 (d, 1H, J = 2.4 Hz).

Compound Ii-71

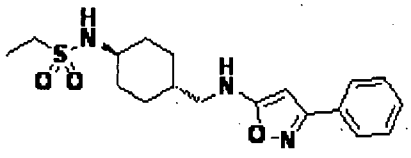
[Formula 239]



1H-NMR (DMSO-d6) δ: 0.96-1.10 (m, 2H), 1.20-1.32 (m, 2H), 1.27 (s, 9H), 1.82-1.88 (m, 2H), 1.88-1.97 (m, 2H), 2.83-2.88 (m, 2H), 3.04 (m, 1H), 5.82 (s, 1H), 6.69 (m, 1H), 6.76 (d, 1H, J = 8.8 Hz), 7.12 (dd, 1H, J = 9.2, 8.8 Hz), 7.37 (m, 1H), 7.87 (d, 1H, J = 2.8 Hz), 7.99 (s, 1H).

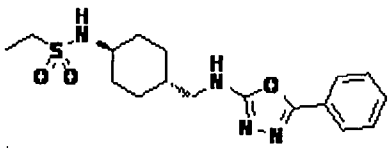
Compound Ii-72

[Formula 240]



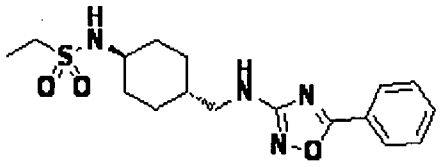
Compound Ii-73

[Formula 241]



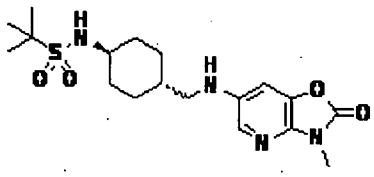
Compound Ii-74

[Formula 242]



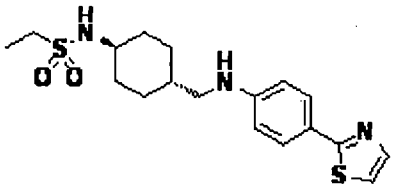
Compound Ii-75

[Formula 243]



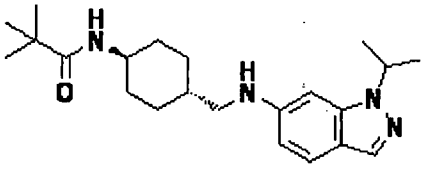
Compound Ii-76

[Formula 244]



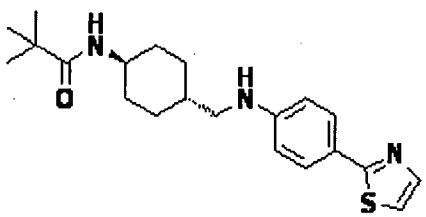
Compound Ii-77

[Formula 245]



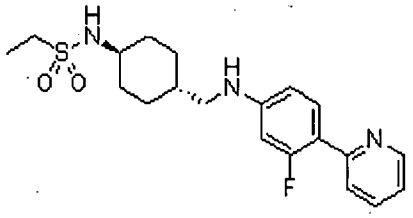
Compound Ii-78

[Formula 246]



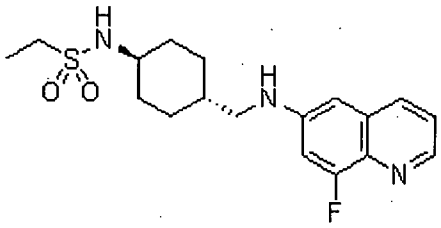
Compound Ii-79

[Formula 247]



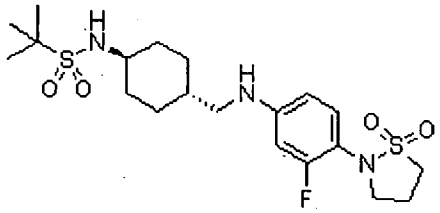
Compound Ii-80

[Formula 248]



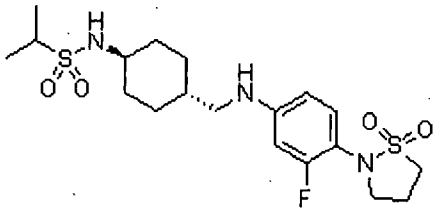
Compound Ii-81

[Formula 249]



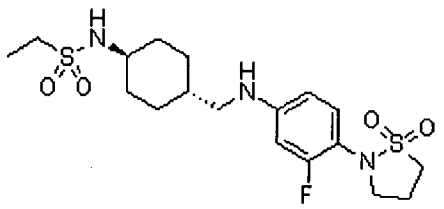
Compound Ii-82

[Formula 250]



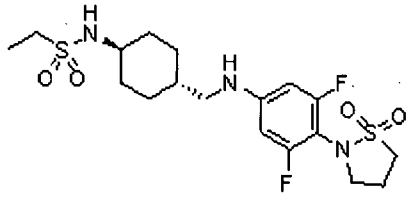
Compound Ii-83

[Formula 251]



Compound Ii-84

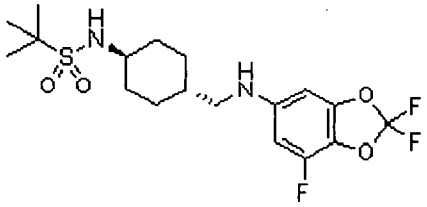
[Formula 252]



1H-NMR (DMSO-d6) δ: 0.91-1.08 (m, 2H), 1.14-1.30 (t, 3H, J = 7.5 Hz ), 1.41 (m, 1H), 1.73-1.94 (m, 4H), 2.34-2.46 (m, 2H), 2.85 (t, 2H, J = 6.6 Hz), 2.97 (q, 2H, J = 7.5 Hz), 3.00 (m, 1H), 3.25 (t, 2H, J = 7.5 Hz), 3.53 (t, 2H, J = 6.6 Hz), 6.27 (d, 2H, J = 11.7 Hz), 6.52 (t, 1H, J = 5.1 Hz), 7.00 (d, 1H, J = 7.2 Hz).

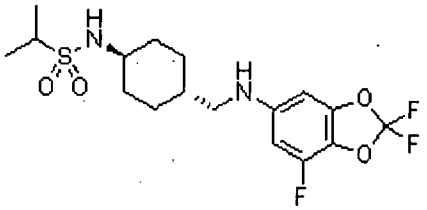
Compound Ii-85

[Formula 253]



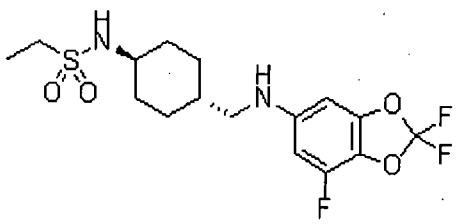
Compound Ii-86

[Formula 254]



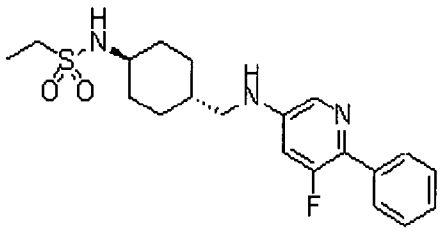
Compound Ii-87

[Formula 255]



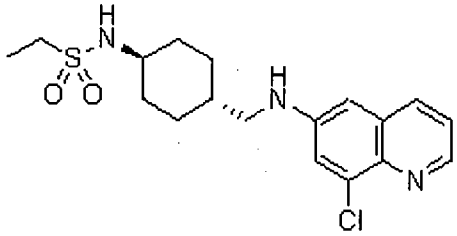
Compound Ii-88

[Formula 256]



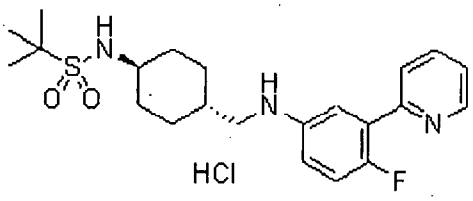
Compound Ii-89

[Formula 257]



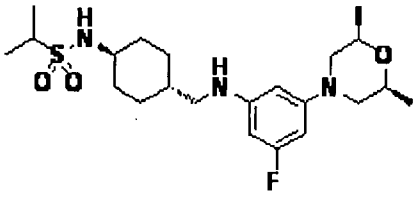
Compound Ii-90

[Formula 258]



Compound Ii-91

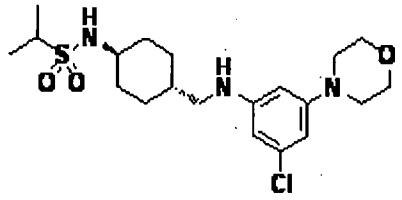
[Formula 259]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.13 (d, 6H, J = 6.0 Hz), 1.18-1.30 (m, 2H), 1.21 (d, 6H, J = 6.4 Hz), 1.40 (m, 1H), 1.76-1.83 (m, 2H), 1.83-1.93 (m, 2H), 2.19 (dd, 1H, J = 11.2, 11.2 Hz), 2.76-2.82 (m, 2H), 3.01 (m, 1H), 3.09 (m, 1H), 3.45 (d, 2H, J = 11.2 Hz), 3.58-3.69 (m, 2H), 5.67 (m, 1H), 5.77 (d, 1H, J = 12.0 Hz), 5.90 (s, 1H), 5.91 (m, 1H), 6.91 (d, 1H, J = 7.6 Hz).

Compound Ii-92

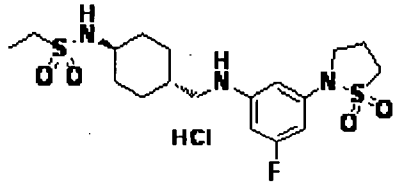
[Formula 260]



1H-NMR (DMSO-d6) δ: 0.90-1.07 (m, 2H), 1.14-1.30 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.32-1.46 (m, 1H), 1.75-1.92 (m, 4H), 2.78-2.83 (m, 2H), 2.95-3.18 (m, 6H), 3.66-3.72 (m, 4H), 5.75 (brs, 1H), 6.00 (s, 1H), 6.04 (s, 1H), 6.11 (s, 1H), 6.95 (d, 1H, J = 9.0 Hz).

Compound Ii-93

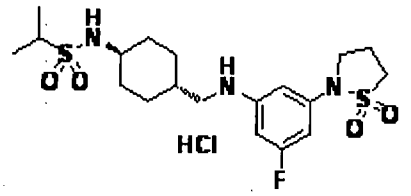
[Formula 261]



1H-NMR (DMSO-d6) δ: 0.90-1.08 (m, 2H), 1.13-1.27 (m, 5H), 1.42 (m, 1H), 1.74-1.93 (m, 4H), 2.30-2.40 (m, 2H), 2.81 (d, 2H, J = 6.6 Hz), 2.97 (q, 2H, J = 7.5 Hz), 3.00 (m, 1H), 3.49 (t, 2H, J = 7.5 Hz), 3.66 (t, 2H, J = 6.6 Hz), 5.00-5.50 (brs, 2H), 6.07-6.15 (m, 2H), 6.25(s, 1H), 7.00 (d, 1H, J = 6.6Hz).

Compound Ii-94

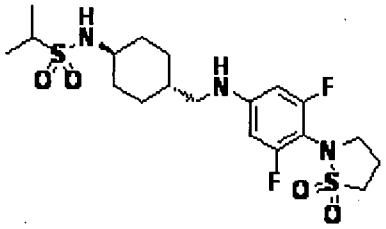
[Formula 262]



1H-NMR (DMSO-d6) δ: 0.92-1.07 (m, 2H), 1.15-1.32 (m, 5H), 1.21 (d, 6H, J = 6.9 Hz), 1.42 (m, 1H), 1.74-1.93 (m, 4H), 2.30-2.42 (m, 2H), 2.81 (d, 2H, J = 6.6 Hz), 2.92-3.18 (m, 2H), 3.49 (t, 2H, J = 7.5 Hz), 3.66 (t, 2H, J = 6.6 Hz), 4.70-5.30 (brs, 2H), 6.05-6.16 (m, 2H), 6.25 (s, 1H), 6.95 (d, 1H, J = 8.1Hz).

Compound Ii-95

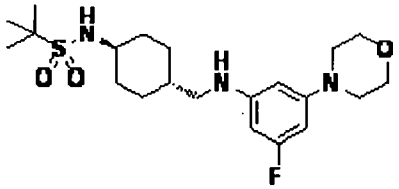
[Formula 263]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.16-1.31 (d, 6H, J = 6.9 Hz), 1.40 (m, 1H), 1.73-1.94 (m, 4H), 2.34-2.46 (m, 2H), 2.84 (t, 2H, J = 6.0 Hz), 2.94-3.16 (m, 2H), 3.28 (t, 2H, J = 7.5 Hz), 3.53 (t, 2H, J = 6.6 Hz), 6.27 (d, 2H, J = 11.7 Hz), 6.52 (t, 1H, J = 5.4 Hz), 6.94 (d, 1H, J = 7.8 Hz).

Compound Ii-96

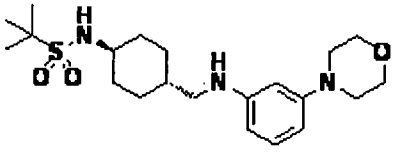
[Formula 264]



1H-NMR (DMSO-d6) δ: 0.91-1.04 (m, 2H), 1.20-1.32 (m, 2H), 1.26 (s, 9H), 1.40 (m, 1H), 1.76-1.95 (m, 4H), 2.77-2.83 (m, 2H), 2.99-3.04 (m, 5H), 3.67-3.72 (m, 4H), 5.71 (m, 1H), 5.79 (d, 1H, J = 11.7 Hz), 5.89 (s, 1H), 5.90 (m, 1H), 6.72 (d, 1H, J = 8.4 Hz).

Compound Ii-97

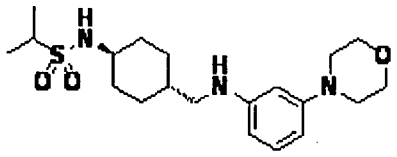
[Formula 265]



1H-NMR (DMSO-d6) δ: 0.92-1.03 (m, 2H), 1.20-1.32 (m, 2H), 1.26 (s, 9H), 1.41 (m, 1H), 1.77-1.93 (m, 4H), 2.78-2.83 (m, 2H), 2.97-3.05 (m, 5H), 3.68-3.72 (m, 4H), 5.36 (m, 1H), 6.04 (d, 1H, J = 8.0 Hz), 6.10 (s, 1H), 6.11 (d, 1H, J = 8.0 Hz), 6.72 (d, 1H, J = 8.0 Hz), 6.89 (dd, 1H, J = 8.0, 8.0 Hz).

Compound Ii-98

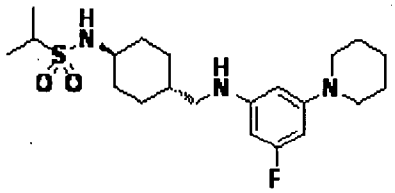
[Formula 266]



1H-NMR (DMSO-d6) δ: 0.92-1.04 (m, 2H), 1.17-1.29 (m, 2H), 1.21 (d, 6H, J = 6.4 Hz), 1.41 (m, 1H), 1.75-1.92 (m, 4H), 2.77-2.83 (m, 2H), 2.95-3.05 (m, 5H), 3.09 (m, 1H), 3.67-3.72 (m, 4H), 5.36 (m, 1H), 6.04 (d, 1H, J = 8.0 Hz), 6.10 (s, 1H), 6.11 (d, 1H, J = 8.0 Hz), 6.89 (dd, 1H, J = 8.0, 8.0 Hz), 6.92 (d, 1H, J = 8.0 Hz).

Compound Ii-99

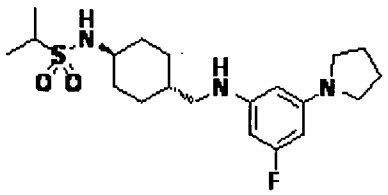
[Formula 267]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.15-1.31 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.39 (m, 1H), 1.47-1.62 (m, 6H), 1.74-1.94 (m, 4H), 2.78 (t, 2H, J = 6.0 Hz), 2.93-3.16 (m, 6H), 5.64-5.76 (m, 2H), 5.83-5.92 (m, 2H), 6.94 (d, 1H, J = 7.8 Hz).

Compound Ii-100

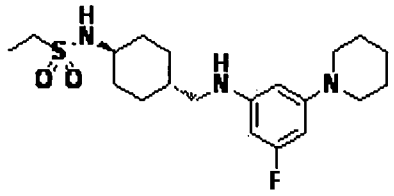
[Formula 268]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.15-1.30 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.40 (m, 1H), 1.74-1.96 (m, 8H), 2.79 (t, 2H, J = 6.0 Hz), 2.93-3.18 (m, 6H), 5.48-5.67 (m, 4H), 6.94 (d, 1H, J = 8.1 Hz).

Compound Ii-101

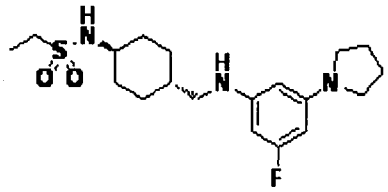
[Formula 269]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 2H), 1.13-1.29 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.39 (m, 1H), 1.47-1.62 (m, 6H), 1.75-1.94 (m, 4H), 2.79 (t, 2H, J = 6.0 Hz), 2.97 (q, 2H, J = 7.5 Hz), 3.03-3.10 (m, 4H), 5.64-5.75 (m, 2H), 5.83-5.91 (m, 2H), 7.00 (d, 1H, J = 7.8 Hz).

Compound Ii-102

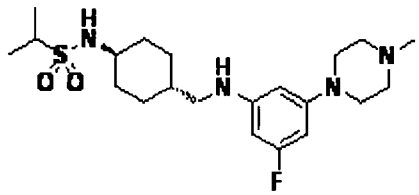
[Formula 270]



1H-NMR (DMSO-d6) δ: 0.90-1.07 (m, 2H), 1.13-1.29 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.41 (m, 1H), 1.74-1.96 (m, 8H), 2.79 (t, 2H, J = 6.0 Hz), 2.97 (q, 2H, J = 7.5 Hz), 3.00 (m, 1H), 3.09-3.19 (m, 4H), 5.46-5.66 (m, 4H), 6.99 (d, 1H, J = 7.2 Hz).

Compound Ii-103

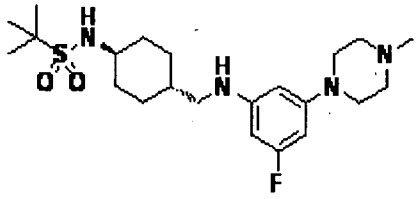
[Formula 271]



1H-NMR (DMSO-d6) δ: 0.91-1.03 (m, 2H), 1.16-1.29 (m, 2H), 1.21 (d, 6H, J = 6.8 Hz), 1.40 (m, 1H), 1.75-1.92 (m, 4H), 2.20 (s, 3H), 2.35-2.43 (m, 4H), 2.75-2.82 (m, 2H), 2.88-3.13 (m, 6H), 5.67 (m, 1H), 5.76 (d, 1H, J = 11.2 Hz), 5.82-5.92 (m, 2H), 6.91 (d, 1H, J = 8.0 Hz).

Compound Ii-104

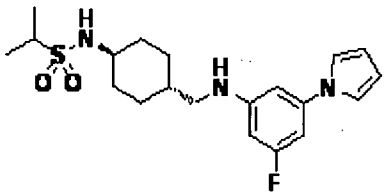
[Formula 272]



1H-NMR (DMSO-d6) δ: 0.92-1.02 (m, 2H), 1.19-1.32 (m, 2H), 1.26 (s, 9H), 1.39 (m, 1H), 1.75-1.95 (m, 4H), 2.19 (s, 3H), 2.38-2.42 (m, 4H), 2.77-2.83 (m, 5H), 2.98-3.09 (m, 5H), 5.67 (m, 1H), 5.76 (d, 1H, J = 11.2 Hz), 5.88 (m, 1H), 5.88 (s, 1H), 6.72 (d, 1H, J = 8.8 Hz).

Compound Ii-105

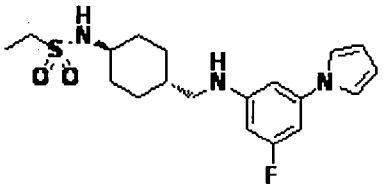
[Formula 273]



1H-NMR (DMSO-d6) δ: 0.95-1.09 (m, 2H), 1.18-1.31 (m, 2H), 1.22 (d, 6H, J = 6.8 Hz), 1.44 (m, 1H), 1.78-1.93 (m, 4H), 2.87-2.92 (m, 2H), 3.03 (m, 1H), 3.10 (m, 1H), 6.13 (m, 1H), 6.21 (m, 1H), 6.22 (s, 2H), 6.51 (s, 1H), 6.52 (d, 1H, J = 8.0 Hz), 6.92 (d, 1H, J = 8.0 Hz), 7.26 (s, 2H).

Compound Ii-106

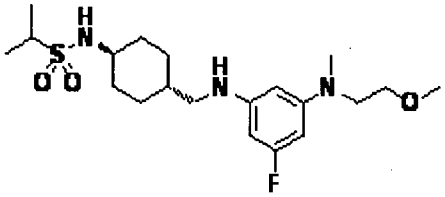
[Formula 274]



1H-NMR (DMSO-d6) δ: 0.97-1.08 (m, 2H), 1.17-1.29 (m, 5H), 1.40-1.68 (m, 3H), 1.80-1.92 (m, 2H), 2.90 (t, 2H, J = 6.0 Hz), 2.94-3.06 (m, 3H), 6.12-6.22 (m, 4H), 6.50-6.54 (m, 2H), 6.94-7.00 (m, 1H), 7.26-7.27 (m, 2H).

Compound Ii-107

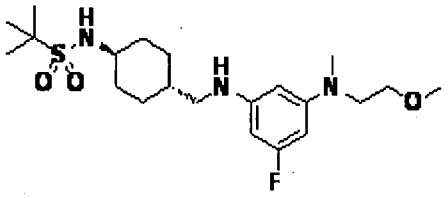
[Formula 275]



1H-NMR (DMSO-d6) δ: 0.91-1.03 (m, 2H), 1.16-1.29 (m, 2H), 1.21 (d, 6H, J = 6.4 Hz), 1.40 (m, 1H), 1.74-1.92 (m, 4H), 2.75-2.81 (m, 2H), 2.84 (s, 3H), 3.00 (m, 1H), 3.09 (m, 1H), 3.25 (s, 3H), 3.35-3.47 (m, 4H), 5.59-5.67 (m, 4H), 6.91 (d, 1H, J = 8.0 Hz).

Compound Ii-108

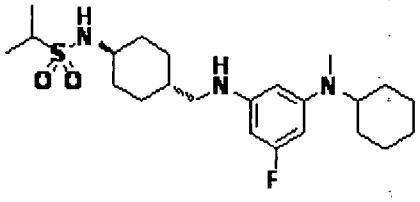
[Formula 276]



1H-NMR (DMSO-d6) δ: 0.92-1.03 (m, 2H), 1.18-1.32 (m, 2H), 1.26 (s, 9H), 1.40 (m, 1H), 1.75-1.94 (m, 4H), 2.75-2.81 (m, 2H), 2.83 (s, 3H), 3.01 (m, 1H), 3.25 (s, 3H), 3.34-3.47 (m, 4H), 5.58-5.70 (m, 4H), 6.72 (d, 1H, J = 8.4 Hz).

Compound Ii-109

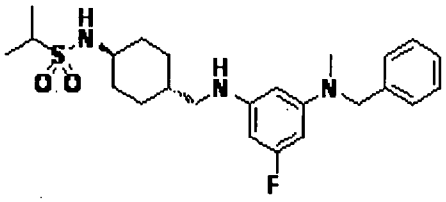
[Formula 277]



1H-NMR (DMSO-d6) δ: 0.90-1.51 (m, 10H), 1.21 (d, 6H, J = 6.9 Hz), 1.56-1.67 (m, 3H), 1.71-1.93 (m, 6H), 2.64 (s, 3H), 2.78 (t, 2H, J = 6.0 Hz), 2.93-3.17 (m, 2H), 3.44 (m, 1H), 5.56-5.77 (m, 4H), 6.94 (d, 1H, J = 7.8 Hz).

Compound Ii-110

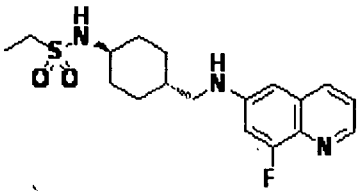
[Formula 278]



1H-NMR (DMSO-d6) δ: 0.83-1.01 (m, 2H), 1.00-1.40 (m, 3H), 1.21 (d, 6H, J = 6.9 Hz), 1.68-1.91 (m, 4H), 2.73 (t, 2H, J = 6.0 Hz), 2.90-3.15 (m, 2H), 2.95 (s, 3H), 4,48 (s, 2H), 5.60-5.72 (m, 4H), 6.94 (d, 1H, J = 7.8 Hz), 7.15-7.35 (m, 5H).

Compound Ii-111

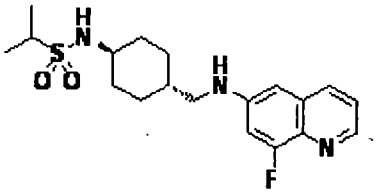
[Formula 279]



1H-NMR (DMSO-d6) δ: 0.97-1.14 (m, 2H), 1.14-1.33 (m, 5H), 1.45-1.61 (m, 1H), 1.81-1.96 (m, 4H), 2.90-3.10 (m, 5H), 6.34 (t, 1H, J = 5.2 Hz), 6.51 (d, 1H, J = 2.2 Hz), 6.99-7.07 (m, 2H), 7.36 (dd, 1H, J = 8.2, 4.1 Hz), 8.02 (d, 1H, J = 8.5 Hz), 8.48 (dd, 1H, J = 4.1, 1.4 Hz).

Compound Ii-112

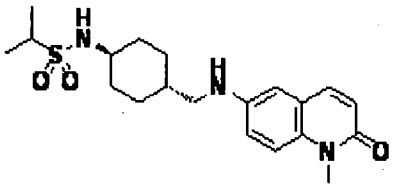
[Formula 280]



1H-NMR (DMSO-d6) δ: 0.97-1.13 (m, 2H), 1.17-1.34 (m, 8H), 1.45-1.59 (m, 1H), 1.81-1.99 (m, 4H), 2.94 (t, 2H, J = 5.9 Hz), 2.99-3.21 (m, 2H), 6.33 (t, 1H, J = 5.4 Hz), 6.51 (d, 1H, J = 2.2 Hz), 6.96 (d, 1H, J = 7.7 Hz), 7.02 (dd, 1H, J = 13.5, 2.2 Hz), 7.36 (dd, 1H, J = 8.2, 4.1 Hz), 8.02 (d, 1H, J = 8.5 Hz), 8.48 (dd, 1H, J = 4.1, 1.4 Hz).

Compound Ii-113

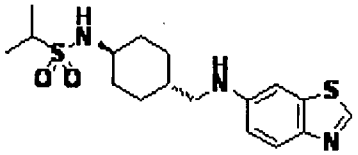
[Formula 281]



1H-NMR (DMSO-d6) δ: 0.93-1.13 (m, 2H), 1.15-1.34 (m, 8H), 1.39-1.57 (m, 1H), 1.79-1.95 (m, 4H), 2.87 (t, 2H, J = 6.2 Hz), 2.94-3.16 (m, 2H), 3.54 (s, 3H), 5.66 (t, 1H, J = 5.5 Hz), 6.49 (d, 1H, J = 9.6 Hz), 6.73 (d, 1H, J = 2.8 Hz), 6.91-7.02 (m, 2H), 7.29 (d, 1H, J = 9.3 Hz), 7.72 (d, 1H, J = 9.3 Hz).

Compound Ii-114

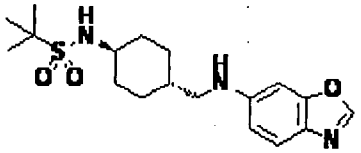
[Formula 282]



1H-NMR (DMSO-d6) δ: 0.93-1.10 (m, 2H), 1.14-1.33 (m, 8H), 1.41-1.56 (m, 1H), 1.79-1.94 (m, 4H), 2.89 (t, 2H, J = 6.0 Hz), 2.95-3.16 (m, 2H), 6.00 (t, 1H, J = 5.4 Hz), 6.84 (dd, 1H, J = 8.8, 2.2 Hz), 6.95 (d, 1H, J = 8.0 Hz), 7.07 (d, 1H, J = 2.2 Hz), 7.72 (d, 1H, J = 8.8 Hz), 8.86 (s, 1H).

Compound Ii-115

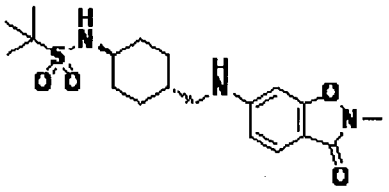
[Formula 283]



1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 4H), 1.26 (s, 9H), 1.40-1.51 (m, 1H), 1.84 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.4 Hz), 2.85-2.90 (m, 2H), 2.97-3.06 (m, 1H), 5.93-5.99 (m, 1H), 6.63-6.79 (m, 3H), 7.40 (d, 1H, J = 8.8 Hz), 8.32 (s, 1H).

Compound Ii-116

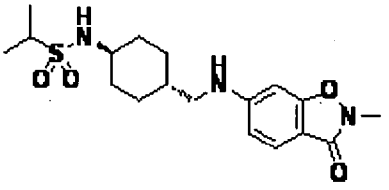
[Formula 284]



1H-NMR (DMSO-d6) δ: 0.95-1.07 (m, 4H), 1.26 (s, 9H), 1.39-1.47 (m, 1H), 1.80 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.4 Hz), 2.87-2.93 (m, 2H), 2.98-3.06 (m, 1H), 3.37 (s, 3H), 6.27 (s, 1H), 6.55 (d, 1H, J = 8.8 Hz), 6.73 (d, 1H, J = 8.8 Hz), 6.80 (t, 1H, J = 5.2 Hz), 7.32 (d, 1H, J = 8.8 Hz).

Compound Ii-117

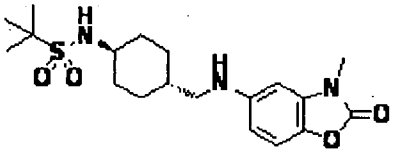
[Formula 285]



1H-NMR (DMSO-d6) δ: 0.94-1.08 (m, 4H), 1.20 (s, 3H), 1.22 (s, 3H), 1.39-1.51 (m, 1H), 1.80 (d, 2H, J = 12.4 Hz), 1.88 (d, 2H, J = 12.4 Hz), 2.87-2.94 (m, 2H), 2.97-3.07 (m, 1H), 3.08-3.14 (m, 1H), 3.37 (s, 3H), 6.27 (s, 1H), 6.55 (d, 1H, J = 8.4 Hz), 6.82 (t, 1H, J = 5.6 Hz), 6.94 (d, 1H, J = 8.0 Hz), 7.32 (d, 1H, J = 8.4 Hz).

Compound Ii-118

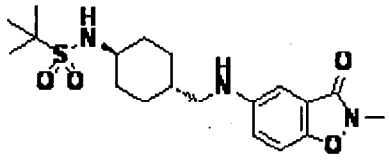
[Formula 286]



1H-NMR (DMSO-d6) δ: 0.92-1.06 (m, 4H), 1.26 (s, 9H), 1.38-1.50 (m, 1H), 1.83 (d, 2H, J = 12.4 Hz), 1.90 (d, 2H, J = 12.4 Hz), 2.80-2.86 (m, 2H), 2.96-3.06 (m, 1H), 3.26 (s, 3H), 5.58-5.65 (m, 1H), 6.27 (d, 1H, J = 8.4 Hz), 6.38 (s, 1H), 6.75 (d, 1H, J = 8.4 Hz), 6.99 (d, 1H, J = 8.4 Hz).

Compound Ii-119

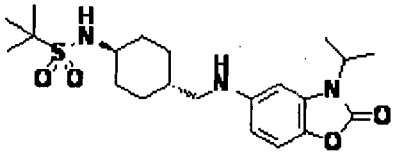
[Formula 287]



1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 4H), 1.26 (s, 9H), 1.39-1.50 (m, 1H), 1.84 (d, 2H, J = 12.4 Hz), 1.90 (d, 2H, J = 12.4 Hz), 2.81-2.89 (m, 2H), 2.96-3.07 (m, 1H), 3.51 (s, 3H), 5.79-5.84 (m, 1H), 6.60 (s, 1H), 6.75 (d, 1H, J = 8.8 Hz), 7.03 (d, 1H, J = 8.8 Hz), 7.19 (d, 1H, J = 8.8 Hz).

Compound Ii-120

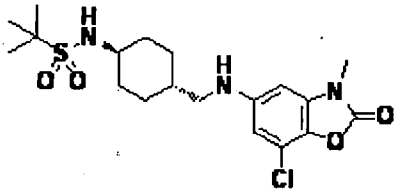
[Formula 288]



1H-NMR (DMSO-d6) δ: 0.93-1.10 (m, 4H), 1.26 (s, 9H), 1.37-1.40 (m, 1H), 1.42 (s, 3H), 1.44 (s, 3H), 1.83 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.4 Hz), 2.79-2.96 (m, 2H), 2.97-3.07 (m, 1H), 4.33-4.46 (m, 1H), 5.50-5.59 (m, 1H), 6.25 (d, 1H, J = 8.8 Hz), 6.57 (s, 1H), 6.75 (d, 1H, J = 8.4 Hz), 7.00 (d, 1H, J = 8.4 Hz).

Compound Ii-121

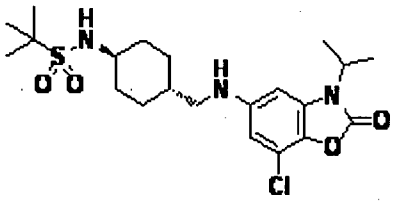
[Formula 289]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 4H), 1.26 (s, 9H), 1.36-1.49 (m, 1H), 1.82 (d, 2H, J = 12.4 Hz), 1.90 (d, 2H, J = 12.4 Hz), 2.80-2.87 (m, 2H), 2.95-3.97 (m, 1H), 3.27 (s, 3H), 5.85-5.92 (m, 1H), 6.33 (s, 1H), 6.36 (s, 1H), 6.75 (d, 1H, J = 8.8 Hz).

Compound Ii-122

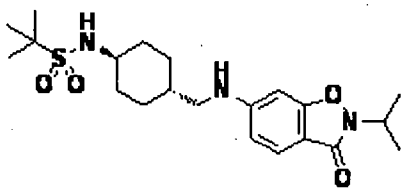
[Formula 290]



1H-NMR (DMSO-d6) δ: 0.92-1.08 (m, 4H), 1.26 (s, 9H), 1.38-1.41 (m, 1H), 1.42 (s, 3H), 1.43 (s, 3H), 1.82 (d, 2H, J = 11.8 Hz), 1.90 (d, 2H, J = 11.8 Hz), 2.83-2.88 (m, 2H), 2.98-3.06 (m, 1H), 4.33-4.47 (m, 1H), 6.35 (s, 1H), 6.54 (s, 1H), 6.76 (d, 1H, J = 8.4 Hz), 8.32 (s, 1H).

Compound Ii-123

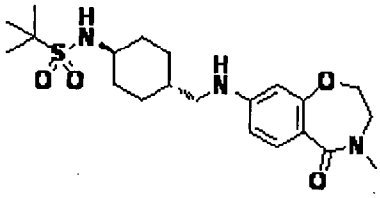
[Formula 291]



1H-NMR (DMSO-d6) δ: 0.93-1.06 (m, 4H), 1.22 (s, 3H), 1.24 (s, 3H), 1.26 (s, 9H), 1.39-1.50 (m, 1H), 1.81 (d, 2H, J = 12.4 Hz), 1.90 (d, 2H, J = 12.4 Hz), 2.87-2.93 (m, 2H), 2.96-3.07 (m, 1H), 4.39-4.47 (m, 1H), 6.30 (s, 1H), 6.54 (d, 1H, J = 8.8 Hz), 6.77 (d, 1H, J = 8.8 Hz), 6.86 (t, 1H, J = 5.2 Hz), 7.32 (d, 1H, J = 8.4 Hz).

Compound Ii-124

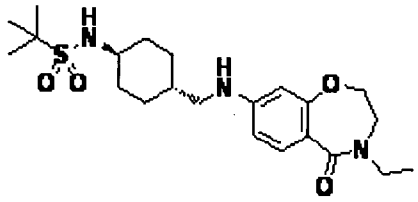
[Formula 292]



1H-NMR (DMSO-d6) δ: 0.90-1.05 (m, 4H), 1.26 (s, 9H), 1.36-1.51 (m, 1H), 1.79 (d, 2H, J = 12.4 Hz), 1.90 (d, 2H, J = 12.4 Hz), 2.80-2.86 (m, 2H), 3.01 (s, 3H), 3.02-3.05 (m, 1H), 3.49 (t, 2H, J = 4.8 Hz), 4.26 (t, 2H, J = 4.8 Hz), 6.02 (s, 1H), 6.20 (t, 1H, J = 5.6 Hz), 6.31 (d, 1H, J = 8.8 Hz), 6.74 (d, 1H, J = 8.8 Hz), 7.43 (d, 1H, J = 8.4 Hz).

Compound Ii-125

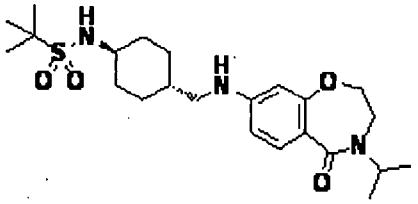
[Formula 293]



1H-NMR (DMSO-d6) δ: 0.92-1.02 (m, 4H), 1.08 (t, 3H, J = 7.2 Hz), 1.25 (s, 9H), 1.35-1.42 (m, 1H), 1.79 (d, 2H, J = 12.0 Hz), 1.90 (d, 2H, J = 12.0 Hz), 2.80-2.86 (m, 2H), 2.96-3.05 (m, 1H), 3.42-3.51 (m, 4H), 4.20-4.26 (m, 2H), 6.03 (s, 1H), 6.20 (s, 1H), 6.31 (d, 1H, J = 8.8 Hz), 6.75 (d, 1H, J = 8.8 Hz), 7.42 (d, 1H, J = 8.8 Hz).

Compound Ii-126

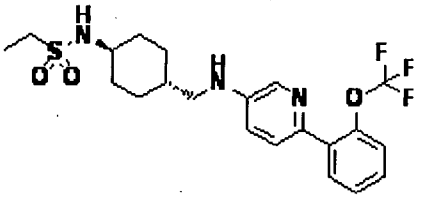
[Formula 294]



1H-NMR (DMSO-d6) δ: 0.92-1.02 (m, 4H), 1.09 (s, 3H), 1.11 (s, 3H), 1.25 (s, 9H), 1.43-1.55 (m, 1H), 1.80 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.0 Hz), 2.84 (m, 2H), 2.97-3.08 (m, 1H), 3.37 (t, 2H, J = 5.2 Hz), 4.18 (t, 2H, J = 5.2 Hz), 4.71-4.80 (m, 1H), 6.05 (s, 1H), 6.19 (t, 1H, J = 5.2 Hz), 6.32 (d, 1H, J = 8.8 Hz), 6.74 (d, 1H, J = 8.4 Hz), 7.18 (d, 1H, J = 8.4 Hz).

Compound Ii-127

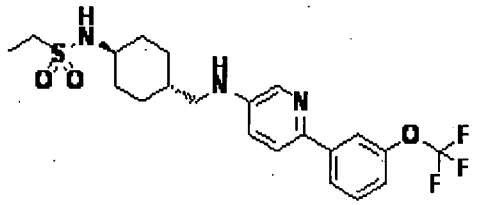
[Formula 295]



1H-NMR (DMSO-d6) δ: 0.94-1.12 (m, 2H), 1.14-1.39 (m, 5H), 1.34-1.56 (m, 1H), 1.70-1.97 (m, 4H), 2.87-3.10 (m, 5H), 6.17 (t, 1H, J = 5.2 Hz), 6.94-7.06 (m, 2H), 7.35-7.47 (m, 4H), 7.75-7.80 (m, 1H), 8.07 (d, 1H, J = 3.0 Hz).

Compound Ii-128

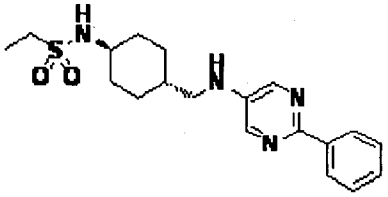
[Formula 296]



1H-NMR (DMSO-d6) δ: 0.96-1.12 (m, 2H), 1.14-1.31 (m, 5H), 1.31-1.55 (m, 1H), 1.70-1.96 (m, 4H), 2.89-3.09 (m, 5H), 6.24 (t, 1H, J = 5.4 Hz), 6.94-7.05 (m, 2H), 7.24 (d, 1H, J = 6.9 Hz), 7.52 (t, 1H, J = 8.0 Hz), 7.75 (d, 1H, J = 8.8 Hz), 7.88-7.97 (m, 2H), 8.07 (d, 1H, J = 2.5 Hz).

Compound Ii-129

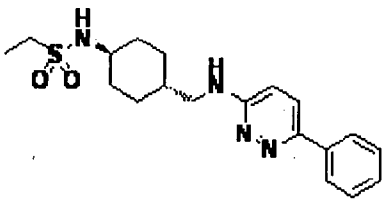
[Formula 297]



1H-NMR (DMSO-d6) δ: 0.98-1.12 (m, 2H), 1.18-1.30 (m, 2H), 1.19 (t, 3H, J = 6.8 Hz), 1.48 (m, 1H), 1.79-1.95 (m, 4H), 2.92-3.09 (m, 3H), 2.97 (q, 2H, J = 6.8 Hz), 6.27 (m, 1H), 7.01 (d, 1H, J = 8.0 Hz), 7.39-7.47 (m, 2H), 7.56 (m, 1H), 8.18-8.25 (m, 2H), 8.23 (s, 2H).

Compound Ii-130

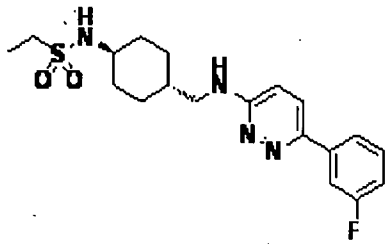
[Formula 298]



1H-NMR (DMSO-d6) δ: 0.96-1.12 (m, 2H), 1.15-1.30 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.45-1.64 (m, 1H), 1.78-1.96 (m, 4H), 2.97 (q, 2H, J = 7.2 Hz), 2.95-3.15 (m, 1H), 3.22-3.28 (m, 2H), 6.89 (d, 1H, J = 9.0 Hz), 6.94-7.02 (m, 2H), 7.38 (t, 1H, J = 6.0 Hz), 7.46 (t, 2H, J = 7.5 Hz), 7.78 (d, 1H, J = 9.0 Hz), 7.96 (d, 2H, J = 9.0 Hz).

Compound Ii-131

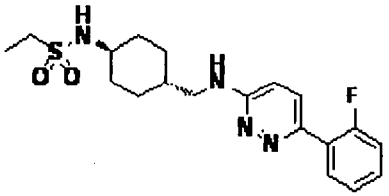
[Formula 299]



1H-NMR (DMSO-d6) δ: 0.96-1.12 (m, 2H), 1.15-1.30 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.48-1.62 (m, 1H), 1.78-1.96 (m, 4H), 2.98 (q, 2H, J = 7.2 Hz), 2.94-3.10 (m, 1H), 3.22-3.28 (m, 2H), 6.89 (d, 1H, J = 9.0 Hz), 7.02 (d, 1H, J = 9.0 Hz), 7.10 (t, 1H, J = 5.4 Hz), 7.22 (td, 1H, J = 9.0, 3.0 Hz), 7.47-7.56 (m, 1H), 7.77-7.88 (m, 3H).

Compound Ii-132

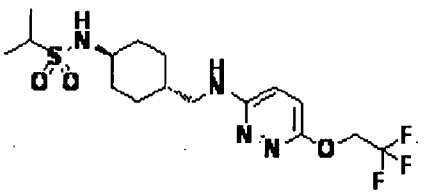
[Formula 300]



1H-NMR (DMSO-d6) δ: 0.96-1.13 (m, 2H), 1.15-1.32 (m, 2H), 1.19 (t, 3H, J = 7.5 Hz), 1.48-1.65 (m, 1H), 1.78-1.96 (m, 4H), 2.98 (q, 2H, J = 7.2 Hz), 2.94-3.12 (m, 1H), 3.22-3.28 (m, 2H), 6.89 (d, 1H, J = 9.0 Hz), 7.01 (d, 1H, J = 6.0 Hz), 7.09 (t, 1H, J = 5.4 Hz), 7.27-7.35 (m, 2H), 7.42-7.50 (m, 1H), 7.57 (dd, 1H, J = 9.0, 3.0 Hz), 7.86 (td, 1H, J = 7.5, 3.0 Hz).

Compound Ii-133

[Formula 301]

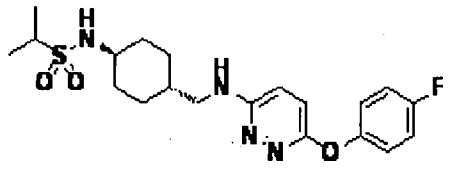


1H-NMR (DMSO-d6) δ: 0.92-1.08 (m, 2H), 1.15-1.30 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.42-1.58 (m, 1H), 1.72-1.94 (m, 4H), 2.95-3.20 (m, 4H), 4.89-4.98 (m, 2H), 6.65 (brs, 1H),

6.92 (d, 1H, J = 9.0 Hz), 6.91-6.98 (m, 1H), 7.03 (d, 1H, J = 9.0 Hz).

Compound Ii-134

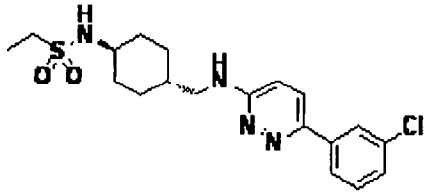
[Formula 302]



1H-NMR (DMSO-d6) δ: 0.90-1.08 (m, 2H), 1.15-1.30 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.42-1.58 (m, 1H), 1.72-1.94 (m, 4H), 2.92-3.20 (m, 4H), 6.74 (t, 1H, J = 6.0 Hz), 6.94 (t, 1H, J = 6.0 Hz), 6.97 (s, 1H), 7.08-7.24 (m, 5H).

Compound Ii-135

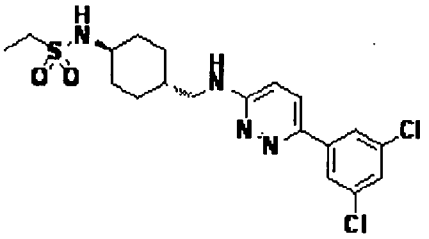
[Formula 303]



1H-NMR (DMSO-d6) δ: 0.95-1.10 (m, 2H), 1.12-1.30 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.48-1.60 (m, 1H), 1.76-1.94 (m, 4H), 2.92-3.10 (m, 1H), 2.97 (q, 2H, J = 7.2 Hz), 3.18-3.30 (m, 2H), 6.89 (d, 1H, J = 9.6 Hz), 7.02 (brs, 1H), 7.11 (t, 1H, J = 5.4 Hz), 7.42-7.56 (m, 2H), 7.85 (d, 1H, J = 9.6 Hz), 7.93 (d, 1H, J = 7.5 Hz), 8.03 (s, 1H).

Compound Ii-136

[Formula 304]

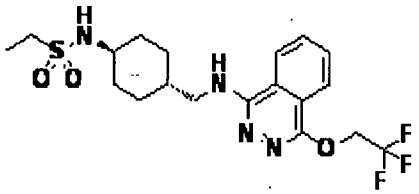


1H-NMR (DMSO-d6) δ: 0.98-1.12 (m, 2H), 1.13-1.30 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.48-1.62 (m, 1H), 1.78-1.96 (m, 4H), 2.92-3.12 (m, 1H), 2.97 (q, 2H, J = 7.2 Hz), 3.22-

3.32 (m, 2H), 6.89 (d, 1H, J = 9.0 Hz), 7.01 (d, 1H, J = 7.5 Hz), 7.20 (t, 1H, J = 6.0 Hz), 7.62 (s, 1H), 7.91 (d, 1H, J = 9.0 Hz), 8.02 (s, 2H).

Compound Ii-137

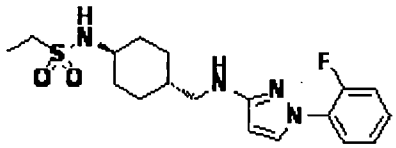
[Formula 305]



1H-NMR (DMSO-d6) δ: 0.95-1.12 (m, 2H), 1.13-1.30 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.65-1.95 (m, 5H), 2.93-3.12 (m, 1H), 2.97 (q, 2H, J = 7.2 Hz), 3.25-3.40 (m, 2H), 5.07-5.16 (m, 2H), 7.01 (d, 1H, J = 7.5 Hz), 7.25 (t, 1H, J = 6.0 Hz), 7.92-8.03 (m, 3H), 8.33 (d, 1H, J = 6.0 Hz).

Compound Ii-138

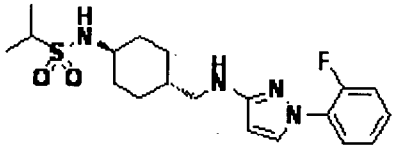
[Formula 306]



1H-NMR (DMSO-d6) δ: 0.91-1.26 (m, 4H), 1.19 (t, 3H, J = 7.5 Hz), 1.36-1.43 (m, 1H), 1.78-1.90 (m, 4H), 2.90-3.07 (m, 3H), 2.96 (q, 2H, J = 7.5 Hz), 5.69 (t, 1H, J = 5.7 Hz), 5.81 (d, 1H, J = 2.4 Hz), 7.00 (d, 1H, J = 7.8 Hz), 7.16-7.39 (m, 3H), 7.73-7.79 (m, 1H), 7.86-7.88 (m, 1H).

Compound Ii-139

[Formula 307]

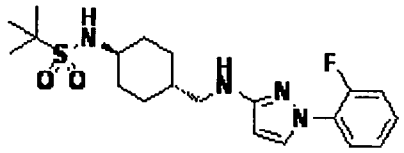


1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 4H), 1.20 (s, 3H), 1.22 (s, 3H), 1.40-1.52 (m, 1H), 1.81 (d, 2H, J = 12.4 Hz), 1.88 (d, 2H, J = 12.4 Hz), 2.90-2.98 (m, 2H), 2.99-3.13 (m, 2H), 5.68 (t, 1H, J = 5.6 Hz), 5.81 (s, 1H), 6.93 (d, 1H, J = 8.8 Hz), 7.16-7.40 (m, 3H), 7.76 (t,

1H, J = 8.0 Hz), 7.87 (s, 1H).

Compound Ii-140

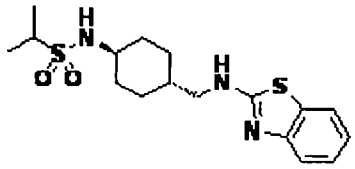
[Formula 308]



1H-NMR (DMSO-d6) δ: 0.90-1.06 (m, 4H), 1.26 (s, 9H), 1.40-1.49 (m, 1H), 1.82 (d, 2H, J = 12.4 Hz), 1.91 (d, 2H, J = 12.4 Hz), 2.90-2.99 (m, 2H), 3.01-3.06 (m, 1H), 5.67 (t, 1H, J = 6.0 Hz), 5.81 (s, 1H), 6.74 (d, 1H, J = 8.4 Hz), 7.14-7.40 (m, 3H), 7.76 (t, 1H, J = 8.4 Hz), 7.87 (s, 1H).

Compound Ii-141

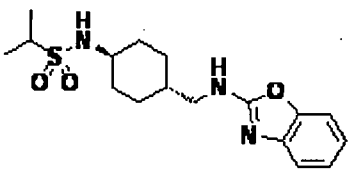
[Formula 309]



1H-NMR (DMSO-d6) δ: 0.97-1.06 (m, 2H), 1.18-1.27 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.45-1.59 (m, 1H), 1.76-1.81 (m, 2H), 1.87-1.91 (m, 2H), 2.97-3.09 (m, 1H), 3.10-3.13 (m, 1H), 3.17-3.22 (m, 2H), 6.94-7.02 (m, 2H), 6.98 (td, 1H, J = 7.8, 1.2 Hz), 7.36 (dd, 1H, J = 7.8, 0.6 Hz), 7.65 (dd, 1H, J = 7.8, 0.6 Hz), 8.00-8.05 (m, 1H).

Compound Ii-142

[Formula 310]

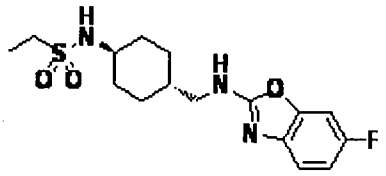


1H-NMR (DMSO-d6) δ: 0.96-1.04 (m, 2H), 1.18-1.28 (m, 2H), 1.20 (d, 6H, J = 6.9 Hz), 1.43-1.59 (m, 1H), 1.74-1.79 (m, 2H), 1.85-1.90 (m, 2H), 2.92-3.07 (m, 1H), 3.09-3.18 (m, 3H), 6.92-6.99 (m, 2H), 7.10 (td, 1H, J = 7.8, 1.2 Hz), 7.21 (dd, 1H, J = 7.8, 0.6 Hz), 7.31

(dd, 1H, J = 7.8, 0.6 Hz), 7.89-7.97 (m, 1H).

Compound Ii-143

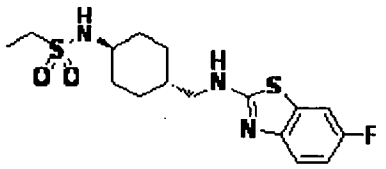
[Formula 311]



1H-NMR (DMSO-d6)δ: 0.97-1.07 (m, 2H), 1.17-1.23 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.42-1.57 (m, 1H), 1.73-1.78 (m, 2H), 1.86-1.90 (m, 2H), 2.93-3.02 (m, 1H), 2.97 (q, 2H, J = 7.2 Hz), 3.11 (t, 2H, J = 6.3 Hz), 6.91-7.02 (m, 2H), 7.19 (dd, 1H, J = 8.4, 4.8 Hz), 7.34 (dd, 1H, J = 9.3, 2.4 Hz), 8.00 (t, 1H, J = 6.0 Hz).

Compound Ii-144

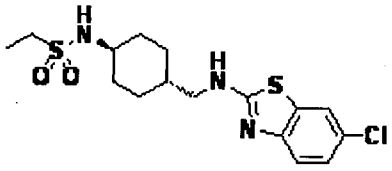
[Formula 312]



1H-NMR (DMSO-d6)δ: 0.97-1.08 (m, 2H), 1.16-1.24 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.42-1.59 (m, 1H), 1.74-1.80 (m, 2H), 1.85-1.90 (m, 2H), 2.92-3.03 (m, 1H), 2.97 (q, 2H, J = 7.5 Hz), 3.18 (t, 2H, J = 6.3 Hz), 6.99-7.07 (m, 2H), 7.33 (dd, 1H, J = 9.0, 4.8 Hz), 7.58 (dd, 1H, J = 8.7, 2.7 Hz), 8.00 (t, 1H, J = 5.4 Hz).

Compound Ii-145

[Formula 313]

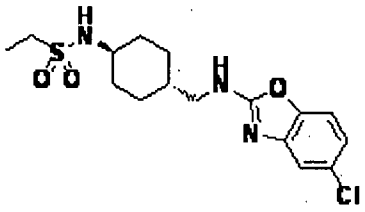


1H-NMR (DMSO-d6) δ: 0.97-1.09 (m, 2H), 1.17-1.23 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.43-1.59 (m, 1H), 1.72-1.81 (m, 2H), 1.85-1.92 (m, 2H), 2.95-3.06 (m, 1H), 2.97 (q, 2H, J

= 7.5 Hz), 3.19 (t, 2H, J = 6.0 Hz), 7.01 (d, 1H, J = 8.1 Hz), 7.20-7.23 (m, 1H), 7.33 (dd, 1H, J = 8.7, 0.6 Hz), 7.58 (dd, 1H, J = 2.1, 0.9 Hz), 8.11-8.18 (m, 1H).

Compound Ii-146

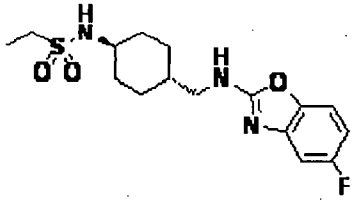
[Formula 314]



1H-NMR (DMSO-d6) δ: 0.98-1.06 (m, 2H), 1.15-1.21 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.42-1.58 (m, 1H), 1.70-1.81 (m, 2H), 1.82-1.96 (m, 2H), 2.93-3.00 (m, 3H), 3.13-3.19 (m, 2H), 6.98-7.02 (m, 2H), 7.26-7.27 (m, 1H), 7.32-7.35 (m, 1H), 8.18-8.21 (m, 1H).

Compound Ii-147

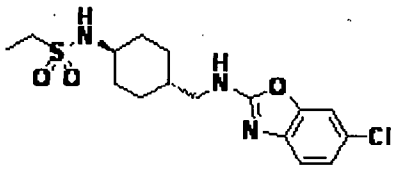
[Formula 315]



1H-NMR (DMSO-d6) δ: 0.98-1.04 (m, 2H), 1.16-1.23 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.43-1.59 (m, 1H), 1.73-1.78 (m, 2H), 1.86-1.89 (m, 2H), 2.93-3.00 (m, 3H), 3.11-3.15 (m, 2H), 6.72-6.79 (m, 1H), 7.00-7.08 (m, 2H), 7.29-7.34 (m, 1H), 8.13-8.16 (m, 1H).

Compound Ii-148

[Formula 316]

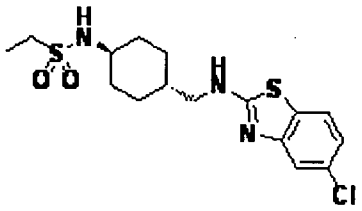


1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 2H), 1.15-1.26 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.45-1.58 (m, 1H), 1.72-1.80 (m, 2H), 1.84-1.92 (m, 2H), 2.96 (q, 2H, J = 7.2 Hz), 2.96-3.05 (m, 1H), 3.09-3.16 (m, 2H), 6.99 (d, 1H, J = 8.0 Hz), 7.13 (dd, 1H, J = 8.0, 2.0 Hz),

7.20 (d, 1H, J = 8.4 Hz), 7.49 (d, 1H, J = 2.0 Hz), 8.11 (t, 1H, J = 6.0 Hz).

Compound Ii-149

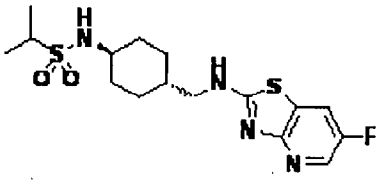
[Formula 317]



1H-NMR (DMSO-d6) δ: 0.96-1.08 (m, 2H), 1.12-1.24 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.43-1.59 (m, 1H), 1.74-1.80 (m, 2H), 1.86-1.91 (m, 2H), 2.93-3.01 (m, 3H), 3.17-3.22 (m, 2H), 7.00-7.05 (m, 2H), 7.37-7.39 (m, 1H), 7.65-7.68 (m, 1H), 8.22-8.26 (m, 1H).

Compound Ii-150

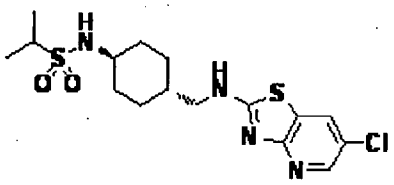
[Formula 318]



1H-NMR (DMSO-d6) δ: 0.98-1.08 (m, 2H), 1.15-1.29 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.44-1.60 (m, 1H), 1.74-1.80 (m, 2H), 1.86-1.91 (m, 2H), 2.95-3.17 (m, 2H), 3.21-3.27 (m, 2H), 6.95-6.98 (m, 1H), 8.10 (dd, 1H, J = 8.4, 2.7 Hz), 8.19 (dd, 1H, J = 3.0, 1.5 Hz), 8.44-8.47 (m, 1H).

Compound Ii-151

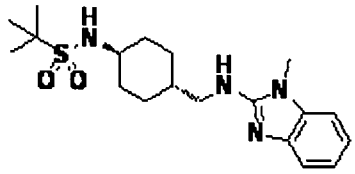
[Formula 319]



1H-NMR (DMSO-d6) δ: 0.99-1.04 (m, 2H), 1.15-1.23 (m, 2H), 1.21 (d, 6H, J = 6.3 Hz), 1.43-1.59 (m, 1H), 1.73-1.81 (m, 2H), 1.85-1.91 (m, 2H), 2.97-3.18 (m, 2H), 3.21-3.29 (m, 2H), 6.95-6.98 (m, 1H), 8.20-8.23 (m, 2H), 8.58-8.61 (m, 1H).

Compound Ii-152

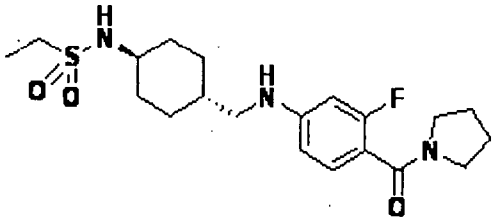
[Formula 320]



1H-NMR (DMSO-d6) δ: 0.96-1.04 (m, 2H), 1.15-1.26 (m, 2H), 1.25 (s, 9H), 1.56-1.62 (m, 1H), 1.78-1.83 (m, 2H), 1.87-1.93 (m, 2H), 2.98-3.08 (m, 1H), 3.17 (t, 2H, J = 6.3 Hz), 3.48 (s, 3H), 6.47 (d, 2H, J = 8.7 Hz), 6.89-6.96 (m, 2H), 7.11-7.19 (m, 2H).

Compound Ii-153

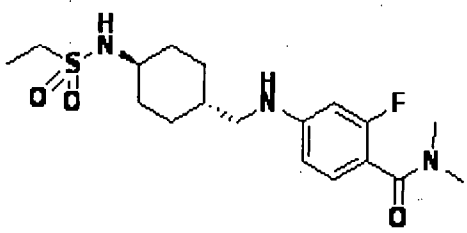
[Formula 321]



1H-NMR (DMSO-d6) δ: 0.95-1.04 (m, 2H), 1.13-1.30 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.41 (m, 1H), 1.71-1.94 (m, 4H), 2.80-2.89 (m, 2H), 2.92-3.10 (m, 2H), 2.97 (q, 2H, J = 7.5 Hz), 3.21-3.30 (m, 2H), 6.25-6.35 (m, 2H), 6.39 (dd, 1H, J = 8.4, 2.1 Hz), 7.01 (d, 1H, J = 7.5 Hz), 7.01 (dd, 1H, J = 8.4, 8.4 Hz).

Compound Ii-154

[Formula 322]

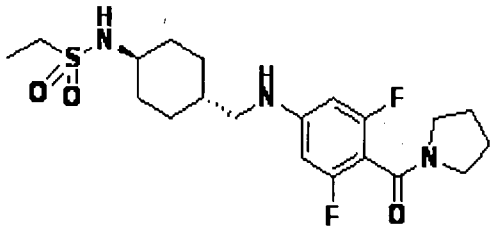


1H-NMR (DMSO-d6) δ: 0.91-1.09 (m, 2H), 1.16-1.28 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.42 (m, 1H), 1.74-1.95 (m, 4H), 2.80-3.16 (m, 9H), 2.97 (q, 2H, J = 7.5 Hz), 6.24-6.36 (m,

2H), 6.30 (dd, 1H, J = 8.4, 2.1 Hz), 7.10 (dd, 1H, J = 8.4, 2.1 Hz), 7.05 (d, 1H, J = 8.4 Hz).

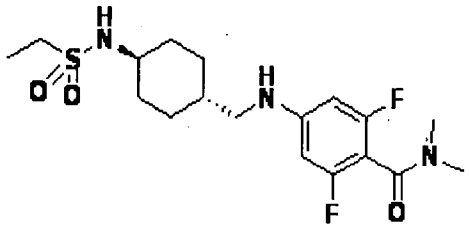
Compound Ii-155

[Formula 323]



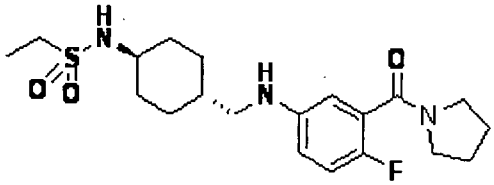
Compound Ii-156

[Formula 324]



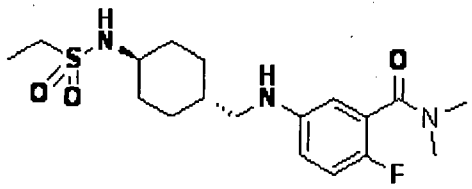
Compound Ii-157

[Formula 325]



Compound Ii-158

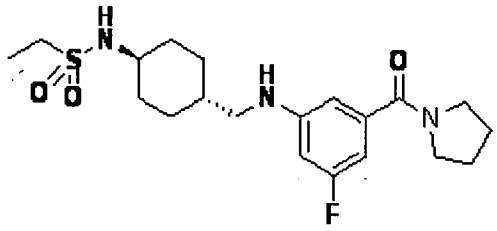
[Formula 326]



1H-NMR (DMSO-d6) δ: 0.91-1.07 (m, 2H), 1.10-1.30 (m, 5H), 1.41 (m, 1H), 1.76-1.94 (m, 4H), 2.74-2.83 (m, 2H), 2.83 (s, 3H), 2.90-3.08 (m, 3H), 2.96 (s, 3H), 5.68 (m, 1H), 6.39 (m, 1H), 6.58 (m, 1H), 6.95 (dd, 1H, J = 8.4, 8.4 Hz), 7.00 (d, 1H, J = 7.8 Hz).

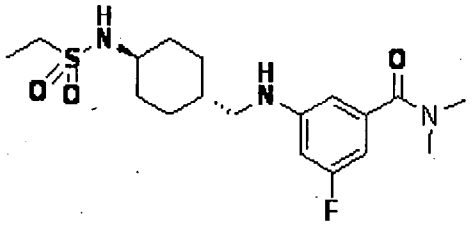
Compound Ii-159

[Formula 327]



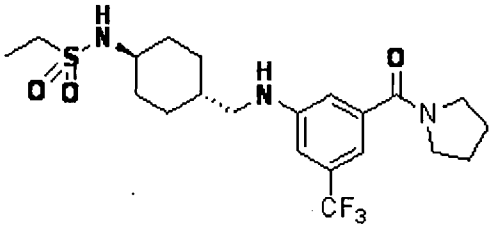
Compound Ii-160

[Formula 328]



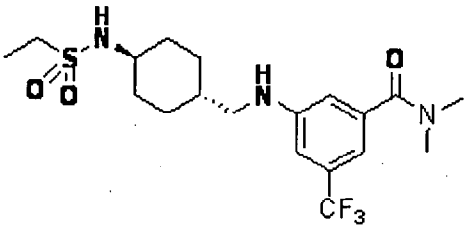
Compound Ii-161

[Formula 329]



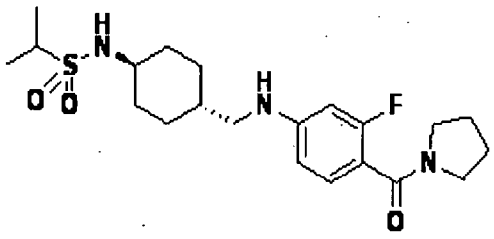
Compound Ii-162

[Formula 330]



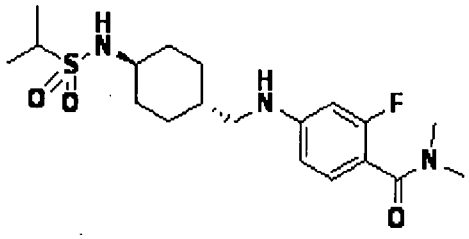
Compound Ii-163

[Formula 331]



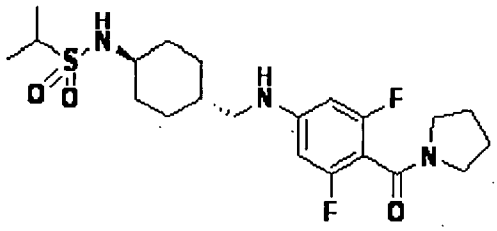
Compound Ii-164

[Formula 332]



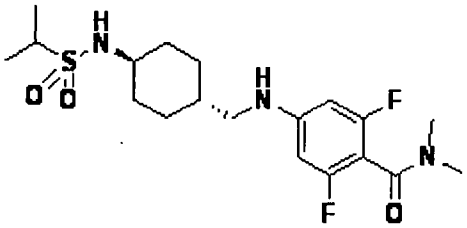
Compound Ii-165

[Formula 333]



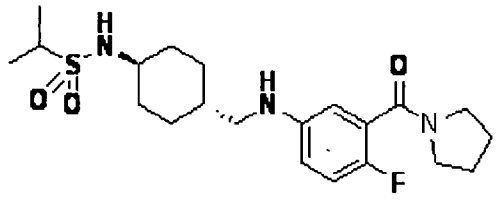
Compound Ii-166

[Formula 334]



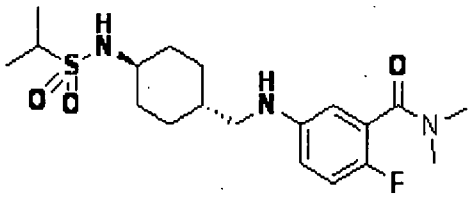
Compound Ii-167

[Formula 335]



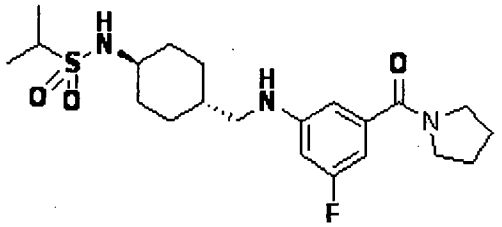
Compound Ii-168

[Formula 336]



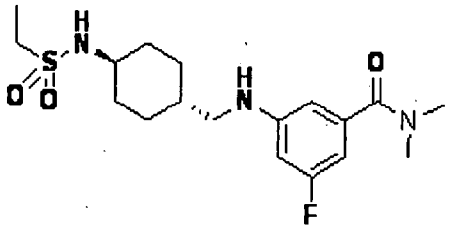
Compound Ii-169

[Formula 337]



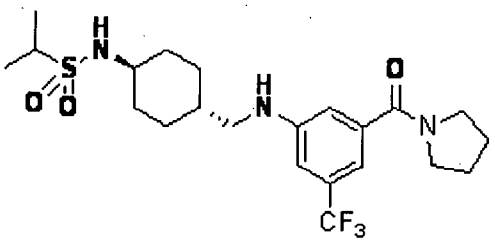
Compound Ii-170

[Formula 338]



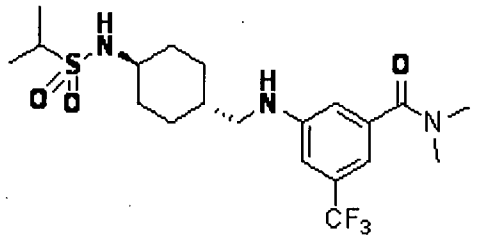
Compound Ii-171

[Formula 339]



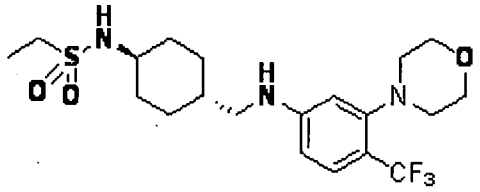
Compound Ii-172

[Formula 340]



Compound Ii-173

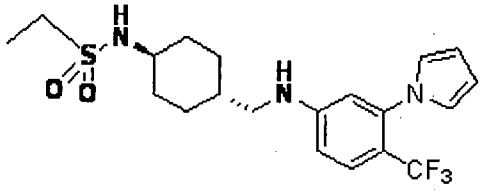
[Formula 341]



1H-NMR (DMSO-d6) δ: 0.95-1.08 (m, 2H), 1.15-1.28 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz),1.43 (m, 1H), 1.76-1.85 (m, 2H), 1.85-1.93 (m, 2H), 2.76-2.82 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 2.97 (t, 2H, J = 7.2 Hz), 3.00 (m, 1H), 3.64-3.70 (m, 4H), 6.33 (m, 1H), 6.37 (d, 1H, J = 8.4 Hz), 6.56 (s, 1H), 7.00 (d, 1H, J = 7.8 Hz), 7.28 (d, 1H, J = 8.4 Hz).

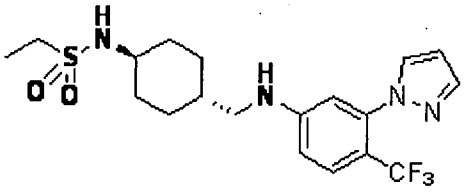
Compound Ii-174

[Formula 342]



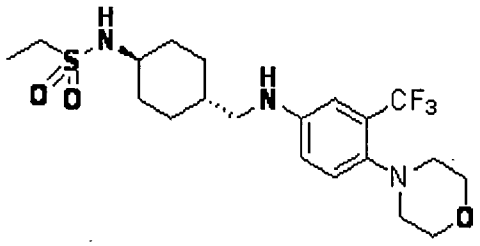
Compound Ii-175

[Formula 343]



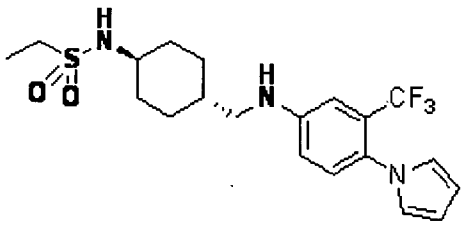
Compound Ii-176

[Formula 344]



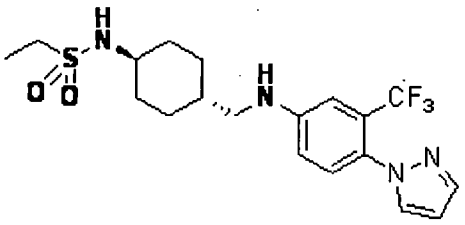
Compound Ii-177

[Formula 345]



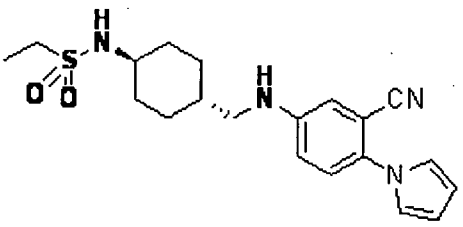
Compound Ii-178

[Formula 346]



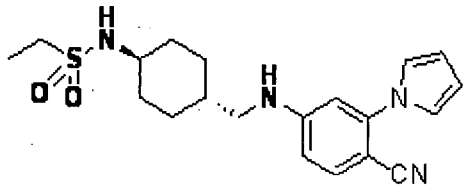
Compound Ii-179

[Formula 347]



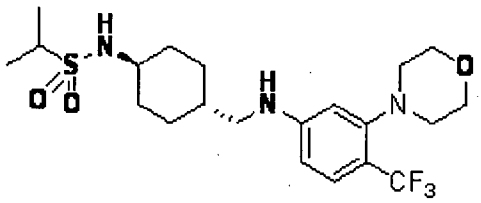
Compound Ii-180

[Formula 348]



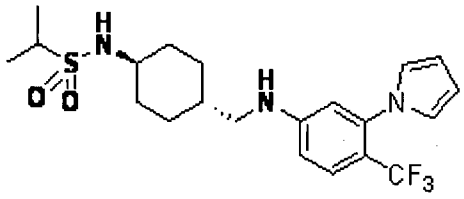
Compound Ii-181

[Formula 349]



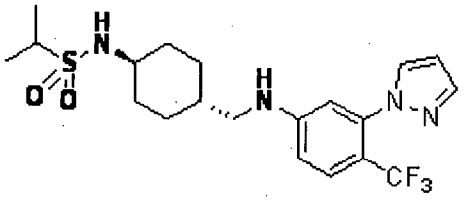
Compound Ii-182

[Formula 350]



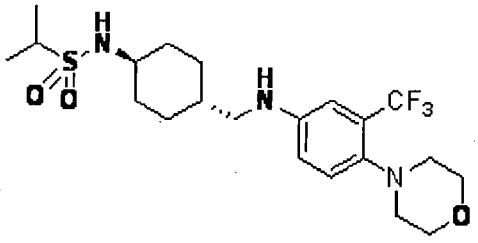
Compound Ii-183

[Formula 351]



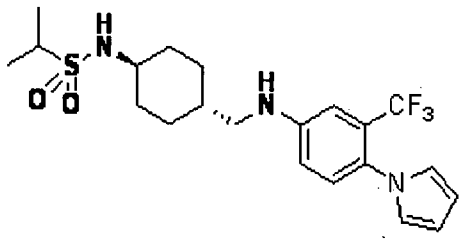
Compound Ii-184

[Formula 352]



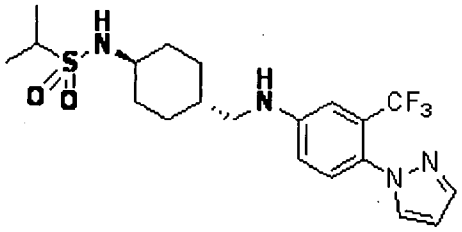
Compound Ii-185

[Formula 353]



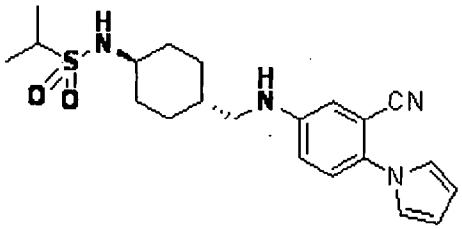
Compound Ii-186

[Formula 354]



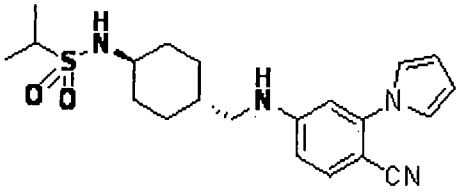
Compound Ii-187

[Formula 355]



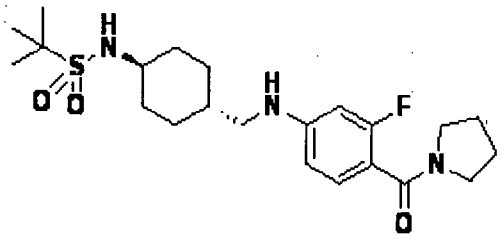
Compound Ii-188

[Formula 356]



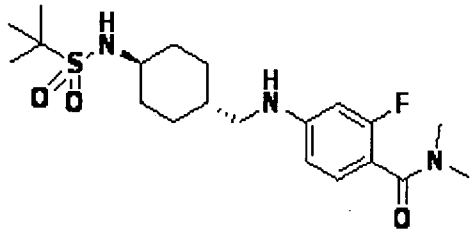
Compound Ii-189

[Formula 357]



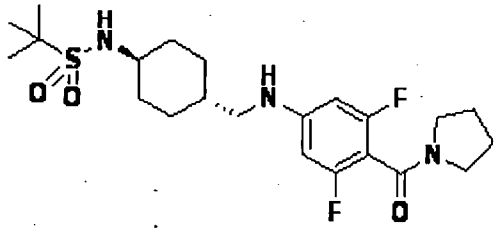
Compound Ii-190

[Formula 358]



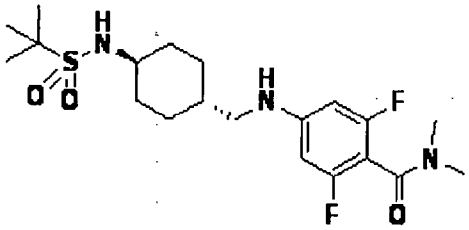
Compound Ii-191

[Formula 359]



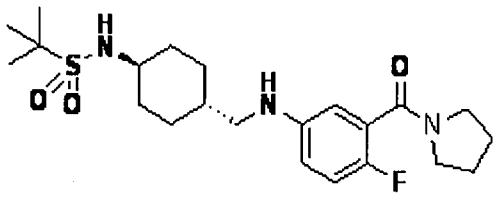
Compound Ii-192

[Formula 360]



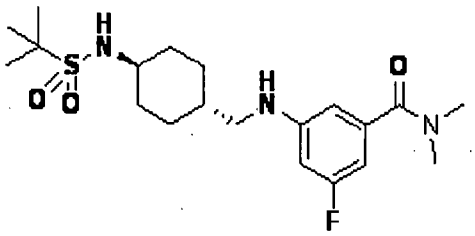
Compound Ii-193

[Formula 361]



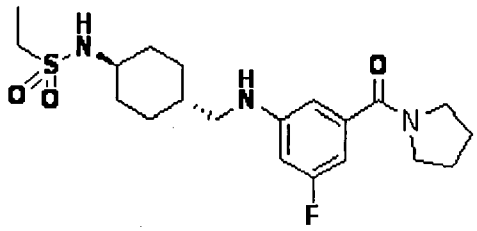
Compound Ii-194

[Formula 362]



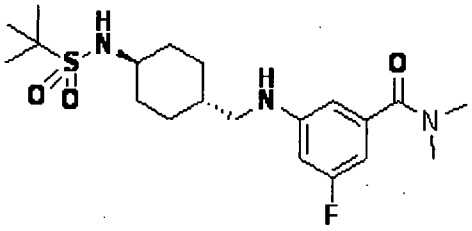
Compound Ii-195

[Formula 363]



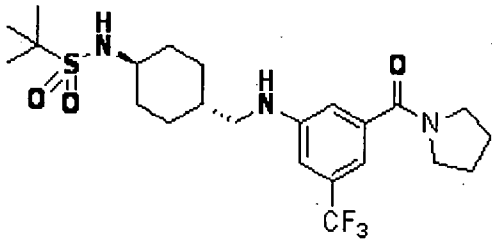
Compound Ii-196

[Formula 364]



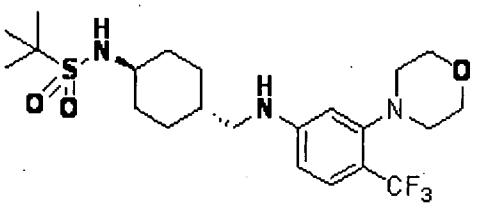
Compound Ii-197

[Formula 365]



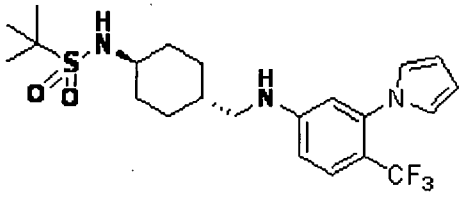
Compound Ii-198

[Formula 366]



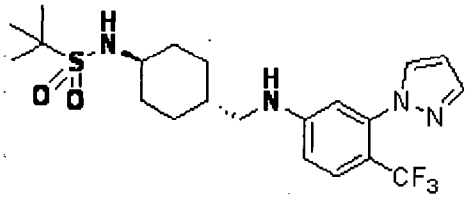
Compound Ii-199

[Formula 367]



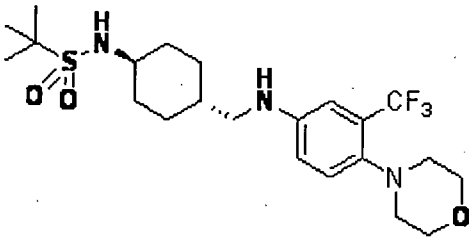
Compound Ii-200

[Formula 368]



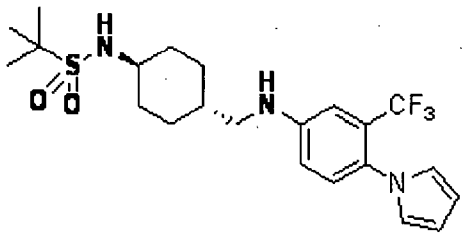
Compound Ii-201

[Formula 369]



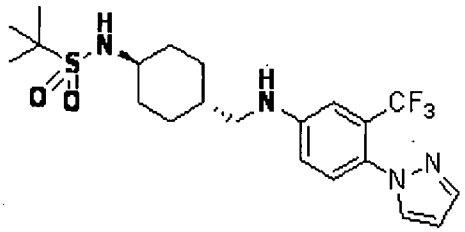
Compound Ii-202

[Formula 370]



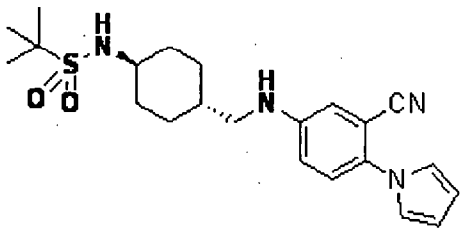
Compound Ii-203

[Formula 371]



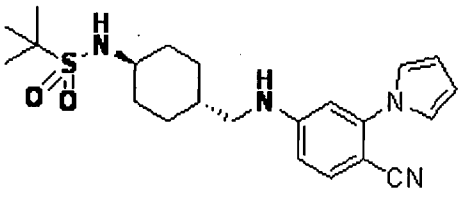
Compound Ii-204

[Formula 372]



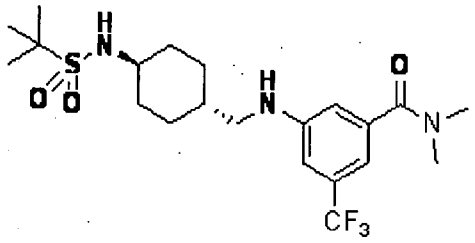
Compound Ii-205

[Formula 373]



Compound Ii-206

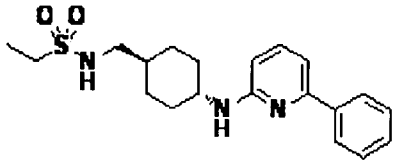
[Formula 374]



[0083]

Compound Ij-2

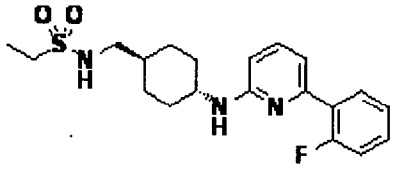
[Formula 375]



1H-NMR (DMSO-d6) δ: 0.98-1.24 (m, 4H), 1.19 (t, 3H, J = 7.5 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.02-2.14 (m, 2H), 2.80 (t, 2H, J = 6.0 Hz), 2.86 (q, 2H, J = 7.2 Hz), 3.64-3.82 (m, 1H), 6.40 (d, 2H, J = 8.1 Hz), 7.01 (d, 2H, J = 7.2 Hz), 7.32-7.50 (m, 4H), 7.99 (d, 2H, J = 6.9 Hz)

Compound Ij-3

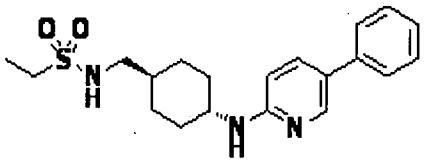
[Formula 376]



1H-NMR (DMSO-d6) δ: 0.96-1.26 (m, 4H), 1.18 (t, 3H, J = 7.5 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.02-2.14 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.5 Hz), 3.60-3.78 (m, 1H), 6.40-6.50 (m,2H), 6.85-6.92 (m, 1H), 6.97-7.03 (m, 1H), 7.22-7.35 (m, 2H), 7.36-7.46 (m, 2H), 7.88-7.96 (m, 1H)

Compound Ij-4

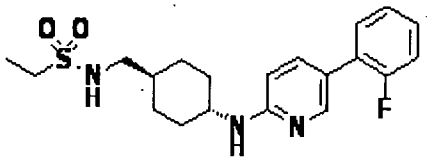
[Formula 377]



1H-NMR (DMSO-d6) δ: 0.92-1.24 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.38 (m, 1H), 1.78-1.88 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.5 Hz), 3.60-3.78 (m, 1H), 6.50 (t, 1H, J = 3.9 Hz), 6.53 (s, 1H), 7.00 (t, 1H, J = 5.7 Hz), 7.25 (t, 1H, J = 7.2 Hz), 7.34-7.45 (m, 2H), 7.55 (d, 2H, J = 7.2 Hz), 7.67 (dd, 1H, J = 8.7, 2.7 Hz), 8.29 (d, 1H, J = 2.7 Hz)

Compound Ij-5

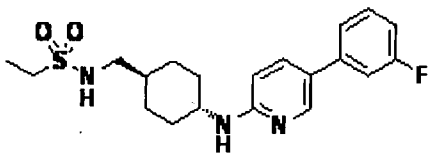
[Formula 378]



1H-NMR (DMSO-d6) δ: 0.92-1.24 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.38 (m, 1H), 1.78-1.88 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.5 Hz), 3.60-3.78 (m, 1H), 6.52 (d, 1H, J = 8.4 Hz), 6.60 (d, 1H, J = 7.8 Hz), 7.01 (t, 1H, J = 5.7 Hz), 7.20-7.36 (m, 3H), 7.46 (t, 1H, J = 8.1 Hz), 7.55 (d, 1H, J = 8.7 Hz), 8.15 (s, 1H)

Compound Ij-6

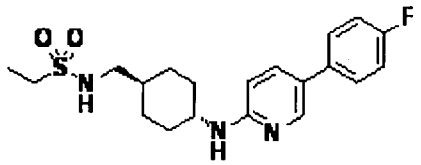
[Formula 379]



1H-NMR (DMSO-d6) δ: 0.92-1.24 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.5 Hz), 3.60-3.78 (m, 1H), 6.51 (d, 1H, J = 8.7 Hz), 6.60 (d, 1H, J = 7.5 Hz), 7.01 (t, 1H, J = 5.7 Hz), 7.02-7.12 (m, 1H), 7.36-7.48 (m, 3H), 7.71 (dd, 1H, J = 8.7, 2.1 Hz), 8.33 (d, 1H, J = 2.1 Hz)

Compound Ij-7

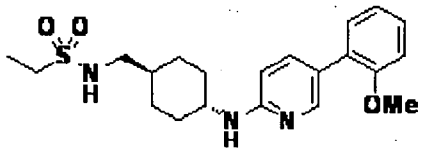
[Formula 380]



1H-NMR (DMSO-d6) δ: 0.92-1.24 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.5 Hz), 3.60-3.78 (m, 1H), 6.50 (d, 2H, J = 8.7 Hz), 6.99 (t, 1H, J = 6.0 Hz), 7.16-7.26 (m, 2H), 7.52-7.68 (m, 3H), 8.25 (s, 1H)

Compound Ij-8

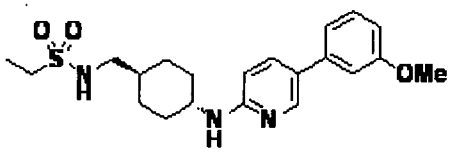
[Formula 381]



1H-NMR (CDCl3) δ: 1.15-1.26 (m, 4H), 1.40 (t, 3H, J = 7.5 Hz), 1.55-1.58 (m, 1H), 1.93 (d, 2H, J = 9.7 Hz), 2.23 (d, 2H, J = 9.7 Hz), 3.01-3.11 (m, 4H), 3.56-3.61 (m, 1H), 3.84 (s, 3H), 4.34 (t, 1H, J = 6.1 Hz), 4.83-4.86 (m, 1H), 6.46 (d, 1H, J = 8.6 Hz), 6.99 (d, 1H, J = 8.5 Hz), 7.05 (d, 1H, J = 8.5 Hz), 7.29 (s, 1H), 7.30-7.34 (m, 1H), 7.69 (dd, 1H, J = 8.7, 2.4 Hz), 8.25 (s, 1H).

Compound Ij-9

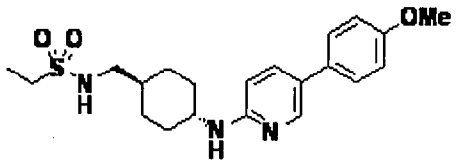
[Formula 382]



1H-NMR (CDCl3) δ: 1.16-1.24 (m, 4H), 1.40 (t, 3H, J = 6.2 Hz), 1.55-1.59 (m, 1H), 1.94 (d, 2H, J = 11.8 Hz), 2.23 (d, 2H, J = 11.8 Hz), 3.03-3.09 (m, 4H), 3.58-3.62 (m, 1H), 3.88 (s, 3H), 4.29 (t, 1H, J = 6.4 Hz), 4.85-4.89 (m, 1H), 6.49 (d, 1H, J = 8.7 Hz), 6.88 (dd, 1H, J = 8.7, 2.2 Hz), 7.04-7.06 (m, 1H), 7.10 (d, 1H, J = 8.7 Hz), 7.36 (t, 1H, J = 7.9 Hz), 7.70 (dd, 1H, J = 8.7, 2.2 Hz), 8.32 (s, 1H).

Compound Ij-10

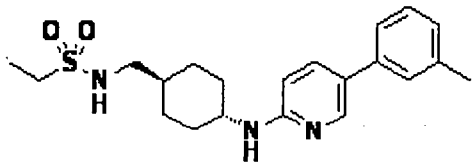
[Formula 383]



1H-NMR (CDCl3) δ: 1.19-1.30 (m, 4H), 1.41 (t, 3H, J = 6.3 Hz), 1.56-1.59 (m, 1H), 1.94 (d, 2H, J = 11.1 Hz), 2.23 (d, 2H, J = 11.1 Hz), 3.01-3.11 (m, 4H), 3.57-3.61 (m, 1H), 3.87 (s, 3H), 4.27 (t, 1H, J = 6.4 Hz), 4.98 (s, 1H), 6.50 (dd, 1H, J = 8.7, 2.2 Hz), 6.99 (d, 2H, J = 8.9 Hz), 7.43 (d, 2H, J = 8.7 Hz), 7.68 (dd, 1H, J = 8.7, 2.2 Hz), 8.25 (s, 1H).

Compound Ij-11

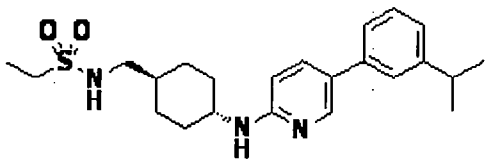
[Formula 384]



1H-NMR (DMSO-d6) δ: 0.93-1.08 (m, 2H), 1.09-1.25 (m, 5H), 1.39 (m, 1H), 1.75-1.86 (m, 2H), 1.95-2.07 (m, 2H), 2.34 (s, 3H), 2.78 (t, 2H, J = 6.2 Hz), 2.98 (q, 2H, J = 7.3 Hz), 3.65 (m, 1H), 6.45-6.53 (m, 2H), 7.01 (t, 1H, J = 5.6 Hz), 7.07 (d, 1H, J = 7.1 Hz), 7.23-7.38 (m, 3H), 7.64 (dd, 1H, J1 = 8.8 Hz, J2 = 2.5 Hz), 8.26 (d, 1H, J = 2.5 Hz).

Compound Ij-12

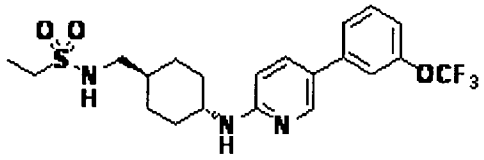
[Formula 385]



1H-NMR (DMSO-d6) δ: 0.93-1.08 (m, 2H), 1.09-1.27 (m, 11H), 1.39 (m, 1H), 1.76-1.87 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.2 Hz), 2.84-3.03 (m, 3H), 3.66 (m, 1H), 6.45-6.54 (m, 2H), 7.01 (t, 1H, J = 5.8 Hz), 7.13 (d, 1H, J = 6.9 Hz), 7.27-7.41 (m, 3H), 7.66 (dd, 1H, J1 = 8.8 Hz, J2 = 2.5 Hz), 8.27 (d, 1H, J = 2.2 Hz).

Compound Ij-13

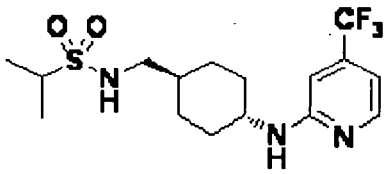
[Formula 386]



1H-NMR (DMSO-d6) δ: 0.92-1.09 (m, 2H), 1.09-1.25 (m, 5H), 1.39 (m, 1H), 1.76-1.85 (m, 2H), 1.95-2.06 (m, 2H), 2.78 (t, 2H, J = 6.2 Hz), 2.98 (q, 2H, J = 7.3 Hz), 3.68 (m, 1H), 6.52 (d, 1H, J = 8.8 Hz), 6.66 (d, 1H, J = 8.0 Hz), 7.02 (t, 1H, J = 5.5 Hz), 7.23 (d, 1H, J = 8.1 Hz), 7.49-7.55 (m, 2H), 7.62 (d, 1H, J1 = 8.5 Hz), 7.72 (dd, 1H, J1 = 8.8 Hz, J2 = 2.5 Hz), 8.35 (d, 1H, J = 2.5 Hz).

Compound Ij-14

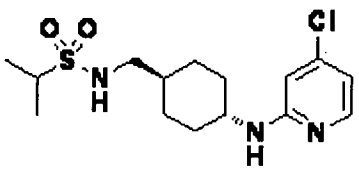
[Formula 387]



1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.22 (d, 6H, J = 6.4 Hz), 1.39 (m, 1H), 1.76-1.86 (m, 2H), 1.95-2.03 (m, 2H), 2.81 (t, 2H, J = 6.4 Hz), 3.10-3.20 (m, 1H), 3.60-3.75 (m, 1H), 6.65 (d, 1H, J = 4.8 Hz), 6.70 (s, 1H), 6.88-6.98 (m, 2H), 8.16 (d, 1H, J = 5.2 Hz).

Compound Ij-15

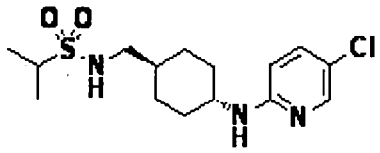
[Formula 388]



1H-NMR (CDCl3) δ: 1.02-1.28 (m, 4H), 1.38 (d, 6H, J = 6.9 Hz), 1.52 (m, 1H), 1.85-1.94 (m, 2H), 2.11-2.21 (m, 2H), 3.01 (t, 2H, J = 6.6 Hz), 3.10-3.25 (m, 1H), 3.38-3.54 (m, 1H), 4.22 (t, 1H, J = 6.3 Hz), 4.58 (d, 1H, J = 7.8 Hz), 6.34 (d, 1H, J = 1.8 Hz), 6.53 (dd, 1H, J = 5.4, 1.8 Hz), 7.93 (d, 1H, J = 5.4 Hz).

Compound Ij-16

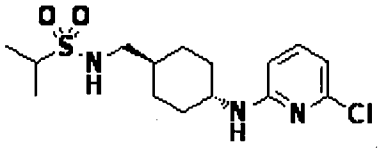
[Formula 389]



1H-NMR (CDCl3) δ: 1.03-1.28 (m, 4H), 1.37 (d, 6H, J = 6.9 Hz), 1.52 (m, 1H), 1.84-1.93 (m, 2H), 2.11-2.21 (m, 2H), 3.01 (t, 2H, J = 6.6 Hz), 3.09-3.24 (m, 1H), 3.40-3.54 (m, 1H), 4.26 (t, 1H, J = 6.6 Hz), 4.44 (d, 1H, J = 8.1 Hz), 6.29 (d, 1H, J = 8.7 Hz), 7.33 (dd, 1H, J = 8.7, 2.7 Hz), 7.99 (d, 1H, J = 2.7 Hz).

Compound Ij-17

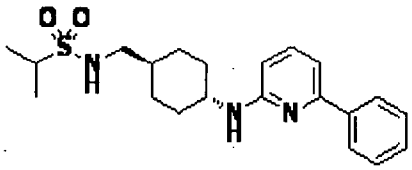
[Formula 390]



1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.21 (d, 6H, J = 6.8 Hz), 1.36 (m, 1H), 1.76-1.84 (m, 2H), 1.92-2.00 (m, 2H), 2.80 (t, 2H, J = 6.4 Hz), 3.08-3.18 (m, 1H), 3.45-3.56 (m, 1H), 6.36 (d, 1H, J = 8.4 Hz), 6.43 (d, 1H, J = 7.2 Hz), 6.75 (d, 1H, J = 7.6 Hz), 6.94 (t, 1H, J = 6.0 Hz), 7.33 (t, 1H, J = 7.6 Hz).

Compound Ij-18

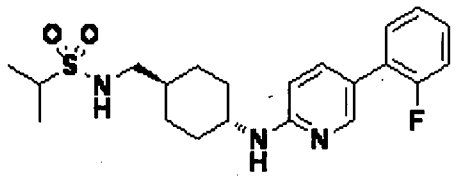
[Formula 391]



1H-NMR (DMSO-d6) δ: 0.98-1.24 (m, 4H), 1.22 (d, 6H, J = 6.9 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.14 (m, 2H), 2.83 (t, 2H, J = 6.0 Hz), 3.10-3.22 (m, 1H), 3.64-3.82 (m, 1H), 6.40 (d, 2H, J = 8.4 Hz), 6.95-7.05 (m, 2H), 7.35-7.50 (m, 4H), 7.99 (d, 2H, J = 7.2 Hz)

Compound Ij-19

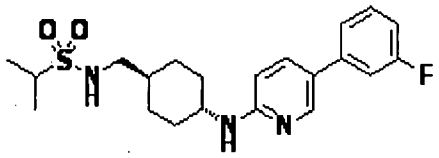
[Formula 392]



1H-NMR (CDCl3) δ: 1.22-1.38 (m, 4H), 1.38 (d, 6H, J = 8.0 Hz), 1.54 (m, 1H), 1.86-1.95 (m, 2H), 2.18-2.26 (m, 2H), 3.03 (t, 2H, J = 6.0 Hz), 3.12-3.22 (m, 1H), 3.52-3.64 (m, 1H), 4.16 (t, 1H, J = 6.4 Hz), 4.82-4.92 (m, 1H), 6.46 (d, 1H, J = 8.0 Hz), 7.10-7.20 (m, 2H), 7.23-7.33 (m, 1H), 7.37 (t, 1H, J = 8.0 Hz), 7.65 (d, 1H, J = 8.7 Hz), 8.24 (s, 1H).

Compound Ij-20

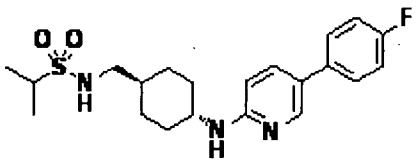
[Formula 393]



1H-NMR (CDCl3) δ: 1.22-1.38 (m, 4H), 1.39 (d, 6H, J = 8.0 Hz), 1.54 (m, 1H), 1.86-1.95 (m, 2H), 2.18-2.26 (m, 2H), 3.03 (t, 2H, J = 6.0 Hz), 3.12-3.22 (m, 1H), 3.52-3.64 (m, 1H), 4.16 (t, 1H, J = 6.4 Hz), 4.78-4.88 (m, 1H), 6.46 (d, 1H, J = 8.0 Hz), 6.98(t, 1H, J = 5.7 Hz), 7.18 (d, 1H, J = 8.0 Hz), 7.23-7.29 (m, 1H), 7.33-7.40 (m, 1H), 7.65 (d, 1H, J = 8.7 Hz), 8.29 (s, 1H).

Compound Ij-21

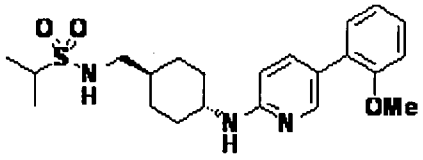
[Formula 394]



1H-NMR (CDCl3) δ: 1.10-1.30 (m, 4H), 1.38 (d, 6H, J = 8.0 Hz), 1.54 (m, 1H), 1.86-1.95 (m, 2H), 2.18-2.26 (m, 2H), 3.03 (t, 2H, J = 6.0 Hz), 3.13-3.22 (m, 1H), 3.52-3.64 (m, 1H), 4.15 (t, 1H, J = 6.4 Hz), 4.78-4.88 (m, 1H), 6.46 (d, 1H, J = 8.0 Hz), 7.07-7.14 (m, 2H), 7.40-7.46 (m, 2H), 7.62 (d, 1H, J = 8.7 Hz), 8.23 (s, 1H).

Compound Ij-22

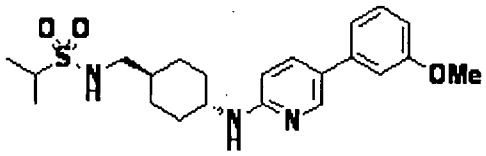
[Formula 395]



1H-NMR (DMSO-d6) δ: 0.95-1.25 (m, 4H), 1.22 (d, 6H, J = 6.6 Hz), 1.25-1.50 (br, 1H), 1.81 (d, 2H, J = 11.4 Hz), 2.00 (d, 2H, J = 10.5 Hz), 2.81 (t, 2H, J = 6.6 Hz), 3.05-3.22 (m, 1H), 3.58-3.80 (m, 1H), 3.76 (s, 3H), 6.49 (d, 2H, J = 8.7 Hz), 6.50-6.70 (br, 1H), 6.95-7.10 (m, 3H), 7.20-7.32 (m, 2H), 7.51 (d, 1H, J = 7.2Hz), 8.05 (br, 1H). ESI(positive) 418.3 [M+H]+

Compound Ij-23

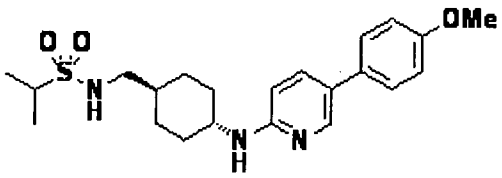
[Formula 396]



1H-NMR (DMSO-d6) δ: 0.95-1.32 (m, 4H), 1.22 (d, 6H, J = 6.6 Hz), 1.25-1.55 (br, 1H), 1.82 (d, 2H, J = 11.4 Hz), 2.01 (d, 2H, J = 10.2 Hz), 2.81 (t, 2H, J = 6.6 Hz), 3.05-3.22 (m, 1H), 3.58-3.78 (m, 1H), 3.80 (s, 3H), 6.59 (d, 2H, J = 9.6 Hz), 6.85 (dd, 1H, J = 8.4 Hz, 2.4 Hz), 6.99 (t, 3H, J = 5.7Hz), 7.05-7.18 (m, 2H), 7.32 (d, 1H, J = 7.8Hz), 7.76 (d, 1H, J = 8.4Hz), 8.27 (d, 1H, J = 2.1 Hz). ESI(positive) 418.3 [M+H]+

Compound Ij-24

[Formula 397]

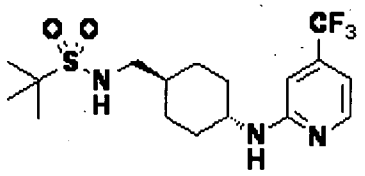


1H-NMR (DMSO-d6) δ: 0.92-1.25 (m, 4H), 1.22 (d, 6H, J = 6.6 Hz), 1.28-1.48 (m, 1H), 1.81 (d, 2H, J = 10.8 Hz), 2.00 (d, 2H, J = 9.6 Hz), 2.81 (t, 2H, J = 6.6 Hz), 3.08-3.22 (m, 1H), 3.58-3.74 (m, 1H), 3.77 (s, 3H), 6.51 (d, 2H, J = 8.7 Hz), 6.97 (d, 2H, J = 8.7 Hz),

6.98 (brs, 1H), 7.48 (d, 2H, J = 8.7 Hz), 7.63 (dd, 1H, J = 11.4Hz, 2.4Hz), 8.21 (d, 1H, J = 2.4 Hz). ESI(positive) 418.3[M+H]+

Compound Ij-25

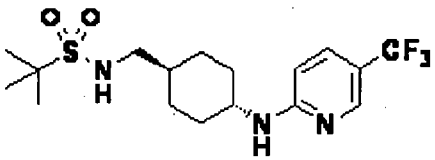
[Formula 398]



1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.27 (s, 9H), 1.38 (m, 1H), 1.78-1.88 (m, 2H), 1.95-2.05 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 3.60-3.80 (m, 1H), 6.65 (d, 1H, J = 5.4 Hz), 6.70 (s, 1H), 6.87 (t, 1H, J = 6.0 Hz), 6.94 (d, 1H, J = 7.8 Hz), 8.16 (d, 1H, J = 5.4 Hz)

Compound Ij-26

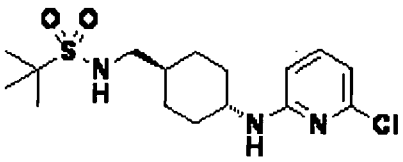
[Formula 399]



1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.27 (s, 9H), 1.38 (m, 1H), 1.78-1.88 (m, 2H), 1.94-2.04 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 3.60-3.80 (m, 1H), 6.53 (d, 1H, J = 8.7 Hz), 6.87 (t, 1H, J = 5.7 Hz), 7.19 (d, 1H, J = 7.5 Hz), 7.59 (dd, 1H, J = 9.0, 2.4 Hz), 8.26 (d, 1H, J = 2.4 Hz)

Compound Ij-27

[Formula 400]

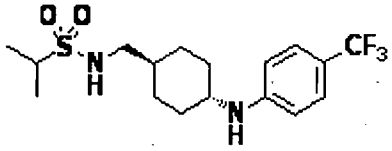


1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.26 (s, 9H), 1.38 (m, 1H), 1.76-1.86 (m, 2H), 1.92-2.02 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 3.40-3.60 (m, 1H), 6.36 (d, 1H, J = 8.1 Hz),

6.43 (d, 1H, J = 6.9 Hz), 6.80 (d, 1H, J = 7.5 Hz), 6.86 (t, 1H, J = 5.4 Hz), 7.34 (t, 1H, J = 8.4 Hz)

Compound Ij-28

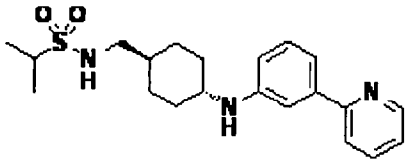
[Formula 401]



1H-NMR ((DMSO-d6) δ: 0.93-1.18 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.39 (m, 1H), 1.75-1.86 (m, 2H), 1.94-2.05 (m, 2H), 2.80 (t, 2H, J = 6.0 Hz), 3.09-3.27 (m, 2H), 6.19 (d, 1H, J = 8.1 Hz), 6.64 (d, 2H, J = 8.7 Hz), 6.98 (t, 1H, J = 6.0 Hz), 7.33 (d, 2H, J = 8.7 Hz) Mass:379[M+H]+

Compound Ij-29

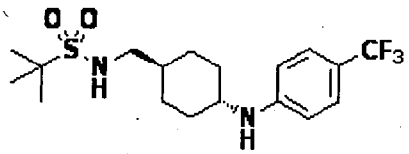
[Formula 402]



1H-NMR (DMSO-d6) δ: 0.93-1.18 (m, 4H), 1.22 (s, 3H), 1.24 (s, 3H), 1.32-1.49 (m, 2H), 1.82 (d, 2H, J = 11.2 Hz), 2.04 (d, 2H, J = 11.2 Hz), 2.75-2.87 (m, 2H), 3.07-3.28 (m, 2H), 6.64 (s, 1H), 6.96 (s, 1H), 7.10-7.22 (m, 2H), 7.25-7.39 (m, 2H), 7.77-7.90 (m, 2H), 8.63 (s, 1H). Melting point: 161 to 162 °C

Compound Ij-30

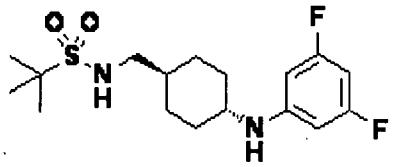
[Formula 403]



1H-NMR (DMSO-d6) δ: 0.92-1.22 (m, 4H), 1.27 (s, 9H), 1.37 (m, 1H), 1.76-1.86 (m, 2H), 1.94-2.05 (m, 2H), 2.88 (t, 2H, J = 6.3 Hz), 3.19 (m, 1H), 6.19 (d, 1H, J = 7.5 Hz), 6.64 (d, 2H, J = 8.7 Hz), 6.88 (d, 1H, J = 6.0Hz), 7.33 (d, 2H, J = 8.7 Hz) Mass:392M+

Compound Ij-31

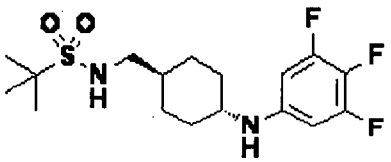
[Formula 404]



1H-NMR (DMSO-d6) δ: 0.92-1.16 (m, 4H), 1.26 (s, 9H), 1,36 (m, 1H), 1.72-1.83 (m, 2H), 1.92-2.02 (m, 2H), 2.87 (t, 2H, J = 6.3 Hz), 3.12 (m, 1H), 6.09-6.23 (m, 4H), 6.87 (t, 1H, J = 6.0 Hz) Mass:361[M+H]+

Compound Ij-32

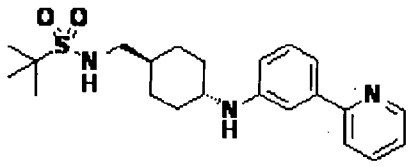
[Formula 405]



1H-NMR (CDCl3) δ: 1.00-1.20 (m, 4H), 1.40 (s, 9H), 1.42-1.64 (m, 2H), 1.84-1.95 (m, 2H), 2.09-2.20 (m, 2H), 3.07 (m, 1H), 3.07 (t, 2H, J = 6.3 Hz), 3.90 (m, 1H), 6.10 (dd, 2H, J = 9.6, 5.4 Hz).

Compound Ij-33

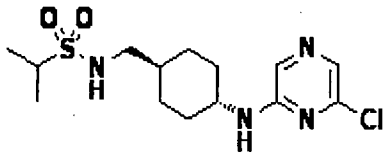
[Formula 406]



1H-NMR (DMSO-d6) δ: 0.93-1.21 (m, 5H), 1.28 (s, 9H), 1.33-1.46 (m, 1H), 1.82 (d, 2H, J = 11.6 Hz), 2.04 (d, 2H, J = 11.6 Hz), 2.86-2.95 (m, 2H), 3.03-3.29 (m, 1H), 6.59-6.71 (m, 1H), 6.80-6.92 (m, 1H), 7.09-7.21 (m, 2H), 7.27-7.37 (m, 2H), 7.77-7.88 (m, 2H), 8.58-8.67 (s, 1H). Melting point: 172 to 173 °C

Compound Ij-34

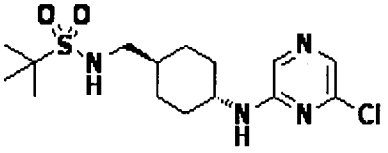
[Formula 407]



1H-NMR (DMSO-d6) δ: 0.96-1.08 (m, 2H), 1.12-1.24(m, 2H), 1.21 (d, 6H, J = 6.4 Hz), 1.38 (m, 1H), 1.76-1.86 (m, 2H), 1.92-2.00 (m, 2H), 2.80 (t, 2H, J = 6.4 Hz), 3.10-3.20 (m, 1H), 3.48-3.60 (m, 1H), 6.95 (t, 1H, J = 5.6 Hz), 7.41 (d, 1H, J = 7.6 Hz), 7.63 (s, 1H), 7.82 (s, 1H).

Compound Ij-35

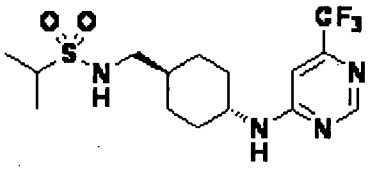
[Formula 408]



1H-NMR (DMSO-d6) δ: 0.96-1.26 (m, 4H), 1.27 (s, 9H), 1.38 (m, 1H), 1.78-1.88 (m, 2H), 1.92-2.02 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 3.48-3.62 (m, 1H), 6.87 (t, 1H, J = 6.0 Hz), 7.45 (d, 1H, J = 7.5 Hz), 7.63 (s, 1H), 7.82 (s, 1H)

Compound Ij-36

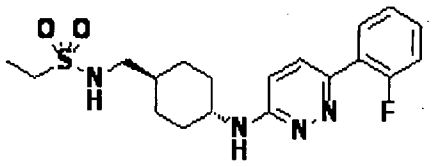
[Formula 409]



1H-NMR (DMSO-d6) δ: 0.96-1.06 (m, 2H), 1.12-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.39 (m, 1H), 1.78-1.84 (m, 2H), 1.95-1.99 (m, 2H), 2.81 (t, 2H, J = 6.0 Hz), 3.10-3.20 (m, 1H), 3.74-3.88 (m, 1H), 6.80 (s, 1H), 6.98 (t, 1H, J = 6.0 Hz), 7.93 (d, 2H, J = 7.2 Hz), 8.53 (s, 1H).

Compound Ij-37

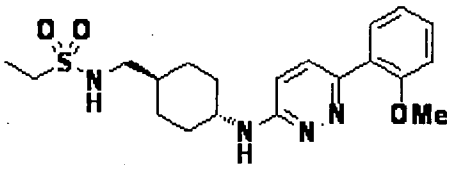
[Formula 410]



1H-NMR (DMSO-d6) δ: 0.96-1.30 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.80 (t, 2H, J = 6.0 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.72-3.90 (m, 1H), 6.85 (d, 1H, J = 9.6 Hz), 6.93 (d, 1H, J = 7.5 Hz), 7.04 (t, 1H, J = 5.7 Hz), 7.26-7.38 (m, 2H), 7.40-7.52 (m, 1H), 7.57 (d, 1H, J = 9.0 Hz), 7.85 (t, 1H, J =7.8 Hz)

Compound Ij-38

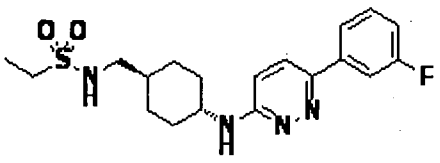
[Formula 411]



1H-NMR (DMSO-d6) δ: 0.96-1.30 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.80 (t, 2H, J = 6.0 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.72-3.90 (m, 1H), 3.80 (s, 3H), 6.72 (d, 1H, J = 7.8 Hz), 6.77 (d, 1H, J = 9.0 Hz), 6.98-7.10 (m, 2H), 7.12 (d, 1H, J = 8.4 Hz), 7.38 (t, 1H, J = 8.1 Hz), 7.56 (d, 1H, J = 9.3 Hz), 7.61 (d, 1H, J = 7.8 Hz)

Compound Ij-39

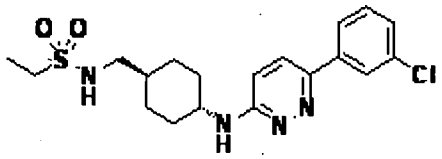
[Formula 412]



1H-NMR (DMSO-d6) δ: 0.96-1.30 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.72-3.90 (m, 1H), 6.85 (d, 1H, J = 9.6 Hz), 6.92 (d, 1H, J = 7.5 Hz), 7.04 (t, 1H, J = 5.7 Hz), 7.21 (t, 1H, J = 8.7 Hz), 7.46-7.56 (m, 1H), 7.75-7.88 (m, 3H)

Compound Ij-40

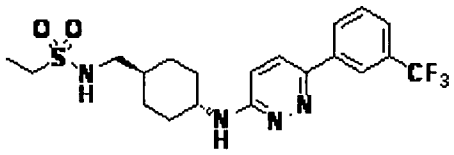
[Formula 413]



1H-NMR (DMSO-d6) δ: 0.96-1.10 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.15-1.26 (m, 2H), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.14 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.76-3.87 (m, 1H), 6.85 (d, 1H, J = 9.6 Hz), 6.91 (d, 1H, J = 7.5 Hz), 7.01 (t, 1H, J = 5.7 Hz), 7.42-7.52 (m, 2H), 7.83 (d, 1H, J = 8.0 Hz), 7.93 (d, 1H, J = 8.0 Hz), 8.02 (s, 1H).

Compound Ij-41

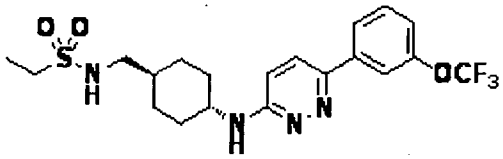
[Formula 414]



1H-NMR (DMSO-d6) δ: 0.96-1.30 (m, 4H), 1.20 (t, 3H, J = 7.5 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.76-3.90 (m, 1H), 6.88 (d, 1H, J = 9.3 Hz), 6.97 (d, 1H, J = 7.5 Hz), 7.03 (t, 1H, J = 5.7 Hz), 7.67-7.77 (m, 2H), 7.92 (d, 1H, J = 9.6 Hz), 8.26 (d, 1H, J = 6.9 Hz), 8.33(s, 1H)

Compound Ij-42

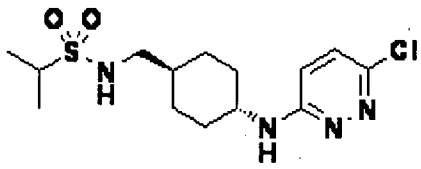
[Formula 415]



1H-NMR (DMSO-d6) δ: 0.93-1.10 (m, 2H), 1.20 (t, 3H, J= 7.2 Hz), 1.22-1.28 (m, 1H), 1.35-1.50 (m, 2H), 1.84 (d, 2H, J = 12.0 Hz), 2.08 (d, 2H, J = 12.0 Hz), 2.63-2.76 (m, 2H), 2.91-3.03 (m, 2H), 3.75-3.90 (m, 1H), 6.86 (d, 1H, J = 9.2 Hz), 6.93 (d, 1H, J = 7.2 Hz), 6.98-7.07 (m, 1H), 7.36 (d, 1H, J = 7.2 Hz), 7.59 (t, 1H, J = 8.0 Hz), 7.85 (d, 1H, J = 9.2 Hz), 7.91-8.02 (m, 2H). Melting point: 144 to 145 °C

Compound Ij-43

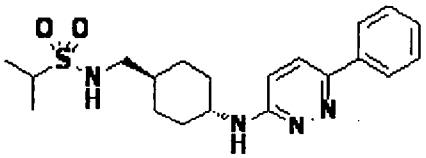
[Formula 416]



1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 2H), 1.10-1.24 (m, 2H), 1.21 (d, 6H, J = 6.8 Hz), 1.39 (m, 1H), 1.76-1.86 (m, 2H), 1.98-2.06 (m, 2H), 2.81 (t, 2H, J = 6.4 Hz), 3.10-3.20 (m, 1H), 3.62-3.74 (m, 1H), 6.84 (d, 1H, J =9.2 Hz), 6.88-6.98 (m, 2H), 7.31 (d, 1H, J = 9.6 Hz).

Compound Ij-44

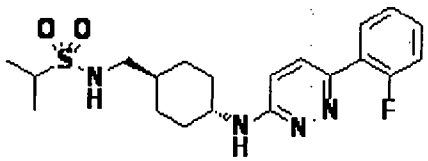
[Formula 417]



1H-NMR (DMSO-d6) δ: 0.94-1.26 (m, 4H), 1.20 (d, 6H, J = 6.6 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.06-3.20 (m, 1H), 3.72-3.90 (m, 1H), 6.75-6.88 (m, 2H), 6.97 (t, 1H, J = 6.0 Hz), 7.30-7.48 (m, 3H), 7.76 (d, 1H, J = 9.3 Hz), 7.94 (d, 2H, J =8.4 Hz)

Compound Ij-45

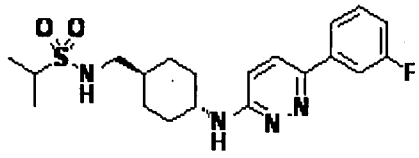
[Formula 418]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.9 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.3 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 6.85 (d, 1H, J = 9.0 Hz), 6.91 (d, 1H, J = 7.5 Hz), 6.98 (t, 1H, J = 6.0 Hz), 7.25-7.36 (m, 2H), 7.40-7.50 (m, 1H), 7.57 (d, 1H, J = 6.9 Hz), 7.85 (t, 1H, J =8.1 Hz)

Compound Ij-46

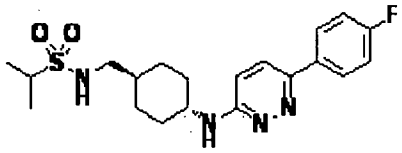
[Formula 419]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.6 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.3 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 6.85 (d, 1H, J = 9.3 Hz), 6.90 (d, 1H, J = 7.5 Hz), 6.98 (t, 1H, J = 6.0 Hz), 7.21 (t, 1H, J = 7.8 Hz), 7.46-7.56 (m, 1H), 7.75-7.86 (m, 3H)

Compound Ij-47

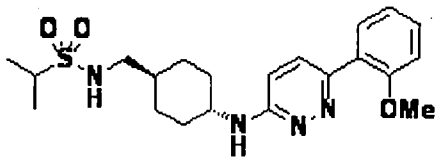
[Formula 420]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.9 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.0 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 6.81 (d, 1H, J = 7.5 Hz), 6.84 (d, 1H, J = 9.3 Hz), 6.98 (t, 1H, J = 6.3 Hz), 7.25-7.35 (m, 2H), 7.77 (d, 1H, J = 9.3 Hz), 7.96-8.06 (m, 2H)

Compound Ij-48

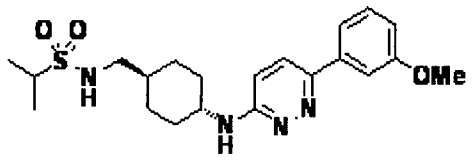
[Formula 421]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.9 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.3 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 3.80 (s, 3H), 6.71 (d, 1H, J = 7.8 Hz), 6.76 (d, 1H, J = 9.3 Hz), 6.98 (t, 1H, J = 5.7 Hz), 7.05 (d, 1H, J = 7.2 Hz), 7.12 (d, 1H, J = 7.8 Hz), 7.38 (t, 1H, J = 8.4 Hz), 7.56 (d, 1H, J = 9.3 Hz), 7.62 (d, 1H, J = 6.9 Hz)

Compound Ij-49

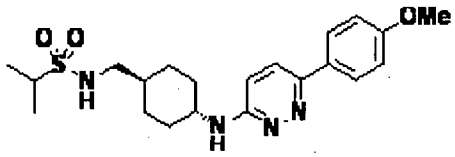
[Formula 422]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.6 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.0 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 3.82 (s, 3H), 6.78-6.88 (m, 2H), 6.92-7.04 (m, 2H), 7.37 (t, 1H, J = 7.5 Hz), 7.46-7.58 (m, 2H), 7.79 (d, 1H, J = 9.3 Hz)

Compound Ij-50

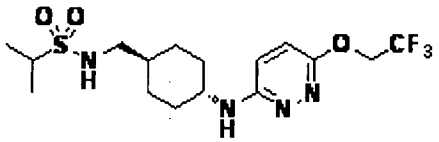
[Formula 423]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.22 (d, 6H, J = 6.9 Hz), 1.42 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.83 (t, 2H, J = 6.0 Hz), 3.10-3.22 (m, 1H), 3.74-3.92 (m, 1H), 3.80 (s, 3H), 6.70 (d, 1H, J = 7.8 Hz), 6.82 (d, 1H, J = 9.3 Hz), 6.95-7.05 (m, 3H), 7.72 (d, 1H, J = 9.3 Hz), 7.90 (d, 2H, J = 9.0 Hz).

Compound Ij-51

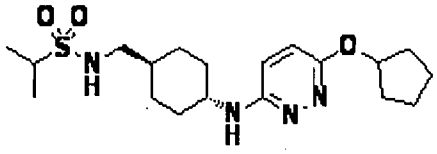
[Formula 424]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.07-1.20 (m, 2H), 1.22 (d, 6H, J = 6.9 Hz), 1.39 (m, 1H), 1.76-1.85 (m, 2H), 2.02-2.10 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.57-3.68 (m, 1H), 4.89-4.98 (m, 2H), 6.47 (d, 1H, J = 8.0 Hz), 6.88 (d, 1H, J = 7.5 Hz), 6.96 (t, 1H, J = 6.0 Hz), 7.02 (d, 1H, J = 7.5 Hz).

Compound Ij-52

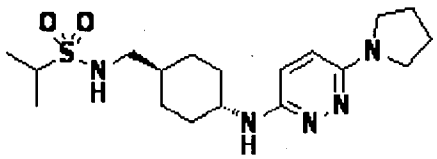
[Formula 425]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.07-1.20 (m, 2H), 1.22 (d, 6H, J = 6.9 Hz), 1.39 (m, 1H), 1.52-1.74 (m, 6H), 1.77-1.85 (m, 2H), 1.87-1.97 (m, 2H), 2.02-2.09 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.55-3.65 (m, 1H), 5.25-5.32 (m, 1H), 6.19 (d, 1H, J = 8.0 Hz), 6.77 (s, 2H), 6.95 (t, 1H, J = 6.0 Hz).

Compound Ij-53

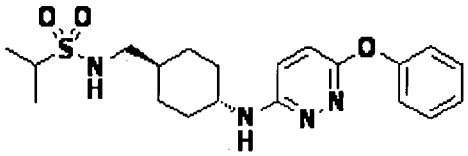
[Formula 426]



1H-NMR (DMSO-d6) δ: 0.92-1.15 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.38 (m, 1H), 1.77-1.85 (m, 2H), 1.88-1.95 (m, 4H), 2.02-2.09 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.25-3.35 (m, 4H), 3.55-3.65 (m, 1H), 5.80-5.85 (m, 1H), 6.72 (d, 1H, J = 8.0 Hz), 6.80 (d, 1H, J = 8.0 Hz), 6.96 (t, 1H, J = 6.0 Hz).

Compound Ij-54

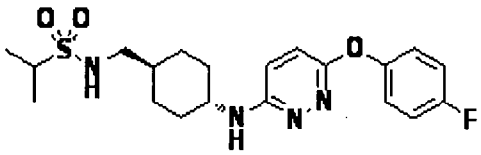
[Formula 427]



1H-NMR (DMSO-d6) δ: 0.92-1.20 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.38 (m, 1H), 1.77-1.85 (m, 2H), 2.02-2.09 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.58-3.65 (m, 1H), 6.56 (d, 1H, J = 8.0 Hz), 6.90-6.98 (m, 2H), 7.03-7.10 (m, 3H), 7.15 (t, 1H, J = 8.0 Hz), 6.38 (t, 2H, J = 8.0 Hz).

Compound Ij-55

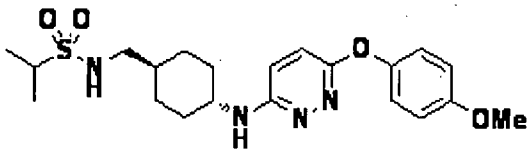
[Formula 428]



1H-NMR (DMSO-d6) δ: 0.92-1.20 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.38 (m, 1H), 1.77-1.85 (m, 2H), 2.02-2.09 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.58-3.65 (m, 1H), 6.55 (d, 1H, J = 8.0 Hz), 6.90-6.98 (m, 2H), 7.05-7.15 (m, 3H), 7.21 (t, 2H, J = 8.0 Hz).

Compound Ij-56

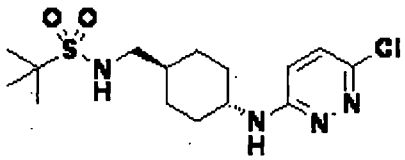
[Formula 429]



1H-NMR (DMSO-d6) δ: 0.92-1.20 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.38 (m, 1H), 1.77-1.85 (m, 2H), 2.02-2.09 (m, 2H), 2.80 (t, 2H, J = 6.3 Hz), 3.09-3.20 (m, 1H), 3.58-3.65 (m, 1H), 3.75 (s, 3H), 6.49 (d, 1H, J = 8.0 Hz), 6.87-6.98 (m, 4H), 7.00-7.07 (m, 3H).

Compound Ij-57

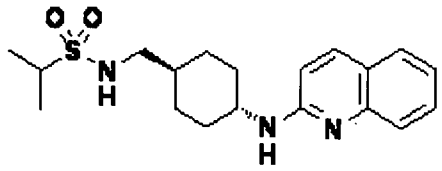
[Formula 430]



1H-NMR (DMSO-d6) δ: 0.96-1.28 (m, 4H), 1.27 (s, 9H), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.00-2.10 (m, 2H), 2.88 (t, 2H, J = 6.0 Hz), 3.60-3.76 (m, 1H), 6.82-6.92 (m, 2H), 6.96 (d, 1H, J = 7.8 Hz), 7.32 (d, 1H, J = 9.6 Hz).

Compound Ij-58

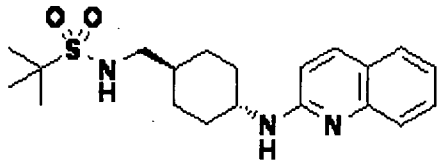
[Formula 431]



1H-NMR (DMSO-d6) δ: 0.99-1.28 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.39 (m, 1H), 1.78-1.86 (m, 2H), 2.04-2.10 (m, 2H), 2.82 (t, 2H, J = 6.1 Hz), 3.06-3.20 (m, 1H), 3.80-3.96 (m, 1H), 6.71 (d, 1H, J = 9.0 Hz), 6.76-6.86 (m, 1H), 6.90-6.98 (m, 1H), 7.10 (t, 1H, J = 8.1 Hz), 7.39-7.50 (m, 2H), 7.56 (d, 1H, J = 7.5 Hz), 7.78 (d, 1H, J = 7.5 Hz).

Compound Ij-59

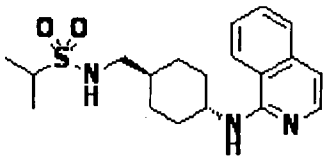
[Formula 432]



1H-NMR (DMSO-d6) δ: 0.99-1.28 (m, 4H), 1.27 (s, 9H), 1.40 (m, 1H), 1.80-1.85 (m, 2H), 2.04-2.09 (m, 2H), 2.91 (t, 2H, J = 6.1 Hz), 3.80-3.96 (m, 1H), 6.70 (d, 1H, J = 9.0 Hz), 6.81-6.87 (m, 2H), 7.10 (t, 1H, J = 8.1 Hz), 7.39-7.44 (m, 2H), 7.56 (d, 1H, J = 7.5 Hz), 7.79 (d, 1H, J = 7.5 Hz).

Compound Ij-60

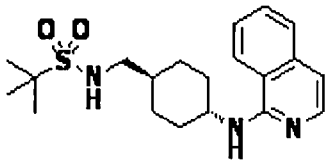
[Formula 433]



1H-NMR (DMSO-d6) δ: 0.97-1.09 (m, 2H), 1.23 (d, 6H, J = 6.9 Hz), 1.31-1.50 (m, 2H), 1.82-1.87 (m, 2H), 2.01-2.05 (m, 2H), 2.83 (t, 2H, J = 6.0 Hz), 3.11-3.20 (m, 1H), 4.00-4.18 (m, 1H), 6.83 (d, 1H, J = 5.7 Hz), 6.90-7.06 (m, 2H), 7.45 (t, 1H, J = 6.9 Hz), 7.59 (t, 1H, J = 8.1 Hz), 7.67 (d, 1H, J = 8.4 Hz), 7.83 (d, 1H, J = 5.7 Hz), 8.27 (d, 1H, J = 7.5 Hz).

Compound Ij-61

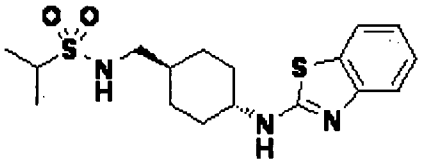
[Formula 434]



1H-NMR (DMSO-d6) δ: 0.96-1.09 (m, 2H), 1.28 (s, 9H), 1.29-1.50 (m, 2H), 1.82-1.87 (m, 2H), 2.01-2.05 (m, 2H), 2.91 (t, 2H, J = 7.8 Hz), 4.00-4.18 (m, 1H), 6.82-6.89 (m, 2H), 6.97 (d, 1H, J = 7.5 Hz ), 7.45 (t, 1H, J = 7.2 Hz), 7.59 (t, 1H, J = 8.1 Hz), 7.67 (d, 1H, J = 7.8 Hz), 7.84 (d, 1H, J = 6.0 Hz), 8.27 (d, 1H, J = 8.4 Hz).

Compound Ij-62

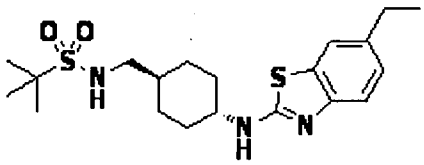
[Formula 435]



1H-NMR (DMSO-d6) δ: 0.96-1.14 (m, 2H), 1.18-1.30 (m, 2H), 1.22 (d, 6H, J = 6.6 Hz), 1.40 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.14 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.10-3.20 (m, 1H), 3.58-3.70 (m, 1H), 6.95-7.03 (m, 2H), 7.20 (t, 1H, J = 7.5 Hz ), 7.37 (d, 1H, J = 8.1 Hz), 7.64 (d, 1H, J = 7.5 Hz), 7.92 (d, 1H, J = 7.8 Hz).

Compound Ij-63

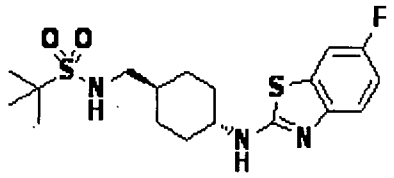
[Formula 436]



1H-NMR (DMSO-d6) δ: 1.00 (dd, 2H, J = 24.8, 10.6 Hz), 1.15-1.22 (m, 2H), 1.18 (t, 3H, J = 7.6 Hz), 1.27 (s, 9H), 1.34-1.40 (m, 1H), 1.81 (d, 2H, J = 11.6 Hz), 2.07 (d, 2H, J = 11.6 Hz), 2.60 (q, 2H, J = 7.6 Hz), 2.89 (t, 2H, J = 6.3 Hz), 3.52-3.63 (m, 1H), 6.87 (t, 1H, J = 5.8 Hz), 7.04 (d, 1H, J = 7.9 Hz), 7.27 (d, 1H, J = 8.2 Hz), 7.47 (s, 1H), 7.80 (d, 1H, J = 7.6 Hz).

Compound Ij-64

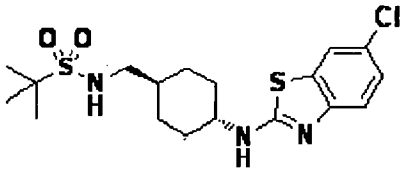
[Formula 437]



1H-NMR (DMSO-d6) δ: 0.92-1.10 (m, 2H), 1.12-1.25 (m, 2H), 1.27 (s, 9H), 1.37 (m, 1H), 1.76-1.84 (m, 2H), 2.02-2.12 (m, 2H), 2.89 (t, 2H, J = 6.0 Hz), 3.50-3.66 (m, 1H), 6.87 (t, 1H, J = 5.7 Hz), 7.03 (dd, 1H, J = 8.7, 2.7 Hz), 7.32-7.37 (m, 1H), 7.58 (dd, 1H, J = 8.7, 2.7 Hz), 7.92 (d, 1H, J = 7.2 Hz).

Compound Ij-65

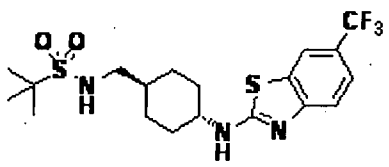
[Formula 438]



1H-NMR (DMSO-d6) δ: 1.01 (dd, 2H, J = 24.6, 10.2 Hz), 1.21 (dd, 2H, J = 24.6, 10.2 Hz), 1.27 (s, 9H), 1.34-1.40 (m, 1H), 1.82 (d, 2H, J = 11.2 Hz), 2.08 (d, 2H, J = 11.2 Hz), 2.89 (t, 2H, J = 6.2 Hz), 3.59-3.65 (m, 1H), 6.87 (t, 1H, J = 5.8 Hz), 7.21 (dd, 1H, J = 8.6, 2.4 Hz), 7.34 (d, 1H, J = 8.6 Hz), 7.77 (d, 1H, J = 1.8 Hz), 8.06 (d, 1H, J = 7.6 Hz).

Compound Ij-66

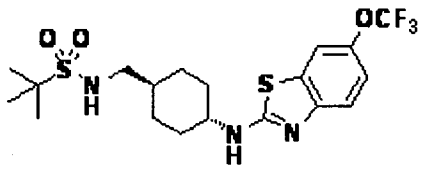
[Formula 439]



1H-NMR (CDCl3) δ: 1.09-1.46 (m, 4H), 1.41 (s, 9H), 1.54 (m, 1H), 1.90-2.00 (m, 2H), 2.24-2.34 (m, 2H), 3.09 (t, 2H, J = 6.6 Hz), 3.46-3.60 (m, 1H), 3.99 (t, 1H, J = 6.6 Hz), 6.58 (brs, 1H), 7.58(s, 2H), 7.85 (s, 1H).

Compound Ij-67

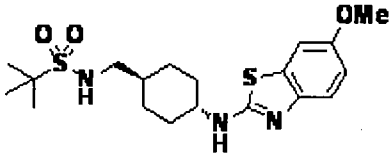
[Formula 440]



1H-NMR (DMSO-d6) δ: 0.90-1.30 (m, 4H), 1.27 (s, 9H), 1.30-1.48 (m, 1H), 1.82 (d, 2H, J = 11.1 Hz), 2.08 (d, 2H, J = 9.6 Hz), 2.89 (t, 2H, J = 6.3 Hz), 3.55-3.70 (m, 1H), 6.87 (t, 1H, J = 5.7 Hz), 7.17 (m, 1H), 7.41 (d, 1H, J = 8.7 Hz), 7.77 (d, 1H, J = 1.5 Hz), 8.10 (d, 1H, J = 7.5 Hz). ESI(positive)m/z 466.2 [M+H]+

Compound Ij-68

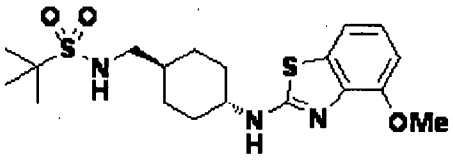
[Formula 441]



1H-NMR (DMSO-d6) δ: 0.90-1.28 (m, 4H), 1.25 (s, 9H), 1.32 (m, 1H), 1.76-1.82 (m, 2H), 2.00-2.10 (m, 2H), 2.87 (t, 2H, J = 6.6 Hz), 3.50-3.62 (m, 1H), 3.71 (s, 3H), 6.77 (dd, 1H, J = 8.7, 2.7 Hz), 6.84 (t, 1H, J = 5.7 Hz), 7.22-7.28 (m, 2H), 7.66 (d, 1H, J = 7.2 Hz).

Compound Ij-69

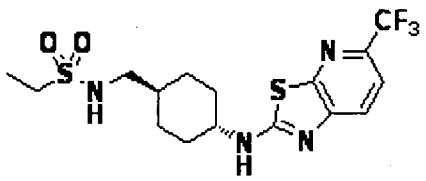
[Formula 442]



1H-NMR (DMSO-d6) δ: 0.94-1.10 (m, 2H), 1.12-1.25 (m, 2H), 1.27 (s, 9H), 1.37 (m, 1H), 1.76-1.84 (m, 2H), 2.02-2.12 (m, 2H), 2.90 (t, 2H, J = 6.0 Hz), 3.52-3.68 (m, 1H), 3.84 (s, 3H), 6.82 (d, 1H, J = 8.1 Hz), 6.88 (t, 1H, J = 5.4 Hz), 6.95 (t, 1H, J = 7.8 Hz), 7.23 (d, 1H, J = 7.8 Hz), 7.83 (d, 1H, J = 7.8 Hz).

Compound Ij-70

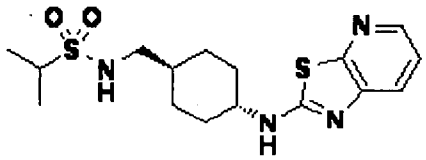
[Formula 443]



1H-NMR (DMSO-d6) δ: 0.98-1.10 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.17-1.32 (m, 2H), 1.40 (m, 1H), 1.76-1.88 (m, 2H), 2.04-2.14 (m, 2H), 2.79 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.2 Hz), 3.60-3.78 (m, 1H), 7.03 (t, 1H, J = 6.3 Hz), 7.45-7.54 (m, 2H), 8.10 (s, 1H), 8.34 (d, 1H, J = 7.2 Hz).

Compound Ij-71

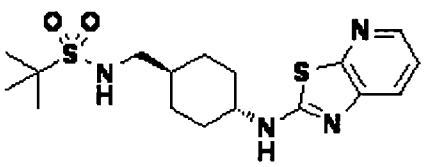
[Formula 444]



1H-NMR (DMSO-d6) δ: 1.01 (dd, 2H, J = 26.1, 12.3 Hz), 1.16-1.22 (m, 2H), 1.22 (d, 6H, J = 6.6 Hz), 1.35-1.41 (m, 1H), 1.70-1.77 (m, 1H), 1.82 (d, 2H, J = 11.6 Hz), 2.08 (d, 2H, J = 11.6 Hz), 2.81 (t, 2H, J = 6.3 Hz), 3.66-3.72 (m, 1H), 6.99 (t, 1H, J = 6.3 Hz), 7.23 (dd, 1H, J = 8.1, 4.7 Hz), 7.66 (d, 1H, J = 8.1 Hz), 8.07 (d, 1H, J = 4.7 Hz), 8.26 (d, 1H, J = 6.3 Hz).

Compound Ij-72

[Formula 445]

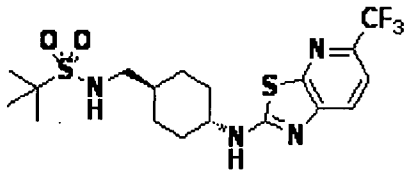


1H-NMR (DMSO-d6) δ: 1.01 (dd, 2H, J = 24.8, 11.3 Hz), 1.18-1.23 (m, 2H), 1.27 (s, 9H), 1.36-1.39 (m, 1H), 1.82 (d, 2H, J = 11.5 Hz), 2.08 (d, 2H, J = 11.5 Hz), 2.89 (t, 2H, J = 6.1 Hz), 3.65-3.73 (m, 1H), 6.87 (t, 1H, J = 5.7 Hz), 7.23 (dd, 1H, J = 8.1, 4.8 Hz), 7.66 (d, 1H,

J = 7.9 Hz), 8.07 (d, 1H, J = 4.7 Hz), 8.26 (d, 1H, J = 7.6 Hz).

Compound Ij-73

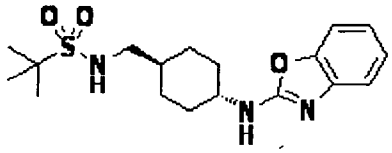
[Formula 446]



1H-NMR (CDCl3)δ: 1.09-1.46 (m, 4H), 1.41 (s, 9H), 1.55 (m, 1H), 1.92-2.02 (m, 2H), 2.24-2.34 (m, 2H), 3.09 (t, 2H, J = 6.3 Hz), 3.58-3.72 (m, 1H), 3.98 (t, 1H, J = 6.0 Hz), 6.30 (brs, 1H), 7.62(d, 1H, J = 8.1 Hz), 7.77 (d, 1H, J = 8.4 Hz).

Compound Ij-74

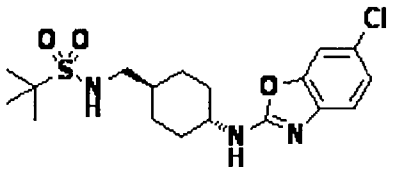
[Formula 447]



1H-NMR (DMSO-d6) δ: 0.90-1.08 (m, 2H), 1.12-1.40 (m, 3H), 1.25 (s, 9H), 1.76-1.86 (m, 2H), 1.98-2.10 (m, 2H), 2.87 (d, 2H, J = 6.3 Hz), 3.40-3.56 (m, 1H), 6.85 (brs, 1H), 6.93 (t, 1H, J = 7.5 Hz), 7.07 (t, 1H, J = 7.5 Hz), 7.20 (d, 1H, J = 7.5 Hz), 7.29 (d, 1H, J = 7.8 Hz), 7.79 (brs, 1H).

Compound Ij-75

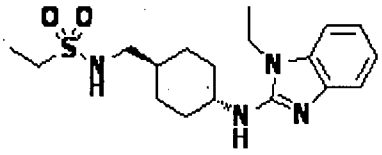
[Formula 448]



1H-NMR (CDCl3) δ: 1.08-1.26 (m, 2H), 1.36-1.60 (m, 3H), 1.40 (s, 9H), 1.92-2.02 (m, 2H), 2.22-2.32 (m, 2H), 3.08 (t, 2H, J = 6.6 Hz), 3.68-3.80 (m, 1H), 4.03 (t, 1H, J = 6.0 Hz), 7.06 (brs, 1H), 7.20-7.36(m, 3H).

Compound Ij-76

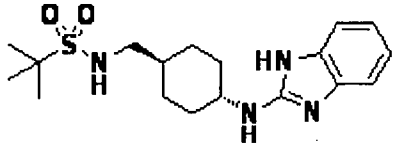
[Formula 449]



1H-NMR (DMSO-d6) δ: 1.02 (dd, 2H, J = 25.2, 12.4 Hz), 1.17 (t, 3H, J = 7.1 Hz), 1.20 (t, 3H, J = 7.3 Hz), 1.26-1.35 (m, 2H), 1.37-1.42 (m, 1H), 1.83 (d, 2H, J = 11.6 Hz), 2.05 (d, 2H, J = 11.6 Hz), 2.80 (t, 2H, J = 6.4 Hz), 2.99 (q, 2H, J = 7.3 Hz), 3.65-3.72 (m, 1H), 4.01 (q, 2H, J = 7.1 Hz), 6.32 (d, 1H, J = 7.9 Hz), 6.86-6.94 (m, 2H), 7.01 (t, 1H, J = 6.0 Hz), 7.12 (d, 1H, J = 6.9 Hz), 7.17 (d, 1H, J = 6.8 Hz).

Compound Ij-77

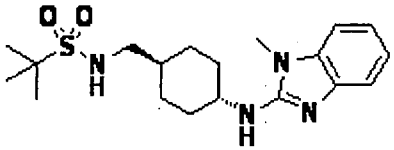
[Formula 450]



1H-NMR (DMSO-d6) δ: 1.02 (dd, 2H, J = 24.8, 10.8 Hz), 1.19-1.21 (m, 2H), 1.30 (s, 9H), 1.37-1.41 (m, 1H), 1.84 (d, 2H, J = 10.6 Hz), 2.06 (d, 2H, J = 10.6 Hz), 2.92 (t, 2H, J = 6.3 Hz), 3.50-3.52 (m, 1H), 6.42 (d, 1H, J = 8.1 Hz), 6.83 (d, 1H, J = 7.9 Hz), 6.88-6.92 (m, 2H), 7.11-7.14 (m, 2H), 10.58 (s, 1H).

Compound Ij-78

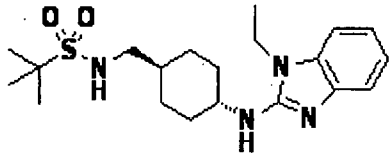
[Formula 451]



1H-NMR (DMSO-d6) δ: 0.97-1.05 (m, 2H), 1.20-1.26 (m, 2H), 1.28 (s, 9H), 1.34-1.38 (m, 1H), 1.84 (d, 2H, J = 11.5 Hz), 2.07 (d, 2H, J = 11.5 Hz), 2.90 (t, 2H, J = 6.1 Hz), 3.47 (s, 3H), 3.63-3.69 (m, 1H), 6.34 (d, 1H, J = 7.6 Hz), 6.87-6.93 (m, 3H), 7.11 (d, 1H, J = 8.4 Hz), 7.17 (d, 1H, J = 8.4 Hz).

Compound Ij-79

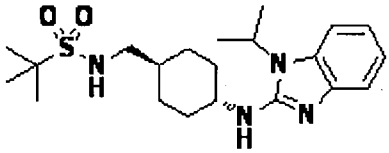
[Formula 452]



1H-NMR (DMSO-d6) δ: 1.03 (dd, 2H, J = 23.6, 10.8 Hz), 1.18 (t, 3H, J = 7.5 Hz), 1.25-1.34 (m, 2H), 1.29 (s, 9H), 1.37-1.40 (m, 1H), 1.86 (d, 2H, J = 11.7 Hz), 2.07 (d, 2H, J = 11.7 Hz), 2.92 (t, 2H, J = 6.2 Hz), 3.67-3.73 (m, 1H), 4.03 (q, 2H, J = 7.1 Hz), 6.34 (d, 1H, J = 7.9 Hz), 6.87-6.96 (m, 3H), 7.14 (dd, 1H, J = 8.1, 1.2 Hz), 7.19 (dd, 1H, J = 8.1, 1.2 Hz).

Compound Ij-80

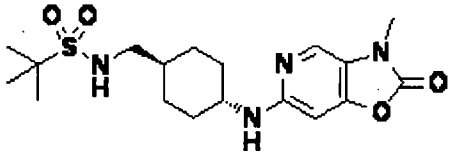
[Formula 453]



1H-NMR (DMSO-d6) δ: 1.00 (dd, 2H, J = 23.2, 11.9 Hz), 1.19-1.25 (m, 2H), 1.28 (s, 9H), 1.33-1.38 (m, 1H), 1.45 (s, 3H), 1.47 (s, 3H), 1.83 (d, 2H, J = 11.1 Hz), 2.07 (d, 2H, J = 11.1 Hz), 2.90 (t, 2H, J = 6.1 Hz), 3.62-3.70 (m, 1H), 4.57-4.66 (m, 1H), 6.21 (d, 1H, J = 7.9 Hz), 6.82-6.94 (m, 3H), 7.18 (d, 1H, J = 7.6 Hz), 7.31 (d, 1H, J = 7.6 Hz).

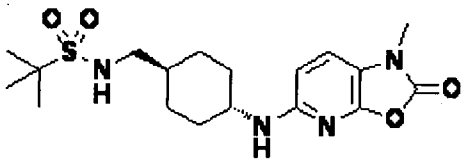
Compound Ij-81

[Formula 454]



Compound Ij-82

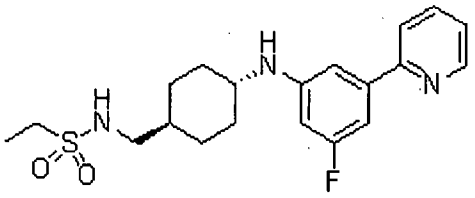
[Formula 455]



1H-NMR (DMSO-d6) δ: 0.90-1.19 (m, 4H), 1.28 (s, 9H), 1.32-1.45 (m, 1H), 1.80 (d, 2H, J = 11.2 Hz), 1.98 (d, 2H, J = 11.2 Hz), 2.84-2.93 (m, 2H), 3.26 (s, 3H), 3.40-3.53 (m, 1H), 6.29 (d, 1H, J = 8.0 Hz), 6.38 (d, 1H, J = 7.2 Hz), 6.86 (s, 1H), 7.33 (d, 1H, J = 8.4 Hz).

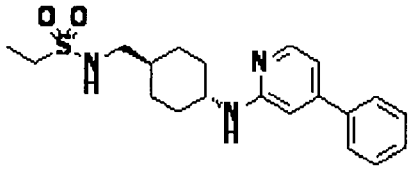
Compound Ij-83

[Formula 456]



Compound Ij-84

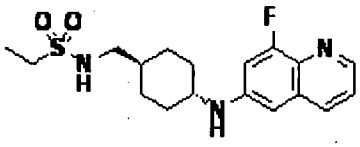
[Formula 457]



1H-NMR (DMSO-d6) δ: 0.92-1.20 (m, 4H), 1.18 (t, 3H, J = 7.2 Hz), 1.40 (m, 1H), 1.75-1.85 (m, 2H), 1.96-2.06 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.2 Hz), 3.60-3.78 (m, 1H), 6.38 (d, 1H, J = 8.1 Hz), 6.67 (s, 1H), 6.72 (d, 1H, J = 5.4 Hz), 7.00 (t, 1H, J = 6.0 Hz), 7.36-7.54 (m, 3H), 7.62 (d, 2H, J = 6.9 Hz), 8.00 (d, 1H, J = 5.4 Hz)

Compound Ij-85

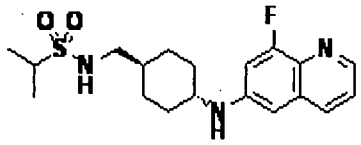
[Formula 458]



1H-NMR (DMSO-d6) δ: 1.00-1.20 (m, 4H), 1.20 (t, 3H, J = 7.2 Hz), 1.43 (m, 1H), 1.80-1.88 (m, 2H), 2.03-2.13 (m, 2H), 2.81 (t, 3H, J = 6.0 Hz), 3.00 (q, 2H, J = 7.2 Hz), 3.26 (m, 1H), 6.17 (d, 1H, J = 7.6 Hz), 6.57 (s, 1H), 6.96-7.07 (m, 2H), 7.35 (dd, 1H, J = 8.4, 4.0 Hz), 8.02 (d, 1H, J = 8.4 Hz), 8.47 (d, 1H, J = 4.0 Hz).

Compound Ij-86

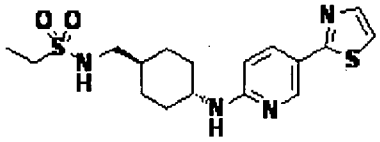
[Formula 459]



1H-NMR (DMSO-d6) δ: 1.00-1.24 (m, 4H), 1.23 (d, 6H, J = 6.4 Hz), 1.42 (m, 1H), 1.80-1.88 (m, 2H), 2.03-2.12 (m, 2H), 2.79-2.87 (m, 2H), 3.16 (m, 1H), 3.27 (m, 1H), 6.17 (d, 1H, J = 8.0 Hz), 6.57 (s, 1H), 6.99 (d, 1H, J = 8.0 Hz), 7.01 (s, 1H), 7.35 (dd, 1H, J = 8.0, 4.0 Hz), 8.02 (d, 1H, J = 8.0 Hz), 8.47 (d, 1H, J = 2.8 Hz).

Compound Ij-87

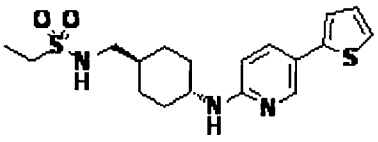
[Formula 460]



1H-NMR (DMSO-d6) δ: 0.95-1.08 (m, 2H), 1.11-1.25 (m, 2H), 1.20 (t, 3H, J = 7.2 Hz), 1.40 (m, 1H), 1.76-1.86 (m, 2H), 1.97-2.04 (m, 2H), 2.73-2.82 (m, 2H), 2.99 (q, 2H, J = 7.2 Hz), 3.70 (m, 1H), 6.53 (d, 1H, J = 8.8 Hz), 6.53 (d, 1H, J = 8.8 Hz), 7.01 (t, 1H, J = 6.0 Hz), 7.58 (d, 1H, J = 3.2 Hz), 7.79 (d, 1H, J = 3.2 Hz), 7.86 (d, 1H, J = 8.8 Hz), 8.55 (s, 1H).

Compound Ij-88

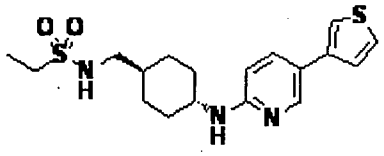
[Formula 461]



1H-NMR (DMSO-d6) δ: 0.92-1.07 (m, 2H), 1.09-1.20 (m, 2H), 1.19 (t, 6H, J = 7.2 Hz), 1.39 (m, 1H), 1.75-1.83 (m, 2H), 1.95-2.03 (m, 2H), 2.74-2.81 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.66 (m, 1H), 6.48 (d, 1H, J = 8.4 Hz), 6.60 (d, 1H, J = 7.6 Hz), 7.00 (t, 1H, J = 5.6 Hz), 7.06 (dd, 1H, J = 4.8, 2.4 Hz), 7.25 (d, 1H, J = 2.4 Hz), 7.37 (d, 1H, J = 4.8 Hz), 7.60 (dd, 1H, J = 8.4, 2.0 Hz), 8.26 (s, 1H).

Compound Ij-89

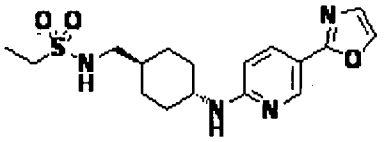
[Formula 462]



1H-NMR (DMSO-d6) δ: 0.93-1.07 (m, 2H), 1.10-1.20 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.39 (m, 1H), 1.76-1.84 (m, 2H), 1.96-2.04 (m, 2H), 2.73-2.81 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.65 (m, 1H), 6.41-6.50 (m, 2H), 7.01 (t, 1H, J = 6.0 Hz), 7.44 (d, 1H, J = 4.0 Hz), 7.58 (m, 1H), 7.59 (s, 1H), 7.68 (d, 1H, J = 8.0 Hz), 8.34 (s, 1H).

Compound Ij-90

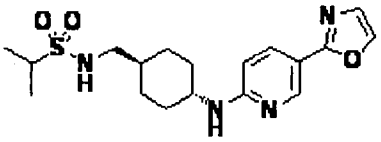
[Formula 463]



1H-NMR (DMSO-d6) δ: 0.95-1.08 (m, 2H), 1.12-1.25 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.39 (m, 1H), 1.76-1.86 (m, 2H), 1.94-2.03 (m, 2H), 2.75-2.82 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.71 (m, 1H), 6.54 (d, 1H, J = 8.8 Hz), 6.98-7.07 (m, 2H), 7.25 (s, 1H), 7.85 (dd, 1H, J = 8.8, 2.0 Hz), 8.07 (s, 1H), 8.56 (d, 1H, J = 2.0 Hz).

Compound Ij-91

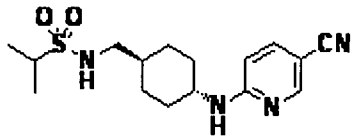
[Formula 464]



1H-NMR (DMSO-d6) δ: 0.93-1.07 (m, 2H), 1.11-1.22 (m, 2H), 1.21 (d, 6H, J = 6.8 Hz), 1.38 (m, 1H), 1.77-1.85 (m, 2H), 1.95-2.03 (m, 2H), 2.77-2.83 (m, 2H), 3.14 (m, 1H), 3.72 (m, 1H), 6.53 (d, 1H, J = 8.8 Hz), 6.97 (t, 1H, J = 6.0 Hz), 7.02 (d, 1H, J = 7.6 Hz), 7.25 (s, 1H), 7.84 (dd, 1H, J = 8.8, 2.0 Hz), 8.06 (s, 1H), 8.56 (d, 1H, J = 2.0 Hz).

Compound Ij-92

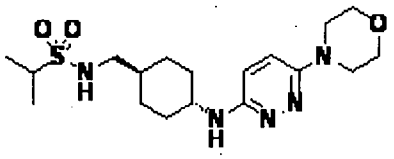
[Formula 465]



1H-NMR (DMSO-d6) δ: 0.92-1.03 (m, 2H), 1.11-1.23 (m, 2H), 1.21 (d, 6H, J = 6.8 Hz), 1.37 (m, 1H), 1.75-1.83 (m, 2H), 1.91-1.99 (m, 2H), 2.36-2.42 (m, 2H), 3.12 (m, 1H), 3.70 (m, 1H), 6.49 (d, 1H, J = 9.2 Hz), 6.97 (t, 1H, J = 6.0 Hz), 7.47 (d, 1H, J = 8.0 Hz), 7.62 (d, 1H, J = 8.0 Hz), 8.36 (s, 1H).

Compound Ij-93

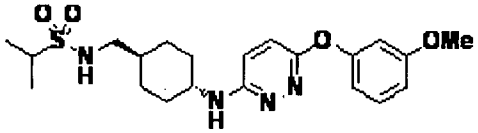
[Formula 466]



1H-NMR (DMSO-d6) δ: 0.95-1.13 (m, 4H), 1.23 (d, 6H, J = 6.9 Hz), 1.31-1.44 (m, 1H), 1.78-1.82 (m, 2H), 2.03-2.06 (m, 2H), 2.76-2.82 (m, 2H), 3.10-3.19 (m, 1H), 3.20-3.25 (m, 4H), 3.58-3.65 (m, 1H), 3.69-3.74 (m, 4H), 6.04 (d, 1H, J = 7.5 Hz), 6.72 (d, 1H, J = 9.6 Hz), 6.95-6.99 (m, 1H), 7.10 (d, 1H, J = 9.6 Hz).

Compound Ij-94

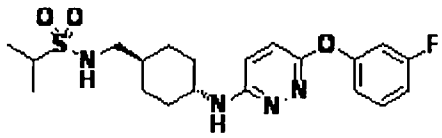
[Formula 467]



1H-NMR (DMSO-d6) δ: 0.96-1.42 (m, 5H), 1.22 (d, 6H, J = 6.9 Hz), 1.79-1.83 (m, 2H), 2.03-2.07 (m, 2H), 2.80 (d, 2H, J = 6.3 Hz), 3.10-3.19 (m, 1H), 3.54-3.70 (m, 1H), 3.74 (s, 3H), 6.57-6.64 (m, 3H), 6.72-6.75 (m, 1H), 6.90-7.09 (m, 3H), 7.24-7.30 (m, 1H).

Compound Ij-95

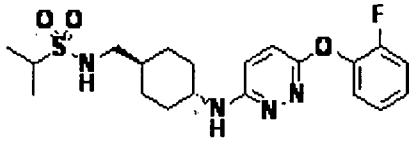
[Formula 468]



1H-NMR (DMSO-d6) δ: 0.93-1.04 (m, 2H), 1.10-1.18 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.34-1.44 (m, 1H), 1.78-1.87 (m, 2H), 2.02-2.12 (m, 2H), 2.77-2.84 (m, 2H), 3.10-3.20 (m, 1H), 3.52-3.70 (m, 1H), 6.64 (d, 1H, J = 8.0 Hz), 6.88-7.06 (m, 5H), 7.12 (d, 1H, J = 8.0 Hz), 7.37-7.46 (m, 1H).

Compound Ij-96

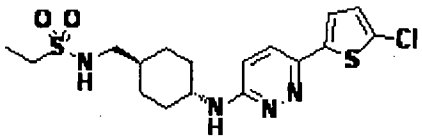
[Formula 469]



1H-NMR (DMSO-d6) δ: 0.90-1.04 (m, 2H), 1.05-1.18 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.33-1.43 (m, 1H), 1.75-1.84 (m, 2H), 1.98-2.08 (m, 2H), 2.76-2.84 (m, 2H), 3.08-3.18 (m, 1H), 3.52-3.64 (m, 1H), 6.55 (d, 1H, J = 8.0 Hz), 6.91-7.00 (m, 2H), 7.15-7.38 (m, 5H).

Compound Ij-97

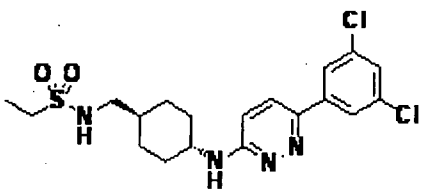
[Formula 470]



1H-NMR (DMSO-d6) δ: 0.96-1.08 (m, 2H), 1.12-1.25 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.35-1.47 (m, 1H), 1.78-1.87 (m, 2H), 2.02-2.10 (m, 2H), 2.78-2.83 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.70-3.82 (m, 1H), 6.82 (d, 1H, J = 8.0 Hz), 6.93 (d, 1H, J = 8.0 Hz), 7.01 (t, 1H, J = 4.5 Hz), 7.13 (d, 1H, J = 4.0 Hz), 7.43 (d, 1H, J = 4.0 Hz), 7.76 (d, 1H, J = 8.0 Hz).

Compound Ij-98

[Formula 471]

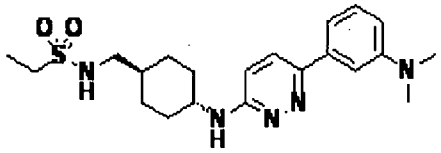


1H-NMR (DMSO-d6) δ: 0.97-1.10 (m, 2H), 1.17-1.28 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz),

1.37-1.49 (m, 1H), 1.80-1.88 (m, 2H), 2.04-2.12 (m, 2H), 2.77-2.83 (m, 2H), 2.99 (q, 2H, J = 7.2 Hz), 3.76-3.88 (m, 1H), 6.85 (d, 1H, J = 8.0 Hz), 6.99-7.05 (m, 2H), 7.61 (s, 1H), 7.90 (d, 1H, J = 8.0 Hz), 8.02 (s, 2H).

Compound Ij-99

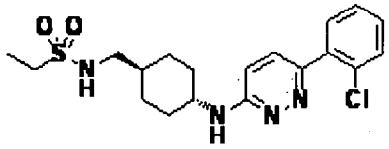
[Formula 472]



1H-NMR (DMSO-d6) δ: 0.98-1.10 (m, 2H), 1.14-1.26 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.37-1.48 (m, 1H), 1.80-1.88 (m, 2H), 2.04-2.13 (m, 2H), 2.77-2.83 (m, 2H), 2.96 (s, 6H), 2.99 (q, 2H, J = 7.2 Hz), 3.76-3.86 (m, 1H), 6.72-6.78 (m, 2H), 6.82 (d, 1H, J = 8.0 Hz), 7.02 (t, 1H, J = 4.5 Hz), 7.18 (d, 1H, J = 8.0 Hz), 7.26 (t, 1H, J = 8.0 Hz), 7.34 (s, 1H), 7.74 (d, 1H, J = 8.0 Hz).

Compound Ij-100

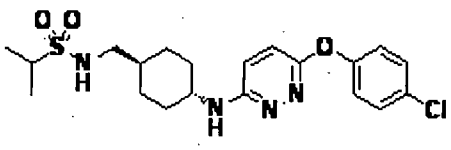
[Formula 473]



1H-NMR (DMSO-d6)δ: 0.98-1.10 (m, 2H), 1.16-1.27 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.37-1.48 (m, 1H), 1.80-1.88 (m, 2H), 2.04-2.13 (m, 2H), 2.77-2.83 (m, 2H), 2.99 (q, 2H, J = 7.2 Hz), 3.76-3.86 (m, 1H), 6.83 (d, 1H, J = 8.0 Hz), 6.89 (d, 1H, J = 8.0 Hz), 7.02 (t, 1H, J = 4.5 Hz), 7.42-7.50 (m, 3H), 7.53-7.59 (m, 2H).

Compound Ij-101

[Formula 474]

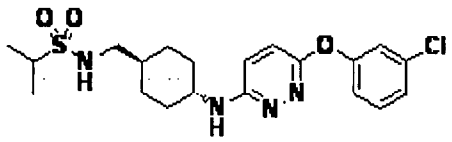


1H-NMR (DMSO-d6)δ: 0.92-1.05 (m, 2H), 1.08-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.36-1.43 (m, 1H), 1.76-1.84 (m, 2H), 2.02-2.09 (m, 2H), 2.77-2.83 (m, 2H), 3.10-3.20 (m,

1H), 3.56-3.68 (m, 1H), 6.62 (d, 1H, J = 8.0 Hz), 6.93 (d, 1H, J = 8.0 Hz), 6.98 (t, 1H, J = 4.5 Hz), 7.10-7.15 (m, 3H), 7.43 (d, 2H, J = 8.0 Hz).

Compound Ij-102

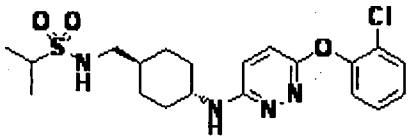
[Formula 475]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.08-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.36-1.43 (m, 1H), 1.76-1.84 (m, 2H), 2.02-2.09 (m, 2H), 2.77-2.83 (m, 2H), 3.10-3.20 (m, 1H), 3.57-3.68 (m, 1H), 6.65 (d, 1H, J = 8.0 Hz), 6.94 (d, 1H, J = 8.0 Hz), 6.97 (t, 1H, J = 4.5 Hz), 7.06 (d, 1H, J = 8.0 Hz), 7.13 (d, 1H, J = 8.0 Hz), 7.18-7.26 (m, 2H), 7.41 (t, 1H, J = 8.0 Hz).

Compound Ij-103

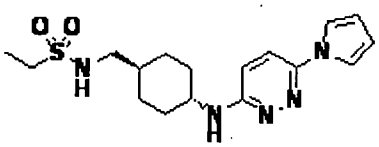
[Formula 476]



1H-NMR (DMSO-d6) δ: 0.88-1.04 (m, 2H), 1.05-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.33-1.43 (m, 1H), 1.77-1.82 (m, 2H), 2.00-2.07 (m, 2H), 2.76-2.82 (m, 2H), 3.08-3.20 (m, 1H), 3.52-3.64 (m, 1H), 6.57 (d, 1H, J = 8.0 Hz), 6.92-7.00 (m, 2H), 7.17 (d, 1H, J = 8.0 Hz), 7.23-7.28 (m, 2H), 7.38 (t, 1H, J = 8.0 Hz), 7.56 (d, 1H, J = 8.0 Hz).

Compound Ij-104

[Formula 477]

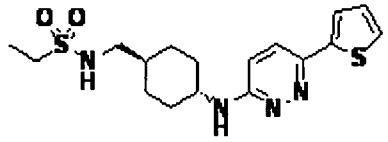


1H-NMR (DMSO-d6) δ: 0.96-1.08 (m, 2H), 1.12-1.24 (m, 2H), 1.19 (t, 3H, J = 7.6 Hz), 1.35-1.46 (m, 1H), 1.78-1.86 (m, 2H), 2.04-2.12 (m, 2H), 2.76-2.82 (m, 2H), 2.98 (q, 2H, J = 7.6 Hz), 3.67-3.78 (m, 1H), 6.27 (s, 2H), 6.71 (d, 1H, J = 8.0 Hz), 6.93 (d, 1H, J = 8.0

Hz), 7.02 (brs, 1H), 7.52 (s, 2H), 7.67 (d, 1H, J = 8.0 Hz).

Compound Ij-105

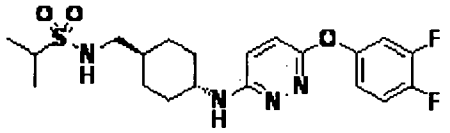
[Formula 478]



1H-NMR (DMSO-d6) δ: 0.96-1.08 (m, 2H), 1.13-1.25 (m, 2H), 1.19 (t, 3H, J = 7.6 Hz), 1.35-1.46 (m, 1H), 1.78-1.87 (m, 2H), 2.04-2.12 (m, 2H), 2.76-2.83 (m, 2H), 2.99 (q, 2H, J = 7.6 Hz), 3.72-3.82 (m, 1H), 6.82 (d, 1H, J = 8.0 Hz), 6.85 (d, 1H, J = 8.0 Hz), 7.03 (t, 1H, J = 4.5 Hz), 7.12 (t, 1H, J = 4.0 Hz), 7.51 (d, 1H, J = 4.0 Hz), 7.56 (d, 1H, J = 4.0 Hz), 7.76 (d, 1H, J = 8.0 Hz).

Compound Ij-106

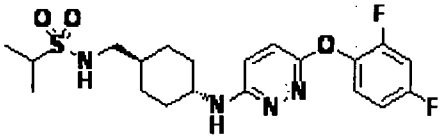
[Formula 479]



1H-NMR (DMSO-d6) δ: 0.88-1.02 (m, 2H), 1.07-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.33-1.45 (m, 1H), 1.76-1.85 (m, 2H), 2.02-2.08 (m, 2H), 2.76-2.83 (m, 2H), 3.10-3.20 (m, 1H), 3.57-3.67 (m, 1H), 6.63 (d, 1H, J = 8.0 Hz), 6.92-7.00 (m, 3H), 7.13 (d, 1H, J = 8.0 Hz), 7.29-7.36 (m, 1H), 7.42-7.50 (m, 1H).

Compound Ij-107

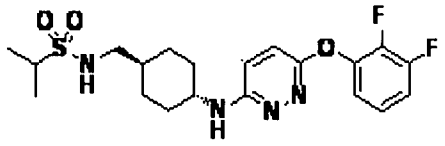
[Formula 480]



1H-NMR (DMSO-d6) δ: 0.88-1.02 (m, 2H), 1.07-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.33-1.43 (m, 1H), 1.75-1.83 (m, 2H), 1.98-2.06 (m, 2H), 2.76-2.83 (m, 2H), 3.08-3.18 (m, 1H), 3.52-3.63 (m, 1H), 6.57 (d, 1H, J = 8.0 Hz), 6.93 (d, 1H, J = 8.0 Hz), 6.97 (t, 1H, J = 4.5 Hz), 7.12 (t, 1H, J = 4.0 Hz), 7.19 (d, 1H, J = 8.0 Hz), 7.33-7.47 (m, 2H).

Compound Ij-108

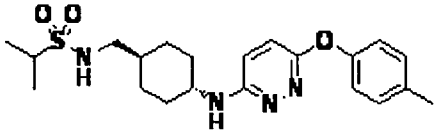
[Formula 481]



1H-NMR (DMSO-d6) δ: 0.88-1.02 (m, 2H), 1.07-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.33-1.43 (m, 1H), 1.75-1.83 (m, 2H), 1.98-2.07 (m, 2H), 2.76-2.83 (m, 2H), 3.08-3.18 (m, 1H), 3.54-3.63 (m, 1H), 6.63 (d, 1H, J = 8.0 Hz), 6.93-7.00 (m, 2H), 7.14 (t, 1H, J = 8.0 Hz), 7.20-7.37 (m, 3H).

Compound Ij-109

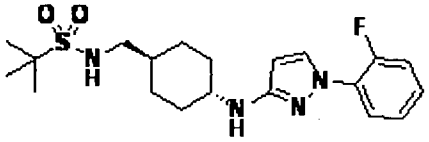
[Formula 482]



1H-NMR (DMSO-d6) δ: 0.82-1.05 (m, 2H), 1.05-1.20 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.32-1.43 (m, 1H), 1.76-1.83 (m, 2H), 2.00-2.08 (m, 2H), 2.29 (s, 3H), 2.76-2.83 (m, 2H), 3.08-3.18 (m, 1H), 3.56-3.66 (m, 1H), 6.55 (d, 1H, J = 8.0 Hz), 6.90 (d, 1H, J = 8.0 Hz), 6.93-7.00 (m, 3H), 7.05 (d, 1H, J = 8.0 Hz), 7.17 (d, 2H, J = 8.0 Hz).

Compound Ij-110

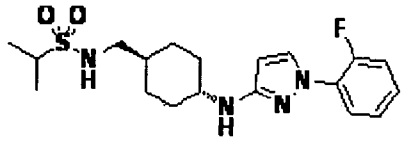
[Formula 483]



1H-NMR (DMSO-d6) δ: 0.91-1.19 (m, 4H), 1.28 (s, 9H), 1.32-1.43 (m, 1H), 1.80 (d, 2H, J = 12.0 Hz), 2.07 (d, 2H, J = 12.0 Hz), 2.88 (t, 2H, J = 6.4 Hz), 3.16-3.27 (m, 1H), 5.47 (d, 1H, J = 7.6 Hz), 5.80 (s, 1H), 6.83 (d, 1H, J = 6.0 Hz), 7.15-7.40 (m, 3H), 7.75 (t, 1H, J = 8.4 Hz), 7.86 (s, 1H).

Compound Ij-111

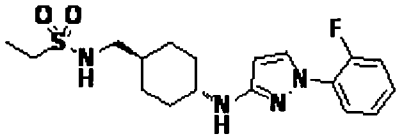
[Formula 484]



1H-NMR (DMSO-d6) δ: 0.91-1.19 (m, 4H), 1.21 (d, 6H, J = 6.9 Hz), 1.32-1.43 (m, 1H), 1.76-1.82 (m, 2H), 2.02-2.12 (m, 2H), 2.77-2.83 (m, 2H), 3.08-3.27 (m, 2H), 5.48 (d, 1H, J = 8.1 Hz), 5.80 (d, 1H, J = 2.7 Hz), 6.95 (t, 1H, J = 6.0 Hz), 7.15-7.39 (m, 3H), 7.75 (td, 1H, J = 8.4, 1.8 Hz), 7.86 (t, 1H, J = 2.7 Hz).

Compound Ij-112

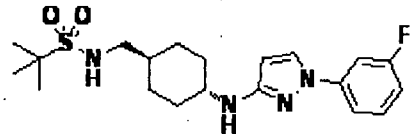
[Formula 485]



1H-NMR (DMSO-d6) δ: 0.91-1.19 (m, 4H), 1.18 (t, 3H, J = 7.2 Hz), 1.30-1.45 (m, 1H), 1.76-1.82 (m, 2H), 2.02-2.12 (m, 2H), 2.77-2.83 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz) 3.10-3.30 (m, 1H), 5.48 (d, 1H, J = 7.8 Hz), 5.80 (d, 1H, J = 2.7 Hz), 6.99 (t, 1H, J = 6.0 Hz), 7.15-7.40 (m, 3H), 7.75 (td, 1H, J = 8.4, 1.8 Hz), 7.86 (t, 1H, J = 2.7 Hz).

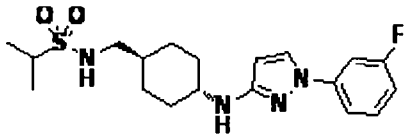
Compound Ij-113

[Formula 486]



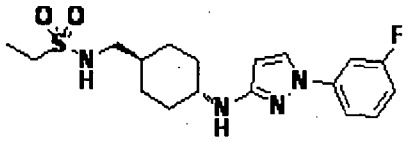
Compound Ij-114

[Formula 487]



Compound Ij-115

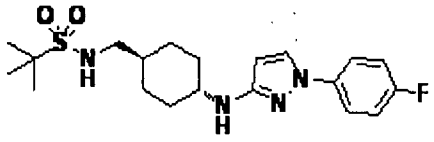
[Formula 488]



1H-NMR (DMSO-d6) δ: 0.92-1.19 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.30-1.45 (m, 1H), 1.76-1.84 (m, 2H), 2.02-2.12 (m, 2H), 2.74-2.82 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz) 3.15-3.30 (m, 1H), 5.53 (d, 1H, J = 8.1 Hz), 5.80 (d, 1H, J = 2.4 Hz), 6.92 (t, 1H, J = 8.4 Hz), 7.01 (t, 1H, J = 6.0 Hz), 7.37-7.43 (m, 3H), 8.21 (d, 1H, J = 2.4 Hz).

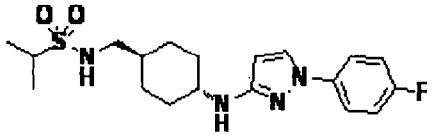
Compound Ij-116

[Formula 489]



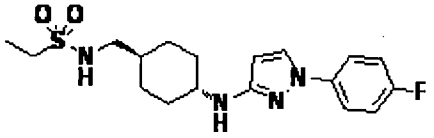
Compound Ij-117

[Formula 490]



Compound Ij-118

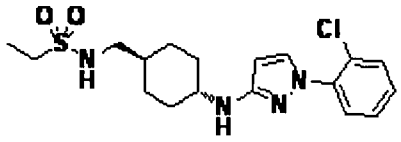
[Formula 491]



1H-NMR (DMSO-d6)δ: 0.92-1.19 (m, 4H), 1.19 (t, 3H, J = 7.5 Hz), 1.30-1.45 (m, 1H), 1.75-1.86 (m, 2H), 2.02-2.12 (m, 2H), 2.74-2.83 (m, 2H), 2.97 (q, 2H, J = 7.5 Hz) 3.13-3.30 (m, 1H), 5.38 (d, 1H, J = 8.4 Hz), 5.75 (d, 1H, J = 2.7 Hz), 6.99 (t, 1H, J = 6.3 Hz), 7.18-7.28 (m, 2H), 7.63-7.70 (m, 2H), 8.11 (d, 1H, J = 2.7 Hz).

Compound Ij-119

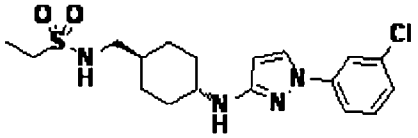
[Formula 492]



1H-NMR (DMSO-d6) δ: 0.88-1.19 (m, 4H), 1.18 (t, 3H, J = 7.5 Hz), 1.28-1.45 (m, 1H), 1.73-1.83 (m, 2H), 2.02-2.13 (m, 2H), 2.73-2.81 (m, 2H), 2.95 (q, 2H, J = 7.5 Hz) 3.12-3.30 (m, 1H), 5.36 (d, 1H, J = 7.5 Hz), 5.76 (d, 1H, J = 2.4 Hz), 6.98 (t, 1H, J = 6.0 Hz), 7.30 (td, 1H, J = 7.5, 1.8 Hz), 7.42 (td, 1H, J = 7.8, 1.5 Hz), 7.53-7.60 (m, 2H), 7.84 (d, 1H, J = 2.7 Hz).

Compound Ij-120

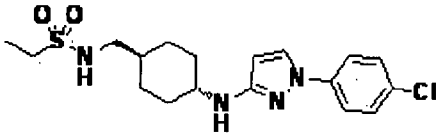
[Formula 493]



1H-NMR (DMSO-d6) δ: 0.92-1.19 (m, 4H), 1.19 (t, 3H, J = 7.5 Hz), 1.30-1.45 (m, 1H), 1.74-1.84 (m, 2H), 2.02-2.10 (m, 2H), 2.75-2.82 (m, 2H), 2.97 (q, 2H, J = 7.5 Hz) 3.20-3.30 (m, 1H), 5.52 (d, 1H, J = 7.8 Hz), 5.80 (d, 1H, J = 2.4 Hz), 6.99 (t, 1H, J = 6.0 Hz), 7.13 (d, 1H, J = 8.1 Hz), 7.40 (t, 1H, J = 8.1 Hz), 7.62 (d, 1H, J = 8.4 Hz), 7.72 (s, 1H), 8.22 (d, 1H, J = 2.4 Hz).

Compound Ij-121

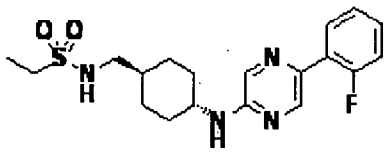
[Formula 494]



1H-NMR (DMSO-d6) δ: 0.92-1.19 (m, 4H), 1.19 (t, 3H, J = 7.5 Hz), 1.30-1.45 (m, 1H), 1.74-1.84 (m, 2H), 2.02-2.12 (m, 2H), 2.75-2.82 (m, 2H), 2.98 (q, 2H, J = 7.5 Hz) 3.15-3.30 (m, 1H), 5.47 (d, 1H, J = 8.1 Hz), 5.78 (d, 1H, J = 2.4 Hz), 7.00 (t, 1H, J = 6.0 Hz), 7.43 (d, 2H, J = 7.8 Hz), 7.67 (d, 2H, J = 9.0 Hz), 8.17 (d, 1H, J = 2.4 Hz).

Compound Ij-122

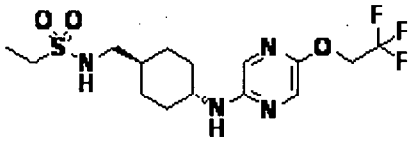
[Formula 495]



1H-NMR (DMSO-d6) δ: 0.94-1.07 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.32-1.50 (m, 1H), 1.81-1.84 (m, 2H), 1.99-2.07 (m, 2H), 2.77-2.81 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.60-3.77 (m, 1H), 7.01-7.05 (m, 1H), 7.22-7.40 (m, 4H), 7.81-7.87 (m, 1H), 8.02 (s, 1H), 8.36 (s, 1H).

Compound Ij-123

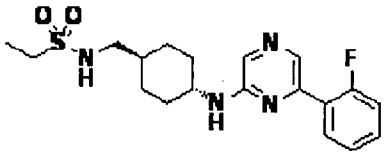
[Formula 496]



1H-NMR (DMSO-d6) δ: 0.95-1.12 (m, 4H), 1.18 (t, 3H, J = 7.2 Hz), 1.32-1.50 (m, 1H), 1.77-1.81 (m, 2H), 1.96-1.99 (m, 2H), 2.74-2.78 (m, 2H), 2.97 (q, 2H, J = 7.2 Hz), 3.54-3.70 (m, 1H), 4.81 (q, 2H, J = 9.0 Hz), 6.50-6.53 (m, 1H), 6.99-7.03 (m, 1H), 7.50 (d, 1H, J =0.9 Hz) 7.83 (d, 1H, J = 0.9 Hz).

Compound Ij-124

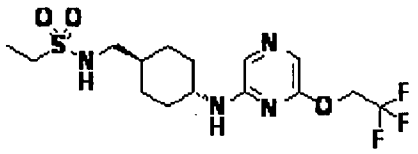
[Formula 497]



1H-NMR (DMSO-d6) δ: 0.95-1.23 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.32-1.50 (m, 1H), 1.77-1.81 (m, 2H), 2.03-2.07 (m, 2H), 2.74-2.80 (m, 2H), 2.97 (q, 2H, J = 7.2 Hz), 3.61-3.73 (m, 1H), 7.00-7.04 (m, 1H), 7.09-7.12 (m, 1H), 7.29-7.37 (m, 2H), 7.45-7.52 (m, 1H), 7.88-7.94 (m, 2H), 8.04-8.05 (m, 1H).

Compound Ij-125

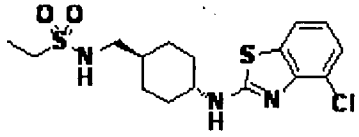
[Formula 498]



1H-NMR (DMSO-d6) δ: 0.94-1.14 (m, 4H), 1.19 (t, 3H, J = 7.2 Hz), 1.32-1.50 (m, 1H), 1.79-1.83 (m, 2H), 1.97-2.03 (m, 2H), 2.76-2.81 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.50-3.63 (m, 1H), 4.43 (q, 2H, J = 9.0 Hz), 7.00-7.04 (m, 1H), 7.13-7.15 (m, 1H), 7.35 (s, 1H) 7.55 (s, 1H).

Compound Ij-126

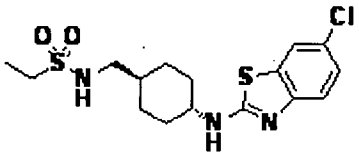
[Formula 499]



1H-NMR (DMSO-d6) δ: 1.02-1.08 (m, 2H), 1.17-1.29 (m, 2H), 1.19 (t, 3H, J = 7.5 Hz), 1.36-1.43 (m, 1H), 1.79-1.85 (m, 2H), 2.05-2.11 (m, 2H), 2.79 (t, 2H, J = 6.0 Hz), 2.99 (q, 2H, J = 7.5 Hz), 3.53-3.62 (m, 1H), 6.98 (t, 1H, J = 7.8 Hz), 7.03 (t, 1H, J = 6.3 Hz), 7.28 (dd, 1H, J = 7.5, 1.2 Hz), 7.63 (dd, 1H, J = 7.5, 1.2 Hz), 8.28 (d, 1H, J = 7.5 Hz).

Compound Ij-127

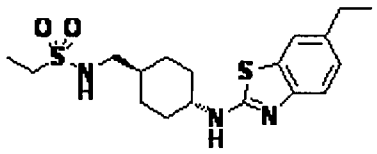
[Formula 500]



1H-NMR (DMSO-d6) δ: 0.97-1.05 (m, 2H), 1.18-1.24 (m, 2H), 1.16 (t, 3H, J = 7.5 Hz), 1.34-1.41 (m, 1H), 1.77-1.81 (m, 2H), 2.02-2.08 (m, 2H), 2.76 (t, 2H, J = 6.0 Hz), 2.96 (q, 2H, J = 7.5 Hz), 3.55-3.64 (m, 1H), 7.00 (t, 1H, J = 7.8 Hz), 7.18 (dd, 1H, J = 8.4, 1.8 Hz), 7.32 (dd, 1H, J = 8.4, 0.6 Hz), 7.74 (d, 1H, J = 1.8 Hz), 8.04 (d, 1H, J = 7.8 Hz).

Compound Ij-128

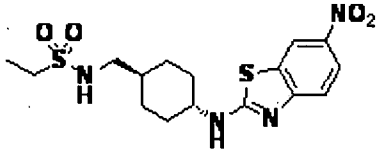
[Formula 501]



1H-NMR (DMSO-d6) δ: 0.98-1.07 (m, 2H), 1.15-1.26 (m, 8H), 1.32-1.43 (m, 1H), 1.78-1.84 (m, 2H), 1.98-2.09 (m, 2H), 2.60 (q, 2H, J = 7.5 Hz), 2.78 (t, 2H, J = 6.3 Hz), 2.96 (q, 2H, J = 7.5 Hz), 3.55-3.64 (m, 1H), 6.98-7.05 (m, 2H), 7.27 (dd, 1H, J = 7.8, 1.8 Hz), 7.47 (m, 1H), 7.84 (d, 1H, J =7.5 Hz).

Compound Ij-129

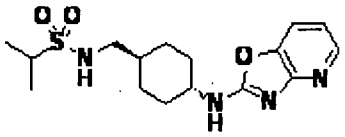
[Formula 502]



1H-NMR (DMSO-d6) δ: 0.92-1.15 (m, 2H), 1.15-1.35 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.33-1.48 (m, 1H), 1.78-1.88 (m, 2H), 2.04-2.16 (m, 2H), 2.78-2.84 (m, 2H), 2.97 (q, 2H, J = 7.2 Hz), 3.62-3.80 (m, 1H), 7.02 (t, 1H, J = 6.0 Hz), 7.45 (d, 1H, J = 9.0 Hz), 8.09 (dd, 1H, J = 9.0, 2.4 Hz), 8.68 (d, 1H, J = 2.4 Hz), 8.70 (brs, 1H).

Compound Ij-130

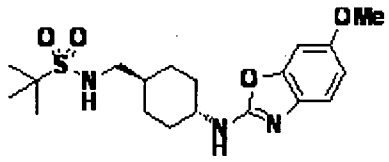
[Formula 503]



1H-NMR (DMSO-d6) δ: 0.88-1.10 (m, 2H), 1.15-1.46 (m, 3H), 1.21 (d, 6H, J = 6.6 Hz), 1.78-1.88 (m, 2H), 1.98-2.08 (m, 2H), 2.76-2.86 (m, 2H), 3.10-3.20 (m, 1H), 3.46-3.62 (m, 1H), 6.91-6.96 (m, 1H), 7.01 (brs, 1H), 7.64 (d, 1H, J = 7.8 Hz), 8.07 (d, 1H, J = 5.1 Hz), 8.35 (d, 1H, J = 7.8 Hz).

Compound Ij-131

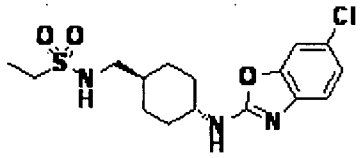
[Formula 504]



1H-NMR (DMSO-d6) δ: 0.92-1.05 (m, 2H), 1.15-1.30 (m, 2H), 1.27 (s, 9H), 1.30-1.43 (m, 1H), 1.77-1.86 (m, 2H), 1.98-2.08 (m, 2H), 2.86-2.92 (m, 2H), 3.35-3.50 (m, 1H), 3.73 (s, 3H), 6.69 (dd, 1H, J = 8.4, 2.0 Hz), 6.86 (t, 1H, J = 6.0 Hz), 7.01 (d, 1H, J = 2.0 Hz), 7.10 (d, 1H, J = 8.4 Hz), 7.62 (d, 1H, J = 7.6 Hz).

Compound Ij-132

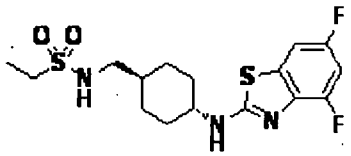
[Formula 505]



1H-NMR (DMSO-d6)δ: 0.92-1.08 (m, 2H), 1.15-1.33 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.33-1.42 (m, 1H), 1.76-1.86 (m, 2H), 1.98-2.08 (m, 2H), 2.76-2.82 (m, 2H), 2.97 (q, 2H, J = 7.2 Hz), 3.40-3.58 (m, 1H), 7.01 (t, 1H, J = 6.0 Hz), 7.13 (d, 1H, J = 8.4 Hz), 7.20 (d, 1H, J = 8.4 Hz), 7.49 (s, 1H), 8.01 (d, 1H, J = 7.6 Hz).

Compound Ij-133

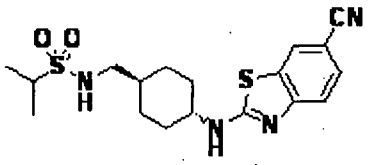
[Formula 506]



1H-NMR (DMSO-d6) δ: 0.96-1.10 (m, 2H), 1.16-1.28 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.33-1.46 (m, 1H), 1.78-1.85 (m, 2H), 2.04-2.12 (m, 2H), 2.76-2.82 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.55-3.70 (m, 1H), 7.01 (t, 1H, J = 6.0 Hz), 7.12 (t, 1H, J = 9.6 Hz), 7.48 (d, 1H, J = 7.6 Hz), 8.13 (d, 1H, J = 7.6 Hz).

Compound Ij-134

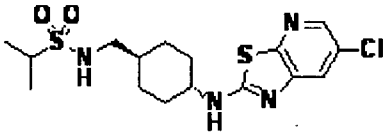
[Formula 507]



1H-NMR (DMSO-d6) δ: 0.98-1.08 (m, 2H), 1.15-1.26 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.33-1.42 (m, 1H), 1.39-1.84 (m, 2H), 2.05-2.09 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.10-3.20 (m, 1H), 3.61-3.75 (m, 1H), 6.98 (t, 1H, J = 6.0 Hz), 7.45 (dd, 1H, J = 7.5, 0.6 Hz), 7.60 (dd, 1H, J = 8.4, 1.5 Hz), 8.17 (d, 1H, J = 1.5 Hz), 8.50 (d, 1H, J = 7.5 Hz).

Compound Ij-135

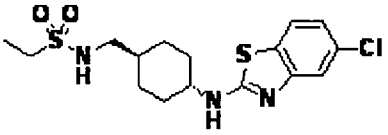
[Formula 508]



1H-NMR (DMSO-d6) δ: 0.98-1.08 (m, 2H), 1.15-1.25 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.35-1.44 (m, 1H), 1.80-1.84 (m, 2H), 2.05-2.08 (m, 2H), 2.81 (t, 2H, J = 6.3 Hz), 3.10-3.19 (m, 1H), 3.62-3.78 (m, 1H), 6.98 (t, 1H, J = 6.0 Hz), 7.79 (d, 1H, J = 2.1 Hz), 8.10 (d, 1H, J = 2.1, 1.5 Hz), 8.52 (d, 1H, J = 6.9 Hz).

Compound Ij-136

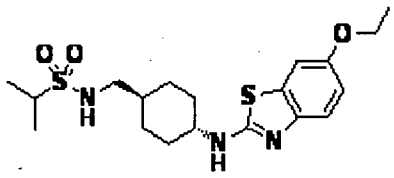
[Formula 509]



1H-NMR (DMSO-d6) δ: 0.97-1.08 (m, 2H), 1.17-1.24 (m, 2H), 1.19 (t, 3H, J = 7.5 Hz), 1.33-1.41 (m, 1H), 1.78-1.83 (m, 2H), 2.04-2.08 (m, 2H), 2.78 (t, 2H, J = 6.3 Hz), 2.98 (q, 2H, J = 7.2 Hz), 3.56-3.67 (m, 1H), 7.00-7.04 (m, 2H), 7.39 (d, 1H, J = 2.1 Hz), 7.66 (dd, 1H, J = 8.4, 1.8 Hz), 8.14 (d, 1H, J = 7.5 Hz).

Compound Ij-137

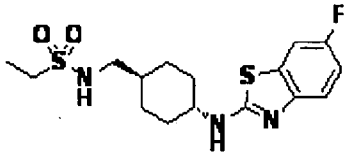
[Formula 510]



1H-NMR (DMSO-d6) δ: 0.96-1.10 (m, 2H), 1.12-1.28 (m, 2H), 1.21 (d, 6H, J = 6.9 Hz), 1.31 (t, 3H, J = 6.9 Hz), 1.33-1.46 (m, 1H), 1.76-1.85 (m, 2H), 2.02-2.16 (m, 2H), 2.78-2.84 (m, 2H), 3.10-3.22 (m, 1H), 3.50-3.64 (m, 1H), 3.98 (q, 2H, J = 6.9 Hz), 6.78 (dd, 1H, J = 8.7, 2.7 Hz), 6.98 (t, 1H, J = 6.0 Hz), 7.23-7.27 (m, 2H), 7.68 (d, 1H, J = 7.2 Hz).

Compound Ij-138

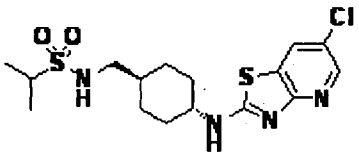
[Formula 511]



1H-NMR (DMSO-d6) δ: 0.94-1.08 (m, 2H), 1.14-1.26 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.33-1.45 (m, 1H), 1.77-1.86 (m, 2H), 2.03-2.12 (m, 2H), 2.76-2.82 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.52-3.68 (m, 1H), 6.97-7.06 (m, 2H), 7.34 (dd, 1H, J = 8.4, 4.8 Hz), 7.56 (dd, 1H, J = 8.4, 2.4 Hz), 7.91 (d, 1H, J = 7.6 Hz).

Compound Ij-139

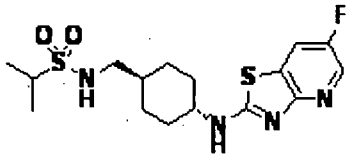
[Formula 512]



1H-NMR (DMSO-d6) δ: 0.96-1.12 (m, 2H), 1.16-1.32 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.32-1.46 (m, 1H), 1.78-1.86 (m, 2H), 2.02-2.16 (m, 2H), 2.78-2.84 (m, 2H), 3.10-3.21 (m, 1H), 3.58-3.76 (m, 1H), 7.00 (t, 1H, J = 6.0 Hz), 8.19-8.23 (m, 2H), 8.52 (d, 1H, J = 6.9 Hz).

Compound Ij-140

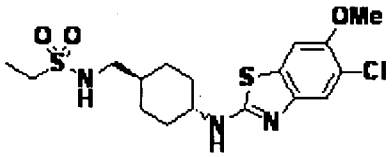
[Formula 513]



1H-NMR (DMSO-d6) δ: 0.96-1.12 (m, 2H), 1.12-1.30 (m, 2H), 1.21 (d, 6H, J = 6.6 Hz), 1.32-1.46 (m, 1H), 1.78-1.86 (m, 2H), 2.02-2.16 (m, 2H), 2.78-2.84 (m, 2H), 3.10-3.20 (m, 1H), 3.58-3.78 (m, 1H), 7.01 (t, 1H, J = 6.0 Hz), 8.08 (dd, 1H, J = 8.4, 2.7 Hz), 8.19 (d, 1H, J = 2.7 Hz), 8.38 (d, 1H, J = 7.2 Hz).

Compound Ij-141

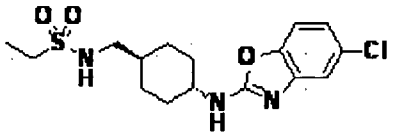
[Formula 514]



1H-NMR (DMSO-d6) δ: 0.97-1.08 (m, 2H), 1.15-1.22 (m, 5H), 1.34-1.42 (m, 1H), 1.78-1.83 (m, 2H), 2.04-2.08 (m, 2H), 2.78 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.2 Hz), 3.53-3.62 (m, 1H), 3.81 (s, 1H), 7.02 (t, 1H, J = 6.3 Hz), 7.41 (s, 1H), 7.53 (s, 1H), 7.88 (d, 1H, J = 7.5 Hz).

Compound Ij-142

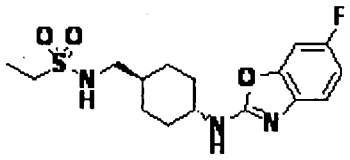
[Formula 515]



1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 2H), 1.17-1.30 (m, 2H), 1.18 (t, 3H, J = 7.5 Hz), 1.32-1.41 (m, 1H), 1.79-1.84 (m, 2H), 2.01-2.05 (m, 2H), 2.77 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 7.2 Hz), 3.41-3.58 (m, 1H), 6.97 (dd, 1H, J = 8.4, 2.4 Hz), 6.99-7.03 (m, 1H), 7.27 (d, 1H, J = 2.4 Hz), 7.34 (dd, 1H, J = 8.4, 0.3 Hz), 8.07-8.14 (m, 1H).

Compound Ij-143

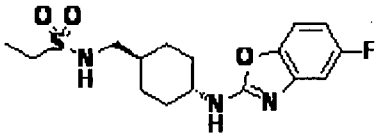
[Formula 516]



1H-NMR (DMSO-d6) δ: 0.94-1.08 (m, 2H), 1.16-1.33 (m, 2H), 1.19 (t, 3H, J = 7.2 Hz), 1.33-1.45 (m, 1H), 1.77-1.86 (m, 2H), 2.00-2.08 (m, 2H), 2.74-2.82 (m, 2H), 2.98 (q, 2H, J = 7.2 Hz), 3.38-3.54 (m, 1H), 6.90-7.00 (m, 1H), 7.02 (t, 1H, J = 4.5 Hz), 7.19 (dd, 1H, J = 8.4, 5.1 Hz), 7.33 (dd, 1H, J = 8.4, 2.7 Hz), 7.88 (d, 1H, J = 7.8 Hz).

Compound Ij-144

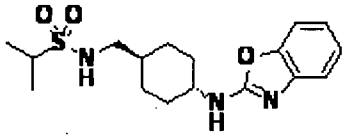
[Formula 517]



1H-NMR (DMSO-d6) δ: 0.94-1.06 (m, 2H), 1.19-1.29 (m, 2H), 1.18 (t, 3H, J = 7.2 Hz), 1.31-1.41 (m, 1H), 1.79-1.84 (m, 2H), 2.01-2.05 (m, 2H), 2.77 (t, 2H, J = 6.0 Hz), 2.98 (q, 2H, J = 6.9 Hz), 3.41-3.57 (m, 1H), 6.71-6.79 (m, 1H), 7.06-7.08 (m, 2H), 7.31 (dd, 1H, J = 8.7, 4.8 Hz), 8.03 (d, 1H, J = 7.8 Hz).

Compound Ij-145

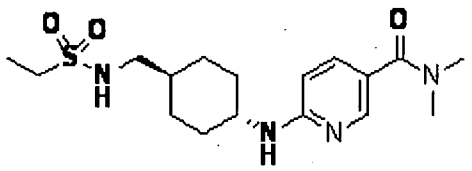
[Formula 518]



1H-NMR (DMSO-d6) δ: 0.95-1.16 (m, 2H), 1.18-1.44 (m, 3H), 1.21 (d, 6H, J = 6.6 Hz), 1.78-1.86 (m, 2H), 2.02-2.12 (m, 2H), 2.78-2.84 (m, 2H), 3.10-3.20 (m, 1H), 3.40-3.58 (m, 1H), 6.95 (t, 1H, J = 7.8 Hz), 7.01 (brs, 1H), 7.09 (t, 1H, J = 6.9 Hz), 7.22 (d, 1H, J = 6.6 Hz), 7.31 (d, 1H, J = 7.8 Hz), 7.83 (d, 1H, J = 7.8 Hz).

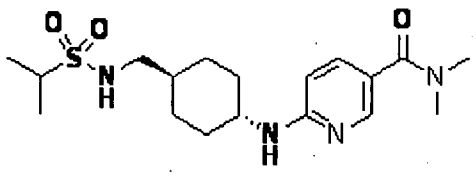
Compound Ij-146

[Formula 519]



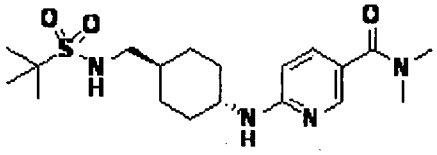
Compound Ij-147

[Formula 520]



Compound Ij-148

[Formula 521]



[0084]

Experiment 1 Transportability through the blood-brain barrier and potential for drug-drug interactions through P-gp

Transportability of the compounds of the present invention through the blood-brain barrier (blood-brain partition coefficient; Kp) in mice (Jcl;C57BL/6J mice, ♂, 7 weeks) was defined from the difference in concentration of the compounds between in plasma and in brain after intravenous administration of the compounds (0.5 mg/2 mL/kg). The brain Kp value of Compound (I-72) ($Kp_{Cont.}$) was 1.29 showing high transportability through the blood-brain barrier.

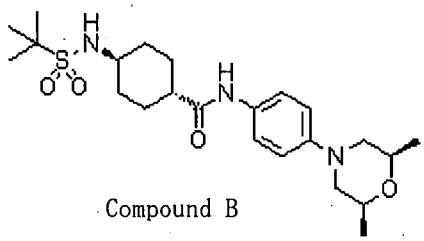
To examine the potential for drug-drug interactions through P-gp in vivo, the Kp values of compounds of the present invention with ($Kp_{CSA}$) or without ($Kp_{Cont.}$) cyclosporin A (20 mg/kg), a P-gp inhibitor, were calculated. The $Kp_{CSA}$ value of Compound (I-72) was 1.14, and the calculated $Kp_{CSA}$ / $Kp_{Cont.}$ ratio was 0.9. The result indicate that Compound (I-72) has no significant potential for drug-drug interactions through P-gp in mice.

[0085]

On the other hand the potential for drug-drug interactions through P-pg of amide

compound B which has similar structure of Compound (I-72) was also examined in mice. The $Kp_{Cont.}$ and $Kp_{CSA}$ were 0.04 and 0.84, respectively. The $Kp_{CSA}$ / $Kp_{Cont}$ ratio was more than 1.0 (i.e. 20.5), indicating that the compound is effectively excreted through P-gp from the brain to vessels, and that significant drug-drug interactions through P-gp could be induced in mice.

[Formula 522]



Compound B

[0086]

Experiment 2 Affinity for NPY Y5 receptor

cDNA sequence encoding a mouse NPY Y5 receptor Biochim, Biophys, Acta 1328, 83-89, 1997) was cloned in a vector (pME18S, Takebe et al. Mol. Cell. Biol. 8, 466-472). The obtained expression vector was transfected into CHO cells as a host by using Lipofect AMINE reagent (Trademark, Gico BRL Co., Ltd.) according to the instruction manual. The cells that stably express NPY Y5 receptor were obtained.

The membranes prepared from the CHO cells expressing NPY Y5 receptor, the compound of the present invention and 30,000 cpm [$^{125}$I] peptide YY (60 pM of final concentration: Amersham) were incubated in the assay buffer (20 mM HEPES-Hanks buffer containing 0.1% bovine serum albumin, pH 7.4) at 25 °C for 2 hours, and then the membrane was filtered from the mixture through a glassfilter (GF/C) presoaked with 1 % polyethyleneimine. After washing with 50 mM Tris-HCl buffer (pH 7.4), radioactivity retained on the filters was quantified with a gamma counter. Nonspecific binding was defined as the amount of radioactivity bound to the membranes after incubation in the presence of 200 nM of peptide YY. The 50 % inhibitory concentration of the test compound against the specific peptide YY binding ($IC_{50}$ value) was calculated (Inui, A. et al. Endocrinology 131, 2090 - 2096 (1992)). The results are shown in Table 1.

The compounds of the present invention inhibited the binding of peptide YY (NPY homologue) to NPY Y5 receptor, indicating that the compounds of the present invention have an affinity for the NPY Y5 receptor.

[Table 1]

| Compound No. | Binding $IC_{50}$(nM) |
|---|---|
| Ii-1 | 0.10 |
| Ii-16 | 1.2 |
| Ii-34 | 11 |
| Ii-44 | 3.4 |
| Ij-1 | 0.70 |
| Ij-52 | 0.99 |
| Ij-59 | 2.5 |
| Ij-66 | 0.39 |

[0087]

Experiment 3 Inhibitory effect on cAMP production in CHO cells

CHO cells expressing human NPY Y5 receptor were incubated in the presence of 2.5 mM isobutylmethylxanthine (SIGMA) at 37 °C for 20 min. After the incubation the compound of the present invention was added, and then the mixture was incubated for 5 min. Next, 50 nM NPY and 10 μM forskolin (SIGMA) were added, and the mixture was incubated for 30 min. After termination of the reaction by adding 1N HCl, the amount of cAMP in the supernatant was determined with an EIA kit (Amersham LIFE SCIENCE). The inhibitory activity of NPY against forskolin stimulated cAMP production was expressed as 100 % and the 50 % inhibitory concentration ($IC_{50}$ value) of the compound of the present invention against the NPY activity was calculated.

[0088]

Experiment 4

Using the membranes prepared from Y1-expression cells (human neuroblastoma, SK-N-MC) and the membranes prepared from Y2-expression cells (human neuroblastoma, SMS-KAN), the experiment was carried out in a similar way as Experiment 2 to determine the affinity of the compounds for NPY Y1 and NPY Y2 receptor. The results showed that the compounds of the present invention had no significant affinity for their receptors, indicating high selectivity for NPY Y5 receptor.

[0089]

Experiment 5

Under diethylether anesthesia the skull of male C57BL/6J mice (12-14 week old, 25-30g) was exposed by making an incision about 1-cm long from external occipital crest to nasal dorsum, and drilled in the 1-mm lateral position to the left following 1-mm posterior from bregma. After recovery from anesthesia mice were dosed with either 0.5% hydroxymethylpropylmethyl cellulose solution (Shin-Etsu Chemical Co., Ltd) or the compounds of the present invention suspended in the 0.5%

hydroxymethylpropylmethyl cellulose solution. At one hour after the treatment, each animal received a NPY Y5 receptor specific agonist, [cPP$^{1-7}$, NPY$^{19-23}$, Ala$^{31}$, Aib$^{32}$, Gln$^{34}$]-hPancreatic Polypeptide (0.1 nmol/1.5 μL/mouse) through the skull opening using a canula. Residual food was measured at 2 and 4 hours after the treatment, and the difference in food intake between the compounds-treated mice and 0.5% hydroxymethylpropylmethyl cellulose solution-treated mice was calculated. The compound at 6 mg/kg caused a significant reduction in food intake of mice compared to the treatment with 0.5% hydroxymethylpropylmethyl cellulose solution.

[0090]

Formulation Example

The following Formulation Examples are only exemplified and not intended to limit the scope of the present invention.

Formulation Example 1 Tablets

| | |
|---|---|
| Compound (I-1) | 15 mg |
| Starch | 15 mg |
| Lactose | 15 mg |
| Crystalline cellulose | 19 mg |
| Polyvinyl alcohol | 3 mg |
| Distilled water | 30 ml |
| Calcium stearate | 3 mg |

All of the above ingredients except for calcium stearate are uniformly mixed. Then the mixture was crushed, granulated and dried to obtain a suitable size of granules. Next, calcium stearate was added to the granules. Finally, tableting was performed under a compression force.

[0091]

Formulation Example 2 Capsules

| | |
|---|---|
| Compound (I-2) | 10 mg |
| Magnesium stearate | 10 mg |
| Lactose | 80 mg |

The above ingredients were mixed uniformly to obtain powders or fine granules, and then the obtained mixture was filled in capsules.

[0092]

Formulation Example 3 Granules

| | |
|---|---|
| Compound (I-3) | 30 g |

| | |
|---|---|
| Lactose | 265 g |
| Magnesium Stearate | 5 g |

After the above ingredients are mixed uniformly, the mixture was compressed. The compressed matters were crushed, granulated and sieved to obtain suitable size of granules.

Industrial Applicability

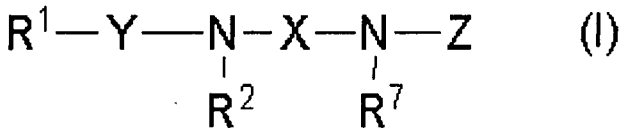
[0093]

As shown in the above Experiments, the compounds of the present invention have a NPY Y5 receptor antagonistic activity. Therefore, the compounds of the present invention are very useful as an anti-obesity and anorectic agent.

Claims

[1] A compound of the formula (I):

[Formula 14]



(I)

a pharmaceutically acceptable salt or solvate thereof,

wherein

$R^1$ is optionally substituted C1 to C10 alkyl,

Y is $-S(O)_2-$,

$R^2$ is hydrogen or optionally substituted C1 to C10 alkyl,

$R^7$ is hydrogen or optionally substituted C1 to C10 alkyl,

X is a group of the formula:

[Formula 15]

wherein

$R^5$ and $R^6$ are each independently hydrogen,

a group of the formula:

[Formula 16]

is optionally substituted cycloalkylene,

p is 0, and

q is 1 or 2,

Z is optionally substituted carbocyclyl or optionally substituted heterocyclyl, and

provided that a compound wherein Z is fused heterocyclyl consisting of three rings or optionally substituted pyrimidinyl is excluded,

wherein

a substituent of "optionally substituted C1 to C10 alkyl" or "optionally



AMENDED SHEET: 25 MAY 2010

substituted cycloalkylene" is one or more group(s) selected from the substituents ß,

the substituents group ß is a group consisting of halogen, optionally protected hydroxy, mercapto, C1 to C10 alkoxy, C2 to C10 alkenyl, amino, C1 to C10 alkylamino, C1 to C10 alkoxycarbonylamino, C1 to C10 alkylthio, acyl, carboxy, C1 to C10 alkoxycarbonyl, carbamoyl, cyano, cycloalkyl, phenyl, phenoxy, C1 to C10 alkylphenyl, C1 to C10 alkoxyphenyl, halogenophenyl, naphthyl and heterocyclyl,

"carbocyclyl" is "cycloalkyl", "cycloalkenyl", "bicycloalkyl" and "aryl",

"heterocyclyl" is 5- or 6-membered heteroaryl including pyrrolyl, imidazolyl, pyrazolyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, triazolyl, triazinyl, tetrazolyl, isoxazolyl, oxazolyl, oxadiazolyl, isothiazolyl, thiazolyl, thiadiazolyl, furyl and thienyl; fused heterocyclyl consisting of two rings including indolyl, isoindolyl, indazolyl, indolizinyl, indolinyl, isoindolinyl, quinolyl, isoquinolyl, cinnolinyl, phthalazinyl, quinazolinyl, naphthyridinyl, quinoxalinyl, purinyl, pteridinyl, benzopyranyl, benzimidazolyl, benzisoxazolyl, benzoxazolyl, benbzoxadiazolyl, benzisothiazolyl, benzothiazolyl, benzothiadiazolyl, benzofuryl, isobenzofuryl, benzothienyl, benzotriazolyl, imidazopyridyl, triazoropyridyl, imidazothiazolyl, pyrazinopyridazinyl, tetrahydroquinolyl, tetrahydrobenzothienyl, oxazolopyridyl, thiazolopyridyl, benzoxazolinonyl, benzisoxazolinonyl, benzoxazinonyl, benzoxyazepinonyl, oxazolopyridinonyl and benzodioxolyl; fused heterocyclyl consisting of three rings including carbazolyl, acridinyl, xanthenyl, phenothiazinyl, phenoxathiinyl, phenoxazinyl and dibenzofuryl; and non-aromatic heterocyclyl including dioxanyl, thiiranyl, oxiranyl, oxathiolanyl, azetidinyl, thianyl, pyrrolidinyl, pyrrolinyl, imidazolidinyl, imidazolinyl, pyrazolidinyl, pyrazolinyl, piperidyl, piperazinyl, morpholinyl, morpholino, thiomorpholinyl, thiomorpholino, dihydropyridyl, tetrahydrofuryl, tetrahydropyranyl, tetrahydrothiazolyl and tetrahydroisothiazolyl,

a substituent of "optionally substituted carbocyclyl" and "optionally substituted heterocyclyl" is the substituents group α or C1 to C10 alkyl which may be substituted with one or more group(s) selected from the substituents groupα,

"a substituents group α" is a group constituting of (1) halogen; (2) oxo; (3) cyano; (4) nitro; (5) imino optionally substituted with C1 to C10 alkyl or hydroxy; (6) the following groups (i) to (xxi), which are optionally substituted with one or more of groups selected from the substituents group ß,

(i) hydroxy, (ii) C1 to C10 alkyl, (iii) C2 to C10 alkenyl, (iv) C1 to C10 alkoxy, (v)



AMENDED SHEET: 25 MAY 2010

carboxy, (vi) C1 to C10 alkoxycarbonyl, (vii) acyl, (viii) acyloxy, (ix) imino, (x) mercapto, (xi) C1 to C10 alkylthio, (xii) carbamoyl, (xiii) C1 to C10 alkylcarbamoyl, (xiv) cycloalkylcarbamoyl, (xv) thiocarbamoyl, (xvi) C1 to C10 alkylthiocarbamoyl, (xvii) C1 to C10 alkylsulfinyl, (xviii) C1 to C10 alkylsulfonyl, (xix) sulfamoyl, (xx) C1 to C10 alkylsulfamoyl and (xxi) cycloalkylsulfamoyl;

(7) the following groups (i) to (v), which are optionally substituted with the substituents group ß, C1 to C10 alkyl, C1 to C10 alkoxy(C1 to C10 alkyl), optionally protected hydroxy(C1 to C10 alkyl), halogeno(C1 to C10 alkyl), C1 to C10 alkylsulfonyl and/or arylsulfonyl,

(i) cycloalkyl, (ii) cycloalkenyl, (iii)cycloalkyloxy, (iv) amino and (v) C1 to C6 alkylenedioxy;

and

(8) the following groups (i) to (xii), which are optionally substituted with the substituents group ß, C1 to C10 alkyl, halogeno(C1 to C10 alkyl) and/or oxo,

(i) phenyl, (ii) naphthyl, (iii) phenoxy, (iv) phenyl(C1 to C10 alkoxy), (v) phenylthio, (vi) phenyl(C1 to C10 alkylthio), (vii) phenylazo, (viii) heterocyclyl, (ix) heterocyclyloxy, (x) heterocyclylthio, (xi) heterocyclylcarbonyl and (xii) heterocyclylsulfonyl, and

heterocyclyl parts in "heterocyclyloxy", "heterocyclylthio" and "heterocyclylcarbonyl" and "heterocyclylsulfonyl" are the same as the above "heterocyclyl".

[2] The compound, pharmaceutically acceptable salt or solvate thereof of Claim 1, wherein Z is optionally substituted phenyl, optionally substituted indanyl, optionally substituted pyridyl, optionally substituted pyridazinyl, optionally substituted pyrazolyl, optionally substituted isoxazolyl, optionally substituted oxadiazolyl or optionally substituted fused heterocycle consisting of two rings,

wherein the substituent is the substituents group α or C1 to C10 alkyl which may be substituted with one or more group(s) selected from the substituents groupα.

[3] The compound, pharmaceutically acceptable salt or solvate thereof of Claim 1, wherein Z is optionally substituted quinolyl, optionally substituted benzothiazolyl, optionally substituted benzoxazolyl, optionally substituted benzopyridyl, optionally substituted benzopyridadiyl, optionally substituted benzimidazolyl, optionally substituted thiazolopyridyl, optionally substituted benzisoxazolinonyl, optionally substituted benzoxazolinonyl, optionally substituted benzoxadinonyl or optionally substituted benzoxyazepinonyl,

wherein the substituent is the substituents group α or C1 to C10 alkyl which may be substituted with one or more group(s) selected from the substituents groupα.

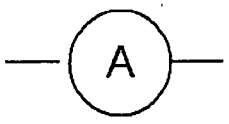
[4] The compound, pharmaceutically acceptable salt or solvate thereof of Claim 1,

$R^1$ is C1-C10 alkyl,

$R^2$ is hydrogen,

$R^7$ is hydrogen,

[Formula 17]




is cyclohexylene,

q is 1,

Z is optionally substituted phenyl,

wherein the substituent is one or more group(s) selected from a group consisting of halogen; cyano; C1-C10 alkyl optionally substituted with halogen; C1 to C10 alkoxy optionally substituted with halogen; amino optionally substituted with C1-C10 alkyl, C1-C10 alkoxy(C1-C10alkyl), cycloalkyl and/or C1-C10 alkylphenyl; carbonyl optionally substituted with pyrrolidinyl; C1-C10 alkylcarbamoyl; morpholino optionally substituted with C1-C10 alkyl; tetrahydroisothiazolyl optionally substituted with oxo; piperidyl optionally substituted with C1-C10 alkyl; piperazinyl optionally substituted with C1-C10 alkyl; pyrrolidinyl optionally substituted with oxo; pyrrolyl; pyridyl; thiazolyl; imidazolyl; pyrazolyl; and phenoxy optionally substituted halogen or C1-C10 alkoxy;

indanyl,

optionally substituted pyridyl, wherein the substituent is one or more group(s) selected from a group consisting of halogen; C1-C10 alkyl optionally substituted with halogen; C1-C10alkoxy optionally substituted with halogen; and phenyl optionally substituted with C1-C10 alkoxy or halogeno(C1-C10alkoxy),

optionally substituted pyridazinyl, wherein the substituent is C1-C10 alkoxy optionally substituted with halogen; phenyl optionally substituted with halogen; or phenoxy optionally substituted with halogen,

optionally substituted pyrazolyl, wherein the substituent is C1 to C10 alkyl; and /or phenyl optionally substituted with halogen,



AMENDED SHEET: 25 MAY 2010

optionally substituted thiazolyl, wherein the substituent is morpholino (C1-C10alkyl) optionally substituted with C1-C10 alkyl,
optionally substituted isoxazolyl, wherein the substituent is phenyl,
optionally substituted oxadiazolyl, wherein the substituent is phenyl,
optionally substituted quinolyl, wherein the substituent is one or more group(s) selected from a group consisting of halogen; oxo; and C1-C10 alkyl,
optionally substituted benzothiazolyl, wherein the substituent is halogen,
optionally substituted benzoxazolyl, wherein the substituent is halogen,
optionally substituted benzoimidazolyl, wherein the substituent is C1-C10alkyl,
optionally substituted thiazolopyridyl, wherein the substituent is halogen,
optionally substituted benzisoxazolinonyl, wherein the substituent is oxo; and/or C1-C10 alkyl,
optionally substituted benzoxazolinonyl, wherein the substituent is one or more group(s) selected from a group consisting of oxo; halogen; and C1-C10 alkyl optionally substituted with C1-C10 alkoxy,
optionally substituted benzoxazinonyl, wherein the substituent is oxo; and/or C1-C10 alkyl,
optionally substituted benzoxyazepinonyl, wherein the substituent is oxo; and/or C1-C10 alkyl,
optionally substituted phthalazinyl, wherein the substituent is C1-C10 alkoxy optionally substituted with halogen,
optionally substituted oxazolopyridinonyl, wherein the substituent is oxo; and/or C1-C10 alkyl,
optionally substituted indazolyl, wherein the substituent is C1-C10 alkyl, or
optionally substituted benzodioxolyl, wherein the substituent is halogen.

[5] A pharmaceutical composition comprising the compound, pharmaceutically acceptable salt or solvate thereof of any one of Claims 1 to 4 as an active ingredient.

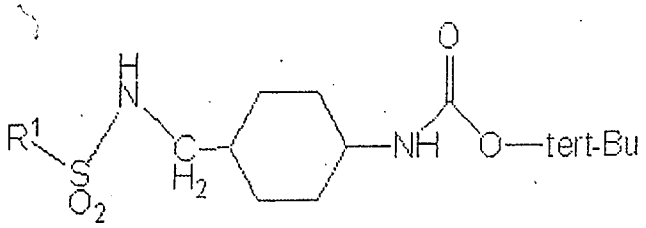
[6] A NPY Y5 receptor antagonist comprising the compound, pharmaceutically acceptable salt or solvate thereof of any one of Claims 1 to 4 as an active ingredient.



AMENDED SHEET: 25 MAY 2010

[18] A compound of the formula:

[Formula 26]



a salt or solvate thereof,

wherein $R^1$ is ethyl, isopropyl or tert-butyl.

DATED THIS 23rd DAY OF OCTOBER 2009

SPOOR & FISHER

APPLICANT'S PATENT ATTORNEYS