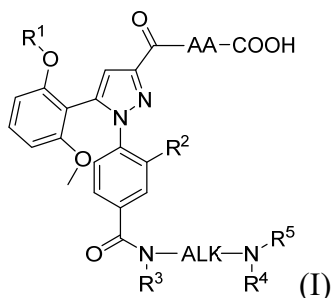


Claims

1. A compound of formula (I):



wherein

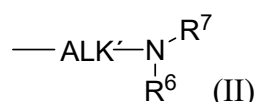
R¹ is selected from the group consisting of hydrogen, methyl and cyclopropylmethyl;

AA-COOH is an amino acid selected from the group consisting of 2-amino-2- adamantane carboxylic acid, cyclohexylglycine and 9-amino-bicyclo[3.3.1]nonane-9- carboxylic acid;

R² is selected from the group consisting of (C₁-C₆)alkyl, (C₃-C₈)cycloalkyl, (C₃-C₈)cycloalkylmethyl, halogen, nitro and trifluoromethyl;

ALK is (C₂-C₅)alkylidene;

R³, R⁴ and R⁵ are each and independently selected from the group consisting of hydrogen and (C₁-C₄)alkyl under the proviso that one of R³, R⁴ and R⁵ is of the following formula (II)



wherein

ALK' is (C₂-C₅)alkylidene;

R⁶ is selected from the group consisting of hydrogen and (C₁-C₄)alkyl; and

R⁷ is selected from the group consisting of H and an Effector moiety; wherein

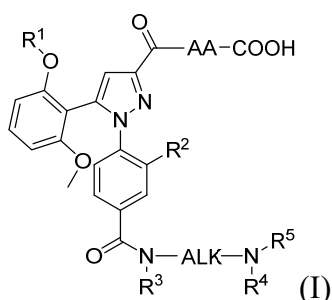
the Effector is selected from the group consisting of Acceptor, -[Acceptor-Effector], -[Linker-Acceptor], and -[Linker-Acceptor-Effector], wherein

- [Acceptor-Effector] is a moiety where the Effector is complexed or covalently bound to the Acceptor,

- [Linker-Acceptor] is a moiety where the Linker is conjugated to the Acceptor, and
- [Linker-Acceptor-Effector] is a moiety where the Linker is conjugated to the Acceptor, wherein the Effector is complexed or covalently bound to the Acceptor,

wherein Effector is selected from the group consisting of a diagnostically active nuclide, a therapeutically active nuclide and a combination thereof, wherein Acceptor is a chelator or an aromate, and wherein Linker is a moiety which links the Acceptor to the N atom of formula (II) with the Acceptor, wherein the type of covalent linkage between the Linker and the N atom of the group of formula (II) is selected from the group consisting of amide, urea, thiourea and alkylamine; and the type of covalent linkage between the Linker and the Acceptor is selected from the group comprising amide, alkylamine, urea, ether, thioether, thiourea and carbamate; or a pharmacologically acceptable salt, solvate or hydrate thereof.

2. A neurotensin receptor 1 binding compound of formula (I):



for use in a method for the diagnosis of a disease; wherein

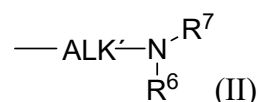
R¹ is selected from the group consisting of hydrogen, methyl and cyclopropylmethyl;

AA-COOH is an amino acid selected from the group consisting of 2-amino-2-adamantane carboxylic acid, cyclohexylglycine and 9-amino-bicyclo[3.3.1]nonane-9-carboxylic acid;

R² is selected from the group consisting of (C₁-C₆)alkyl, (C₃-C₈)cycloalkyl, (C₃-C₈)cycloalkylmethyl, halogen, nitro and trifluoromethyl;

ALK is (C₂-C₅)alkylidene;

R³, R⁴ and R⁵ are each and independently selected from the group consisting of hydrogen and (C₁-C₄)alkyl under the proviso that one of R³, R⁴ and R⁵ is of the following formula (II)



wherein

ALK' is (C₂-C₅)alkylidene;

R⁶ is selected from the group consisting of hydrogen and (C₁-C₄)alkyl; and

R⁷ is an Effector moiety selected from the group consisting of Acceptor, -[Acceptor-Effector], -[Linker-Acceptor], and -[Linker-Acceptor-Effector], wherein

- [Acceptor-Effector] is a moiety where the Effector is complexed or covalently bound to the Acceptor,
- [Linker-Acceptor] is a moiety where the Linker is conjugated to the Acceptor, and
- [Linker-Acceptor-Effector] is a moiety where the Linker is conjugated to the Acceptor, whereby the Effector is complexed or covalently bound to the Acceptor,

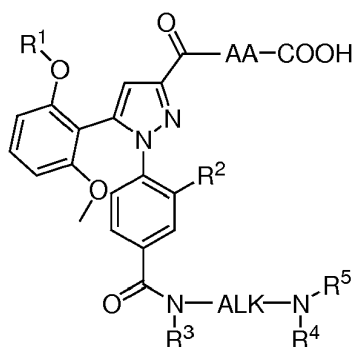
wherein Effector is selected from the group consisting of a diagnostically active nuclide, a therapeutically active nuclide and a combination thereof,

wherein Acceptor is a chelator or an aromate, and

wherein Linker is a moiety which links the Acceptor to the N atom of formula (II) with the Acceptor, wherein the type of covalent linkage between the Linker and the N atom of the group of formula (II) is selected from the group consisting of amide, urea, thiourea and alkylamine; and the type of covalent linkage between the Linker and the Acceptor is selected from the group comprising amide, alkylamine, urea, ether, thioether, thiourea and carbamate;

or a pharmacologically acceptable salt, solvate or hydrate thereof.

3. A neurotensin receptor 1 binding compound of formula (I):



(I)

for use in a method for the treatment of a disease, wherein

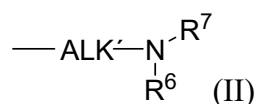
R¹ is selected from the group consisting of hydrogen, methyl and cyclopropylmethyl;

AA-COOH is an amino acid selected from the group consisting of 2-amino-2-adamantane carboxylic acid, cyclohexylglycine and 9-amino-bicyclo[3.3.1]nonane-9-carboxylic acid;

R² is selected from the group consisting of (C₁-C₆)alkyl, (C₃-C₈)cycloalkyl, (C₃-C₈)cycloalkylmethyl, halogen, nitro and trifluoromethyl;

ALK is (C₂-C₅)alkylidene;

R³, R⁴ and R⁵ are each and independently selected from the group consisting of hydrogen and (C₁-C₄)alkyl under the proviso that one of R³, R⁴ and R⁵ is of the following formula (II)



wherein

ALK' is (C₂-C₅)alkylidene;

R⁶ is selected from the group consisting of hydrogen and (C₁-C₄)alkyl; and

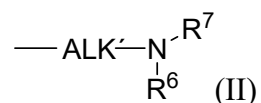
R⁷ is an Effector moiety selected from the group consisting of Acceptor, -[Acceptor-Effector], -[Linker-Acceptor], and -[Linker-Acceptor-Effector], wherein

- [Acceptor-Effector] is a moiety where the Effector is complexed or covalently bound to the Acceptor,

- [Linker-Acceptor] is a moiety where the Linker is conjugated to the Acceptor, and

ALK is (C₂-C₅)alkylidene;

R³, R⁴ and R⁵ are each and independently selected from the group consisting of hydrogen and (C₁-C₄)alkyl under the proviso that one of R³, R⁴ and R⁵ is of the following formula (II)



wherein

ALK' is (C₂-C₅)alkylidene;

R⁶ is selected from the group consisting of hydrogen and (C₁-C₄)alkyl; and

R⁷ is an Effector moiety selected from the group consisting of Acceptor, -[Acceptor-Effector], -[Linker-Acceptor], and -[Linker-Acceptor-Effector], wherein

- [Acceptor-Effector] is a moiety where the Effector is complexed or covalently bound to the Acceptor,

- [Linker-Acceptor] is a moiety where the Linker is conjugated to the Acceptor, and

- [Linker-Acceptor-Effector] is a moiety where the Linker is conjugated to the Acceptor, whereby the Effector is complexed or covalently bound to the Acceptor,

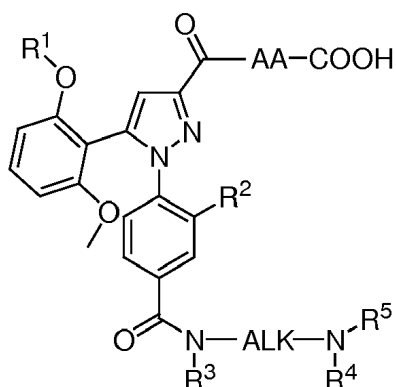
wherein Effector is selected from the group consisting of a diagnostically active nuclide, a therapeutically active nuclide and a combination thereof,

wherein Acceptor is a chelator or an aromate, and

wherein Linker is a moiety which links the Acceptor to the N atom of formula (II) with the Acceptor, wherein the type of covalent linkage between the Linker and the N atom of the group of formula (II) is selected from the group consisting of amide, urea, thiourea and alkylamine; and the type of covalent linkage between the Linker and the Acceptor is selected from the group comprising amide, alkylamine, urea, ether, thioether, thiourea and carbamate;

or a pharmacologically acceptable salt, solvate or hydrate thereof.

5. A neurotensin receptor 1 binding compound of formula (I):



(I)

for use in a method for the stratification of a group of subjects into subjects which are likely to respond to a treatment of a disease, and into subjects which are not likely to respond to a treatment of a disease, wherein the method for the stratification of a group of subjects comprises carrying out a method of diagnosis using the compound, wherein

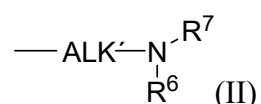
R^1 is selected from the group consisting of hydrogen, methyl and cyclopropylmethyl;

AA-COOH is an amino acid selected from the group consisting of 2-amino-2-adamantane carboxylic acid, cyclohexylglycine and 9-amino-bicyclo[3.3.1]nonane-9-carboxylic acid;

R^2 is selected from the group consisting of (C₁-C₆)alkyl, (C₃-C₈)cycloalkyl, (C₃-C₈)cycloalkylmethyl, halogen, nitro and trifluoromethyl;

ALK is (C₂-C₅)alkylidene;

R^3 , R^4 and R^5 are each and independently selected from the group consisting of hydrogen and (C₁-C₄)alkyl under the proviso that one of R^3 , R^4 and R^5 is of the following formula (II)



wherein

ALK' is (C₂-C₅)alkylidene;

R^6 is selected from the group consisting of hydrogen and (C₁-C₄)alkyl; and

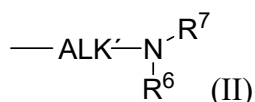
R^7 is an Effector moiety selected from the group consisting of Acceptor, -[Acceptor-Effector], -[Linker-Acceptor], and -[Linker-Acceptor-Effector], wherein

- [Acceptor-Effector] is a moiety where the Effector is complexed or covalently bound to the Acceptor,

- [Linker-Acceptor] is a moiety where the Linker is conjugated to the Acceptor, and

- [Linker-Acceptor-Effector] is a moiety where the Linker is conjugated to the Acceptor, whereby the Effector is complexed or covalently bound to the Acceptor, wherein Effector is selected from the group consisting of a diagnostically active nuclide, a therapeutically active nuclide and a combination thereof, wherein Acceptor is a chelator or an aromate, and wherein Linker is a moiety which links the Acceptor to the N atom of formula (II) with the Acceptor, wherein the type of covalent linkage between the Linker and the N atom of the group of formula (II) is selected from the group consisting of amide, urea, thiourea and alkylamine; and the type of covalent linkage between the Linker and the Acceptor is selected from the group comprising amide, alkylamine, urea, ether, thioether, thiourea and carbamate; or a pharmacologically acceptable salt, solvate or hydrate thereof.

6. The compound of claim 1 and the compound for use of any one of claims 2 to 5, wherein R¹ is methyl.
7. The compound of claims 1 and 6 and the compound for use any one of claims 2 to 6, wherein AA-COOH is an amino acid selected from the group consisting of 2-amino-2-adamantane carboxylic acid and cyclohexylglycine.
8. The compound of any one of claims 1, 6 and 7 and the compound for use of any one of claims 2 to 7, wherein R² is isopropyl.
9. The compound of any one of claims 1, 6, 7 and 8 and the compound for use of any one of claims 2 to 8, wherein R³, R⁴ and R⁵ are each and independently selected from the group consisting of hydrogen and methyl under the proviso that one of R³, R⁴ and R⁵ is of the following formula (II)



wherein

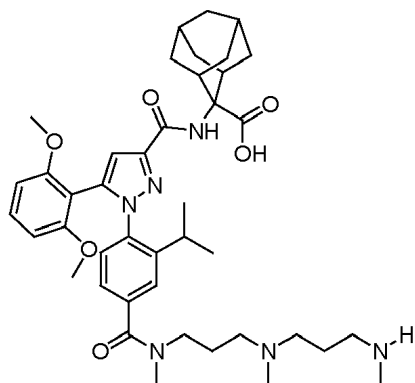
ALK' is (C₂-C₅)alkylidene;

R⁶ is selected from the group consisting of hydrogen and (C₁-C₄)alkyl;

preferably R⁶ is selected from the group consisting of hydrogen and methyl.

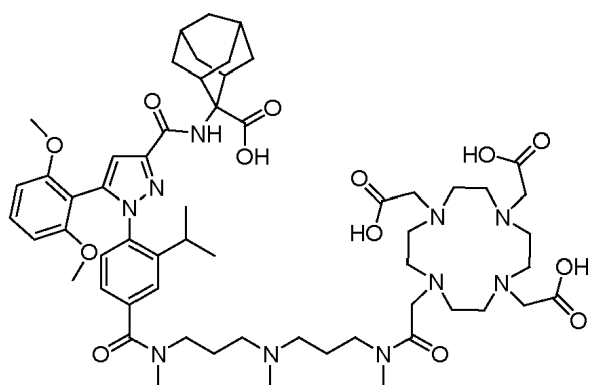
10. The compound of any one of claims 1, 6, 7, 8 and 9, wherein R⁷ is H.
11. The compound of any one of claims 1, 6, 7, 8 and 9, wherein Effector is a diagnostically active radionuclide, or a therapeutically active radionuclide.
12. The compound for use of any one of claims 2 to 9, wherein Effector is a diagnostically active nuclide, preferably a diagnostically active radionuclide, or a therapeutically active nuclide, preferably a therapeutically active radionuclide.
13. The compound of claim 11 and the compound for use of claim 12, wherein the radionuclide is selected from the group consisting of ^{113m}In, ^{99m}Tc, ⁶⁷Ga, ⁵²Fe, ⁶⁸Ga, ⁷²As, ¹¹¹In, ⁹⁷Ru, ²⁰³Pb, ⁶²Cu, ⁶⁴Cu, ⁵¹Cr, ^{52m}Mn, ¹⁵⁷Gd, ⁸⁹Zr, ¹⁷⁷Lu, ⁴⁷Sc, ⁶⁷Cu, ²¹²Pb, ²²⁵Ac, ²¹³Bi, ⁹⁰Y, ¹⁸F, ¹²⁰I, ¹²³I, ¹²⁴I, ¹²⁵I, ¹²⁹I, ¹³¹I, ⁷⁵Br, ⁷⁶Br, ⁷⁷Br, ⁸²Br, and ²¹¹At, ¹⁸⁶Re, ⁶⁹Er, ¹²¹Sn, ¹²⁷Te, ¹⁴²Pr, ¹⁴³Pr, ¹⁹⁸Au, ¹⁹⁹Au, ¹⁶¹Tb, ¹⁰⁹Pd, ¹⁸⁸Rd, ¹⁸⁸Re, ⁷⁷As, ¹⁶⁶Dy, ¹⁶⁶Ho, ¹⁴⁹Pm, ¹⁵¹Pm, ¹⁵³Sm, ¹⁵⁹Gd, ¹⁷²Tm, ¹⁶⁹Yb, ¹⁷⁵Yb, ¹⁰⁵Rh, ¹¹¹Ag, ^{177m}Sn, ²²Th, ¹¹⁰In, ^{113m}In, ^{114m}In, ⁵⁹Fe, ⁵¹Mn, ⁵⁷Co, ⁵⁸Co, ⁷⁵Se, ^{82m}Rb, ⁸³Sr, ⁸⁶Y, ^{94m}Tc, ¹⁹⁷Hg, ²⁰¹Tl, ³²P, ³³P, ⁴⁷Sc, ⁷⁷As, ^{80m}Br, ⁸⁹Sr, ⁹⁹Mo, ^{103m}Rh, ¹⁰⁹Pd, ¹⁰⁹Pt, ¹¹⁹Sb, ¹⁵²Dy, ¹⁵³Sm, ¹⁶¹Ho, ¹⁶⁹Er, ¹⁶⁹Yb, ¹⁷²Tm, ¹⁸⁹Re, ^{189m}Os, ¹⁹²Ir, ¹⁹⁴Ir, ²¹¹At, ²¹¹Pb, ²¹²Pb, ²¹¹Bi, ²¹²Bi, ²¹⁵Po, ²¹⁷At, ²¹⁹Rn, ²²¹Fr, ²²³Ra and ²⁵⁵Fm.
14. The compound of claim 13 and the compound for use of claim 13, wherein the radionuclide is selected from the group consisting of ¹¹¹In, ¹⁷⁷Lu and ^{99m}Tc.
15. The compound of claim 13 and the compound for use of claim 13, wherein the radionuclide is ¹¹¹In.
16. The compound of claim 13 and the compound for use of claim 13, wherein the radionuclide is ¹⁷⁷Lu.

17. The compound of claim 13 and the compound for use of claim 13, wherein the radionuclide is ^{99m}Tc .
18. The compound of any one of claims 1, 6 to 11 and 13 to 17 and the compound for use of any one of claims 2 to 9 and 12 to 17, wherein the chelator is selected from the group consisting of DOTA, NOTA, DTPA, TETA, EDTA, NODAGA, NODASA, TRITA, CDTA, BAT, DFO and HYNIC.
19. The compound of any one of claims 1 and 6 to 11 and 17, and the compound for use of any one of claims 2 to 9 and 12 to 17, wherein the aromate is an electron rich aromate.
20. The compound of claim 19 and the compound for use of claim 19, wherein the electron rich aromate is selected from the group consisting of indole and benzene, wherein benzene is substituted with at least one heteroatom, wherein the heteroatom is selected from the group comprising O, N and S.
21. The compound of any one of claims 1 and 6 to 11 and 18, wherein the compound is selected from the group consisting of a compound of formula (III), a compound of formula (IIIa), a compound of formula (IIIb), a compound of formula (IIIc), a compound of formula (IIId), a compound of formula (IIIe), a compound of formula (IIIf), a compound of formula (IIIg), a compound of formula (IV), a compound of formula (IVa), a compound of formula (IVb), a compound of formula (V), a compound of formula (Va) and a compound of formula (Vb), wherein the compound of formula (III) is



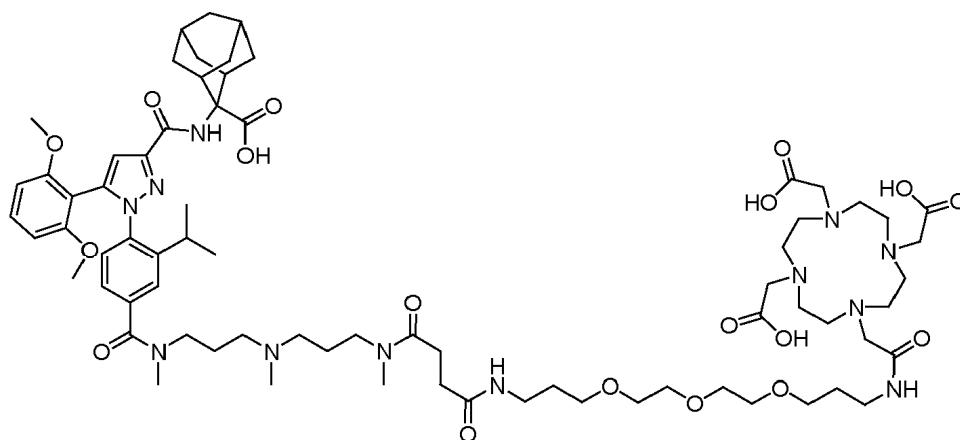
(III);

the compound of formula (IIIa) is



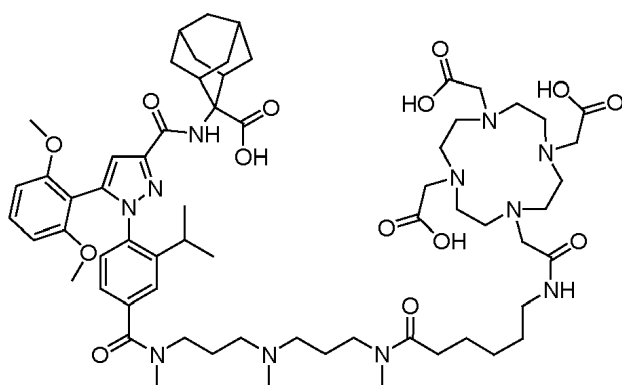
(IIIa);

the compound of formula (IIIb) is



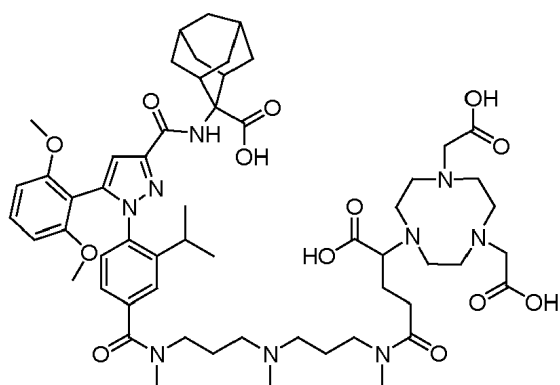
(IIIb);

the compound of formula (IIIc) is



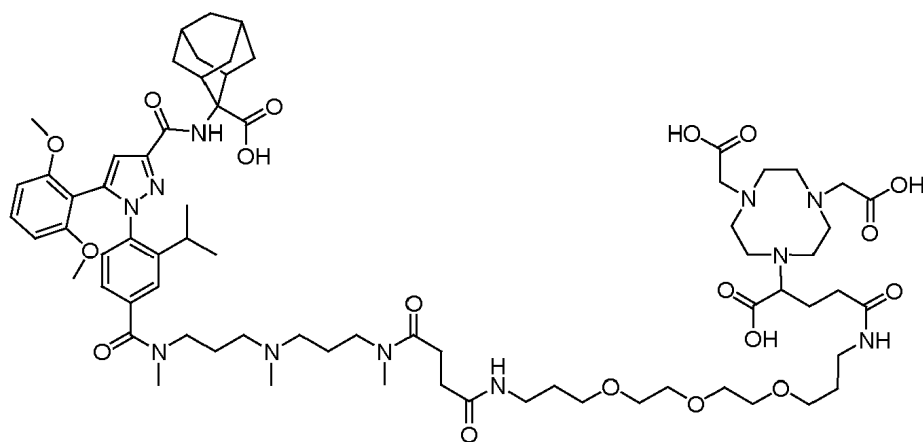
(IIIc);

the compound of formula (IIId) is



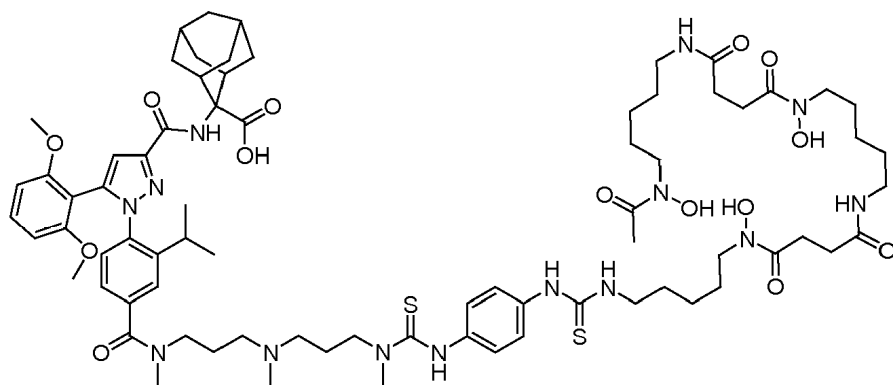
(IIIId);

the compound of formula (IIIe) is



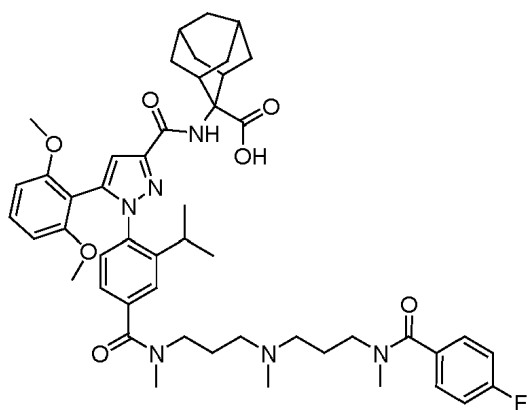
(IIIe);

the compound of formula (IIIf) is



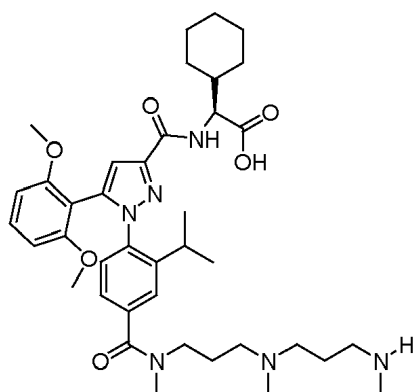
(IIIf);

the compound of formula (IIIg) is



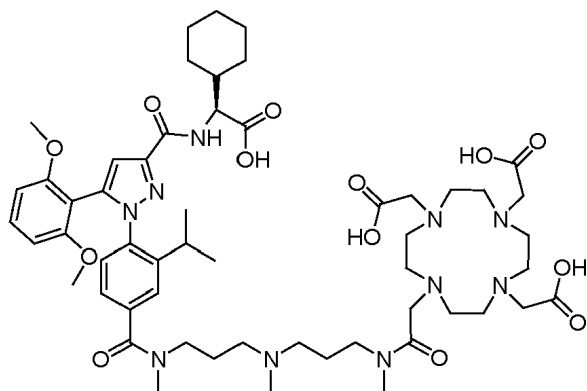
(IIIg);

the compound of formula (IV) is



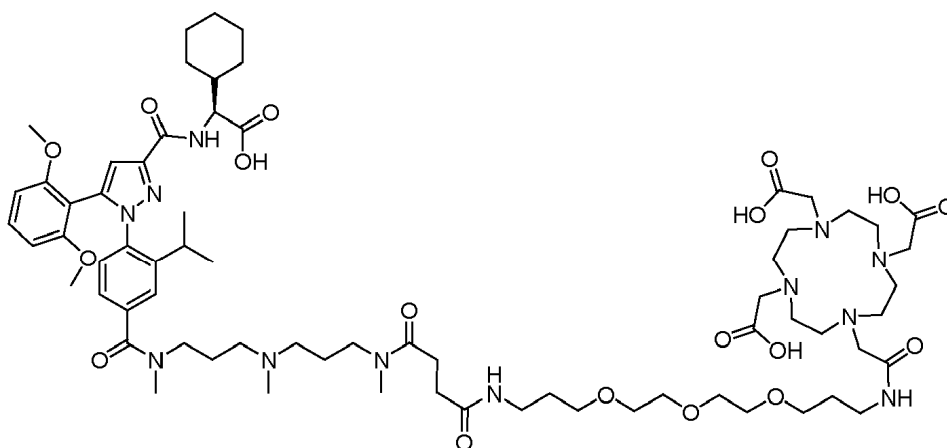
(IV);

the compound of formula (IVa) is



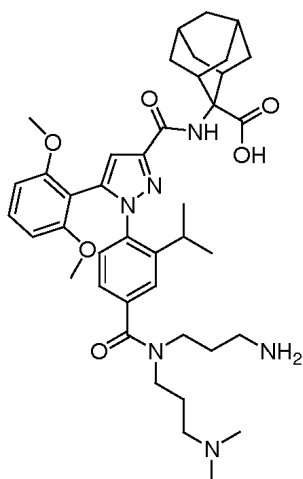
(IVa);

the compound of formula (IVb) is



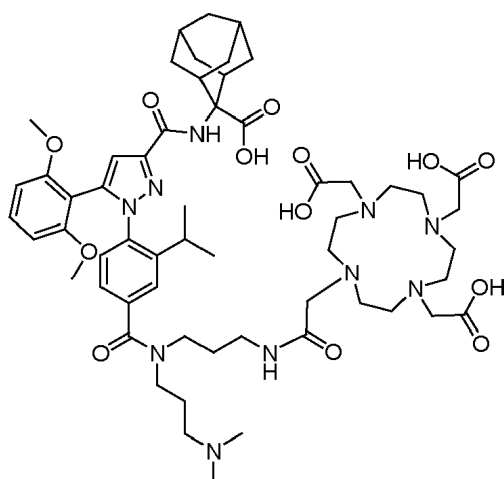
(IVb);

the compound of formula (V) is



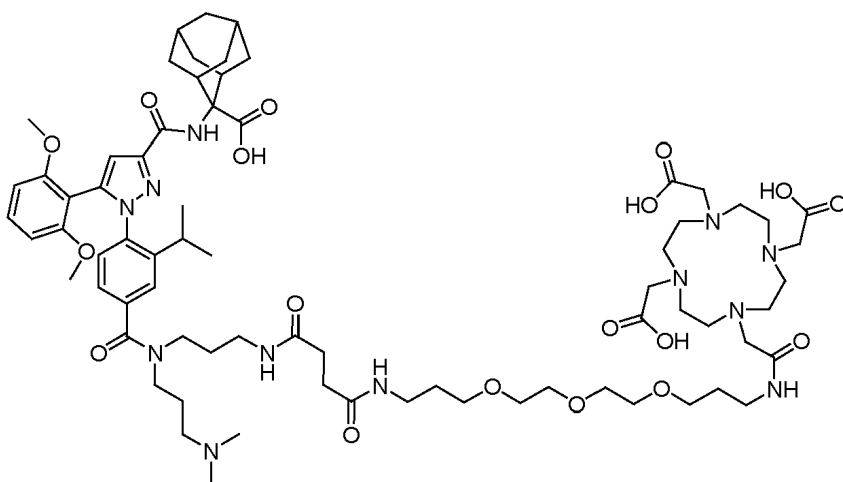
(V);

the compound of formula (Va) is



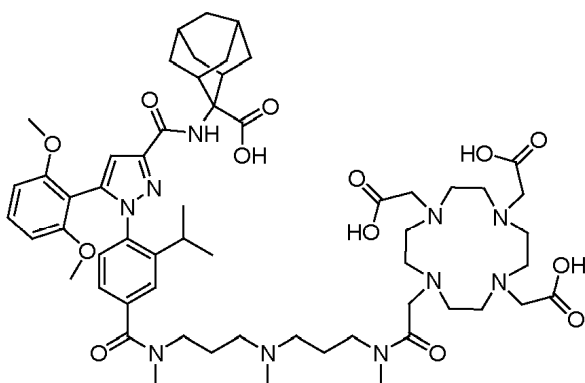
(Va);

and the compound of formula (Vb) is



(Vb).

22. The compound of claim 21, wherein the compound is the compound of formula (IIIa):



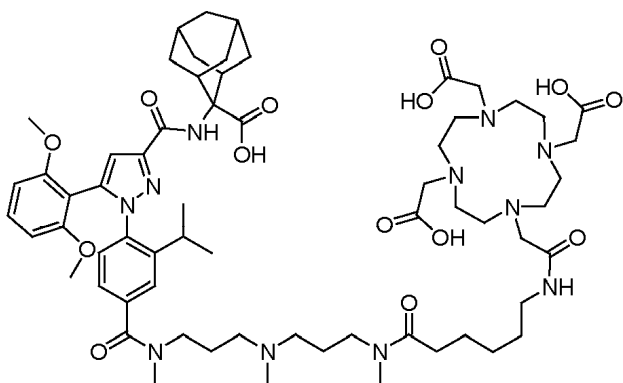
(IIIa)

or a pharmaceutically acceptable salt thereof.

23. The compound of claim 21, wherein the compound is a ¹¹¹In complex of a compound of formula (IIIa).

24. The compound of claim 21, wherein the compound is ¹⁷⁷Lu complex of a compound of formula (IIIa).

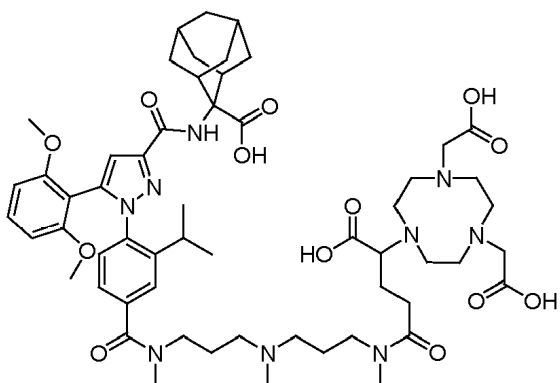
25. The compound of claim 21, wherein the compound is the compound of formula (IIIc):



(IIIc)

or a pharmaceutically acceptable salt thereof.

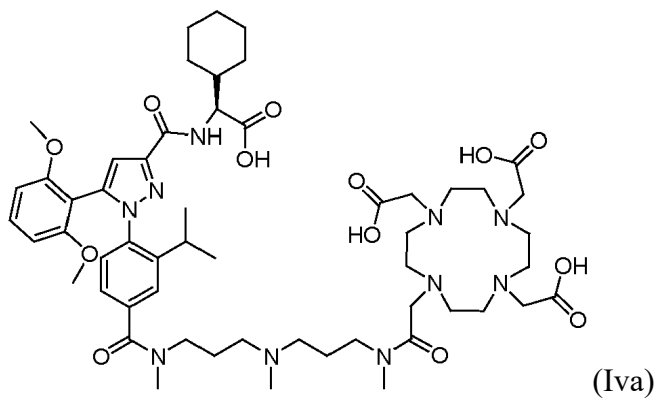
26. The compound of claim 21, wherein the compound is the compound of formula (IIIId):



(IIIId)

or a pharmaceutically acceptable salt thereof.

27. The compound of claim 21, wherein the compound is the compound of formula (Iva):

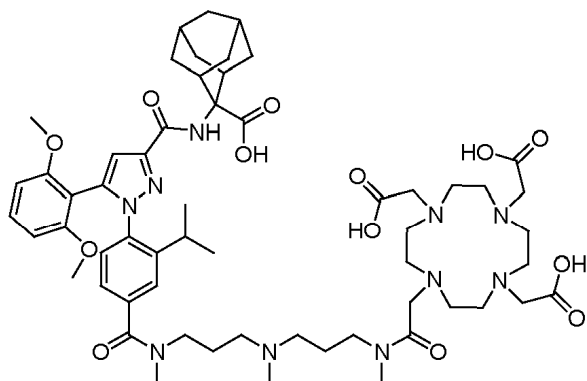


(Iva)

or a pharmaceutically acceptable salt thereof.

28. The compound of any one of claims 1, 6 to 9, 11 and 13 to 18 and the compound for use of any one of claims 2 to 9 and 12 to 18, wherein

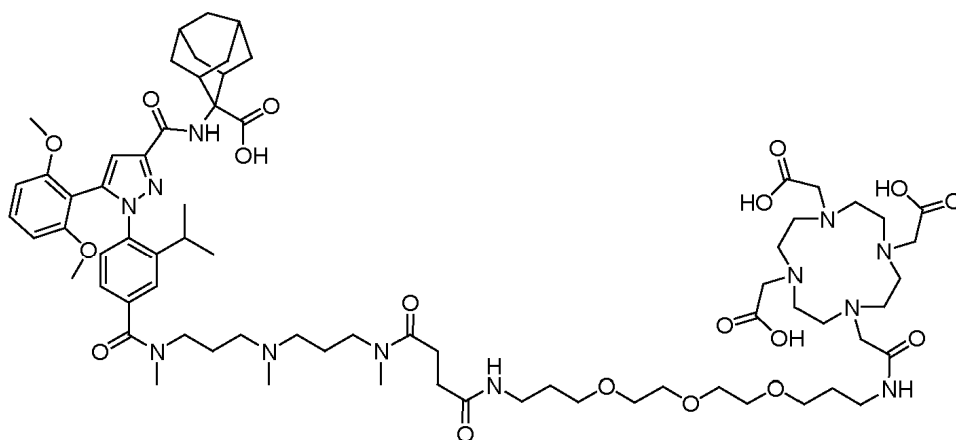
a) the compound is a compound of formula (IIIa)



(IIIa)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (IIIa); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

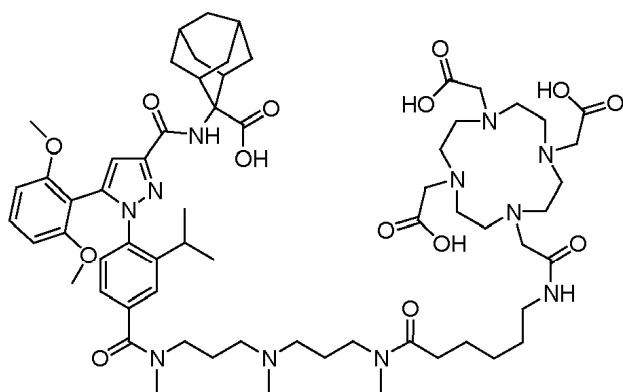
b) the compound is a compound of formula (Iib)



(IIIb)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (IIIb); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

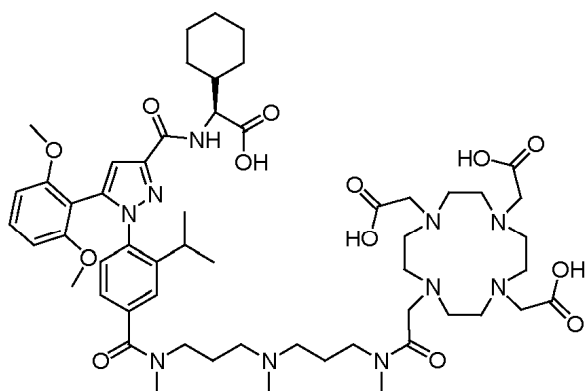
c) the compound is a compound of formula (IIIc)



(IIIc)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (IIIb); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

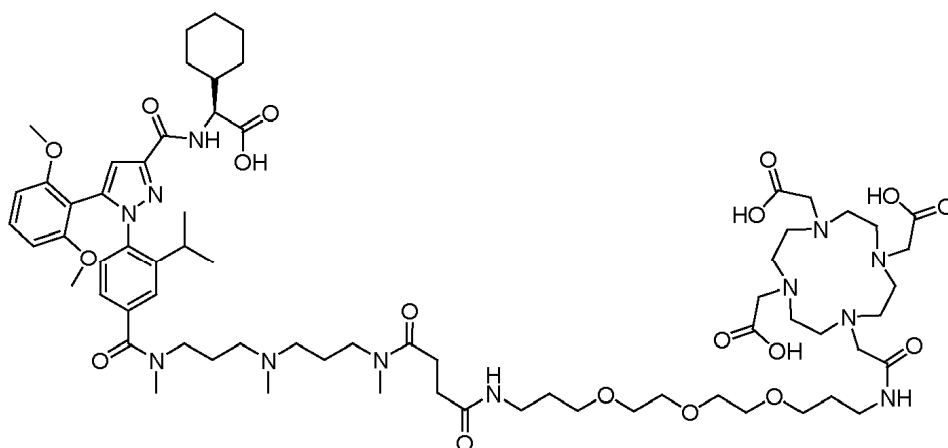
d) the compound is a compound of formula (Iva)



(IVa)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (Iva); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

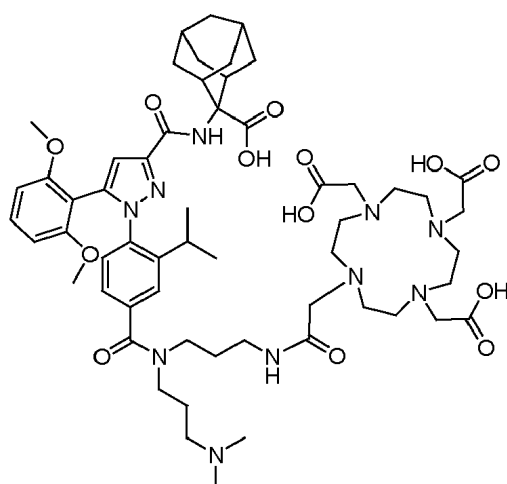
e) the compound is a compound of formula (Ivb)



(IVb)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (Ivb); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y :

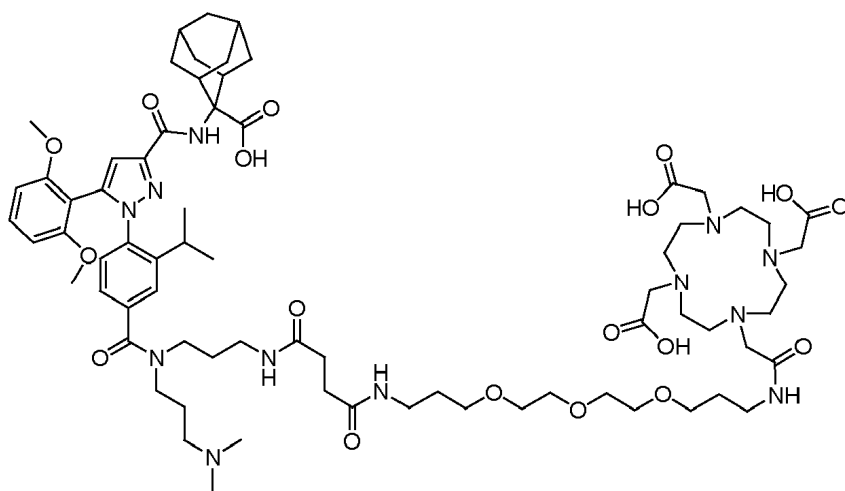
f) the compound is a compound of formula (Va)



(Va)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (Va); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

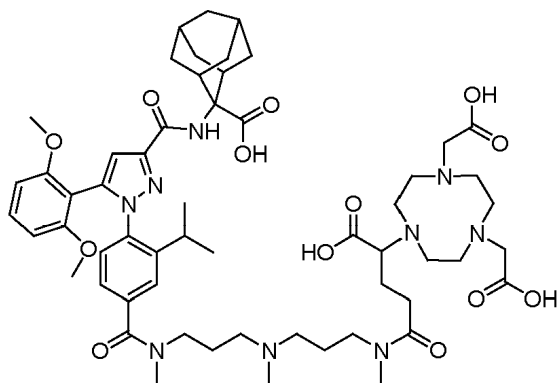
g) the compound is a compound of formula (Vb)



(Vb)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (Vb); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{225}Ac , ^{111}In , ^{177}Lu , ^{67}Ga , ^{68}Ga , ^{64}Cu and ^{90}Y ;

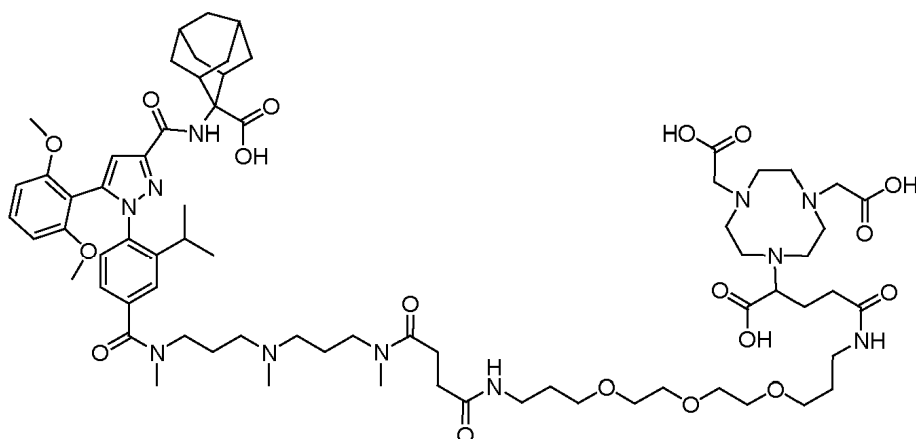
h) the compound is a compound of formula (IIIId)



(IIIId)

and the diagnostically active radionuclide and the therapeutically active radionuclide is chelated by the chelator of formula (IIIId); preferably the diagnostically active radionuclide and the therapeutically active radionuclide is selected from the group comprising ^{67}Ga and ^{68}Ga ;

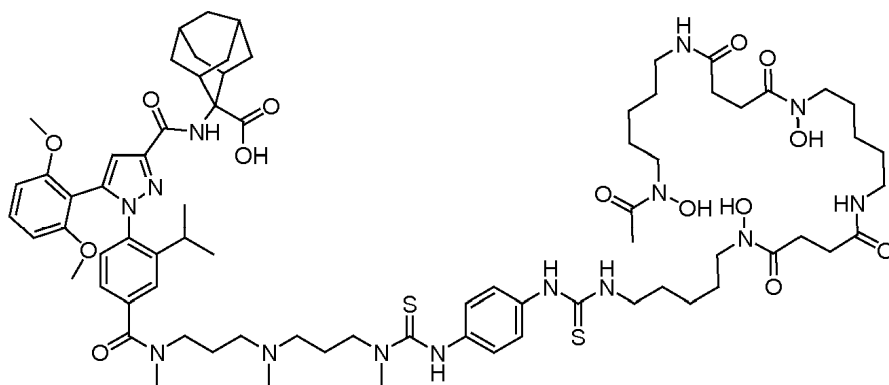
i) the compound is a compound of formula (IIIe)



(IIIe)

and the diagnostically active radionuclide is chelated by the chelator of formula (IIIe);
preferably the diagnostically active radionuclide is selected from the group
comprising ^{67}Ga and ^{68}Ga ;

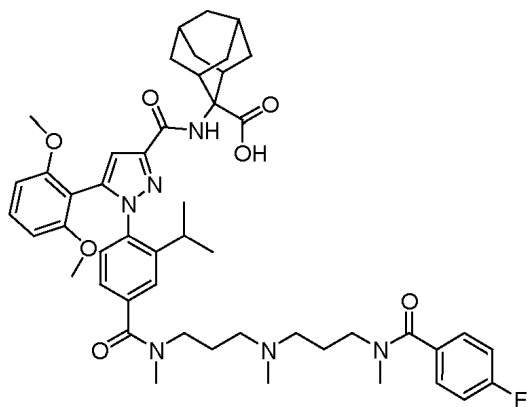
j) the compound is a compound of formula (IIIf)



(IIIf)

and the diagnostically active radionuclide is chelated by the chelator of formula (IIIf);
preferably the diagnostically active radionuclide radionuclide is ^{89}Zr ;

k) the compound is a compound of formula (IIIg)



(IIIg)

and the diagnostically active radionuclide is ^{18}F , wherein said ^{18}F is replacing the F atom at the fluorobenzoic acid moiety of the compound of formula (IIIg).

29. The compound for use of any one of claims 2 to 9 and 12 to 20 and 28, wherein the disease is a disease involving neurotensin receptor, preferably the disease is a disease involving neurotensin receptor 1, and more preferably the disease is selected from the group comprising tumors and hematological malignancies.
30. A composition, preferably a pharmaceutical composition, wherein the composition comprises a compound according to any one of claims 1 and 6 to 11 and 13 to 28 and a pharmaceutically acceptable excipient.
31. A kit comprising a compound according to any one of claims 1 and 6 to 11 and 13 to 28, one or more optional excipient(s) and optionally one or more device(s), whereby the device(s) is/are selected from the group comprising a labeling device, a purification device, a handling device, a radioprotection device, an analytical device or an administration device.
32. The compound of claim 21, wherein the compound is an ^{225}Ac complex of a compound of formula (IIIa).