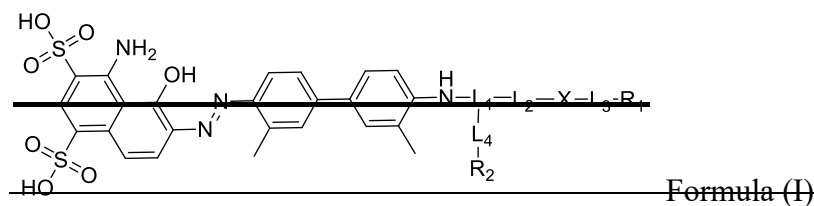


CLAIMS

1. A truncated Evans Blue modified fibroblast activation protein inhibitor compound or a pharmaceutically available salt thereof, wherein the molecular structure of the compound is formed by connecting truncated Evans Blue, a fibroblast activation protein inhibitor and a nuclide chelating group by means of linker groups L₁, L₂, L₃, L₄ and X, and the compound has the following structure shown in Formula (I):



wherein

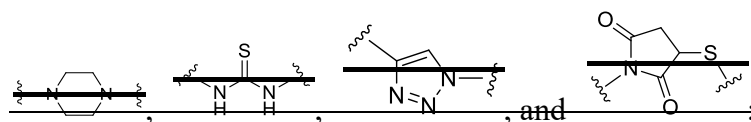
L₁ is lysine, glutamic acid, or a derivative compound containing a lysine or glutamic acid structure;

L₂ is $(\text{CH}_2)_n$, wherein n is an integer from 0 to 30, wherein each CH_2 may be individually substituted or unsubstituted with O, NH, (CO), NH(CO), or (CO)NH, provided that no two adjacent CH_2 groups are substituted;

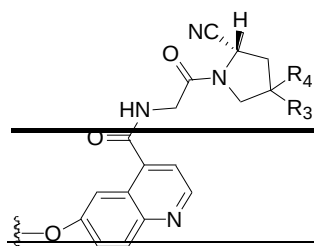
L₃ is $(\text{CH}_2)_m$, wherein m is an integer from 0 to 30, wherein each CH_2 may be individually substituted or unsubstituted with O or (CO), provided that no two adjacent CH_2 groups are substituted;

L₄ is $(\text{CH}_2)_p$, wherein p is an integer from 0 to 30, wherein each CH_2 may be individually substituted or unsubstituted with O, NH, (CO), NH(CO), or (CO)NH, provided that no two adjacent CH_2 groups are substituted;

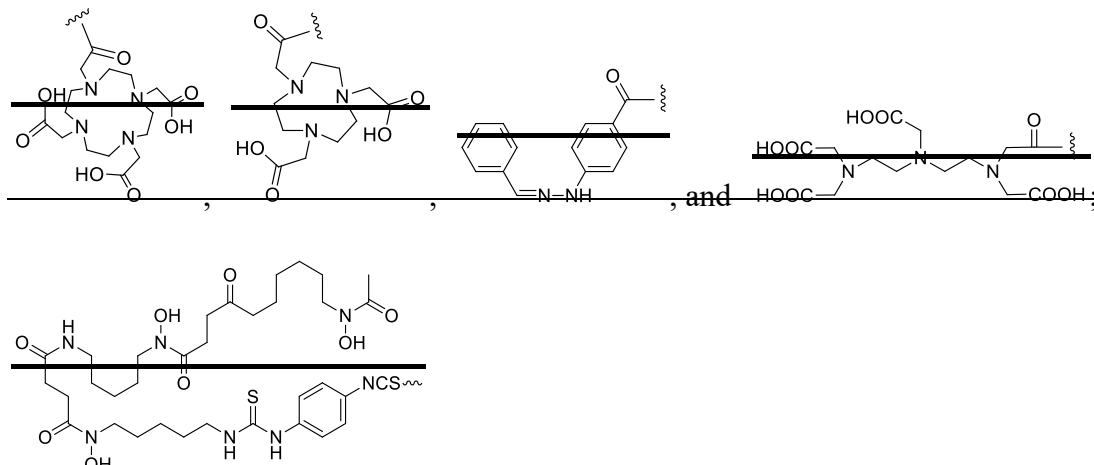
X is selected from N, C, O, S, or any one of the following structures:



R₁ is the following structure of a fibroblast activation protein inhibitor:



R_2 is a nucleide chelating group, and is selected from any one of the following structures:

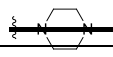


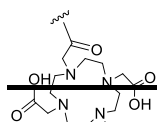
5 and R_3 , R_4 are the same or different, and are independently selected from H or F.

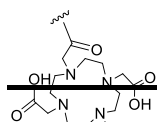
2. The compound according to claim 1, wherein the L_2 in Formula (I) is $-(CH_2)_n$; n is an integer from 0 to 16, is more preferably an integer from 0 to 12, and is further preferably 0, 3, or 10; wherein each $-CH_2-$ may be individually substituted or unsubstituted with $-O-$, $-NH-$, or $-(CO)-$, provided that no two adjacent $-CH_2-$ groups are substituted.

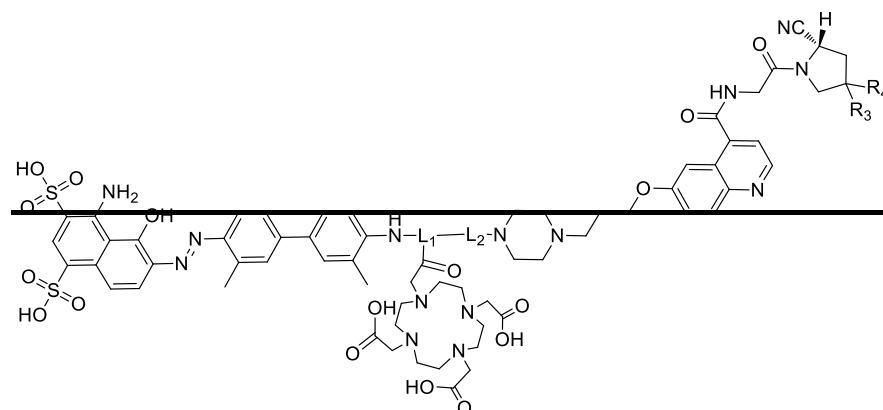
10 3. The compound according to claim 1, wherein the L_3 in Formula (I) is $-(CH_2)_m$; m is an integer from 0 to 20, is more preferably an integer from 1 to 6, and is further preferably 2 or 3; wherein each $-CH_2-$ may be individually substituted or unsubstituted with $-O-$, provided that no two adjacent $-CH_2-$ groups are substituted.

15 4. The compound according to claim 1, wherein the L_4 in Formula (I) is $-(CH_2)_p$; p is an integer from 0 to 20, is more preferably an integer from 0 to 12, is further preferably 3, 4, 9, or 12, and is most preferably 3; wherein each $-CH_2-$ may be individually substituted or unsubstituted with $-O-$, $-NH-$, $-(CO)-$, $-NH(CO)-$, or $-(CO)-NH-$, provided that no two adjacent $-CH_2-$ groups are substituted.

20 5. The compound according to claim 1, wherein the X in Formula (I) is , the L_3 is $-(CH_2)_3-$,

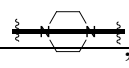


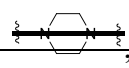
the L_4 is $(CH_2)_0$, and the R_2 is , namely the compound has the following structure shown in Formula (II):



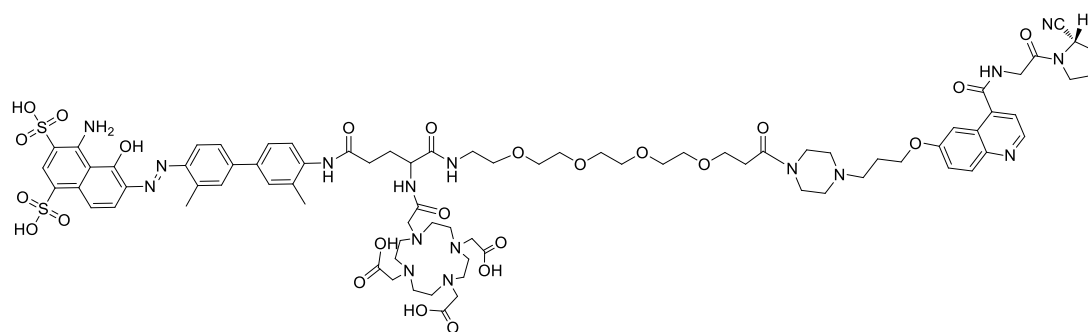
Formula (II)

wherein R_3 and R_4 are both H or both F, L_1 is a glutamic acid or lysine structure, and L_2 is $(CH_2)_0$, $NH-CH_2-(CO)$, $NH-CH_2-(CH_2OCH_2)_2-CH_2-(CO)$, $NH-CH_2-(CH_2OCH_2)_4-CH_2-(CO)$, $(CO)-CH_2-(CO)$, $(CO)-(CH_2)_2-(CO)$, $(CO)-CH_2-(CH_2OCH_2)_2-CH_2-(CO)$, or $(CO)-CH_2-(CH_2OCH_2)_4-CH_2-(CO)$.

6. The compound according to claim 1, wherein the X in Formula (I) is , the L_1 is a glutamic acid structure, the L_2 is $(CH_2)_0$, $NH-CH_2-(CO)$, $NH-CH_2-(CH_2OCH_2)_2-CH_2-(CO)$, or $NH-CH_2-(CH_2OCH_2)_4-CH_2-(CO)$, the L_3 is $(CH_2)_3$, the L_4 is $(CH_2)_0$, the R_2 is DOTA, and the R_3 and R_4 are both H or both F.

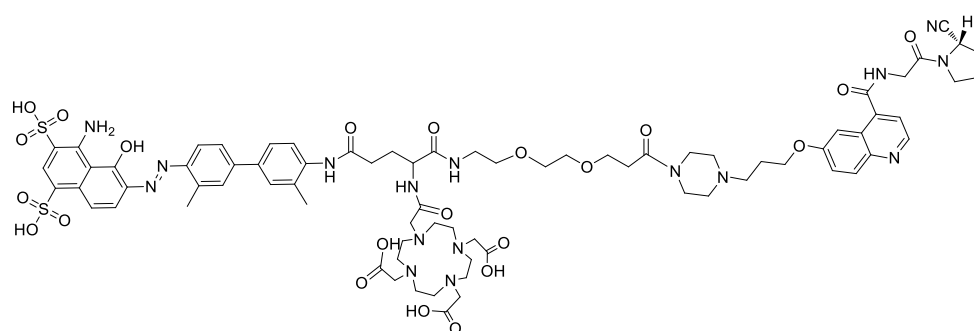
7. The compound according to claim 1, wherein the X in Formula (I) is , the L_1 is a lysine structure, the L_2 is $(CO)-CH_2$, (CO) , $(CO)-(CH_2)_2-(CO)$, $(CO)-CH_2-(CH_2OCH_2)_2-CH_2-(CO)$, or $(CO)-CH_2-(CH_2OCH_2)_4-CH_2-(CO)$, the L_3 is $(CH_2)_3$, the L_4 is $(CH_2)_0$, the R_2 is DOTA, and the R_3 and R_4 are both H or both F.

8. The compound according to claim 1, wherein the compound has any one of the following structures shown in Formula (II-1) to Formula (II-16):

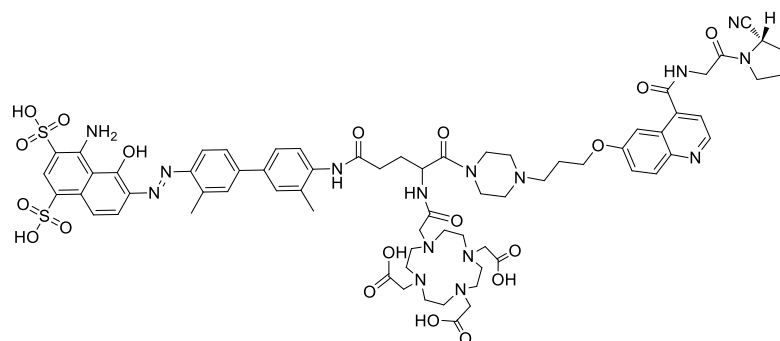


Formula (II-1)

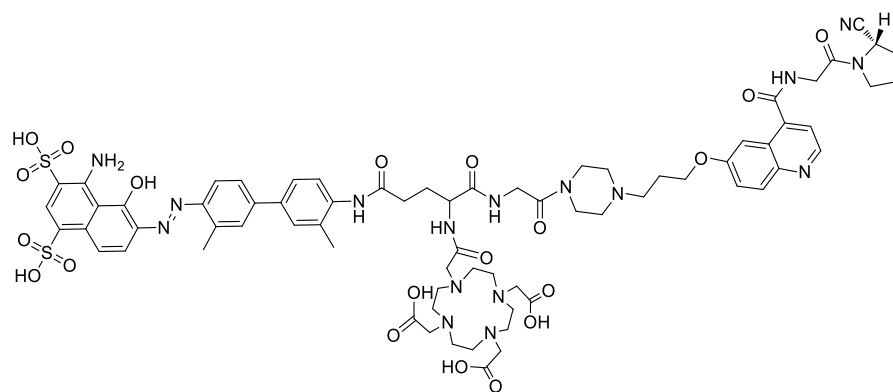
2. A truncated Evans Blue modified fibroblast activation protein inhibitor compound or a pharmaceutically available salt thereof, wherein the molecular structure of the compound has any one of the following structures shown in Formula (II-2) to Formula (II-468)



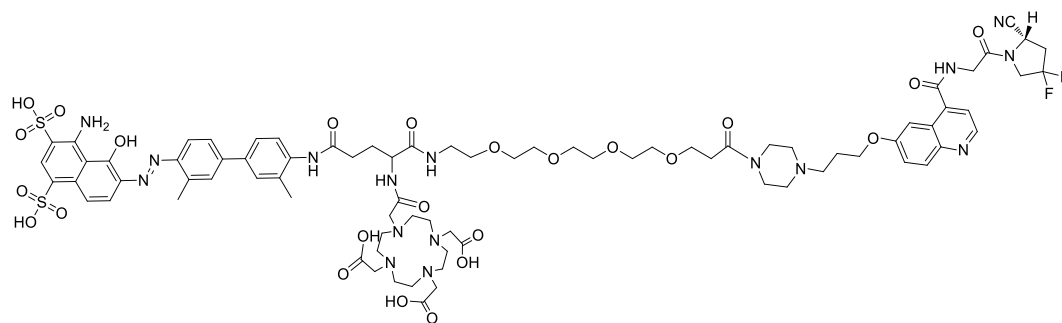
Formula (II-2),



Formula (II-3),

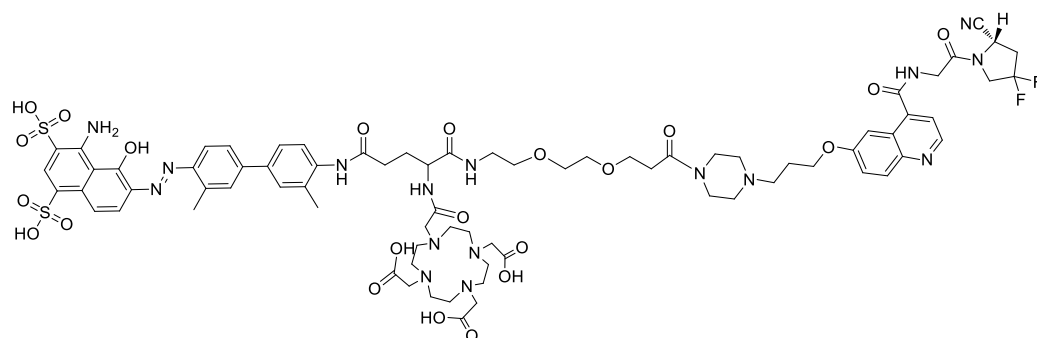


Formula (II-4),



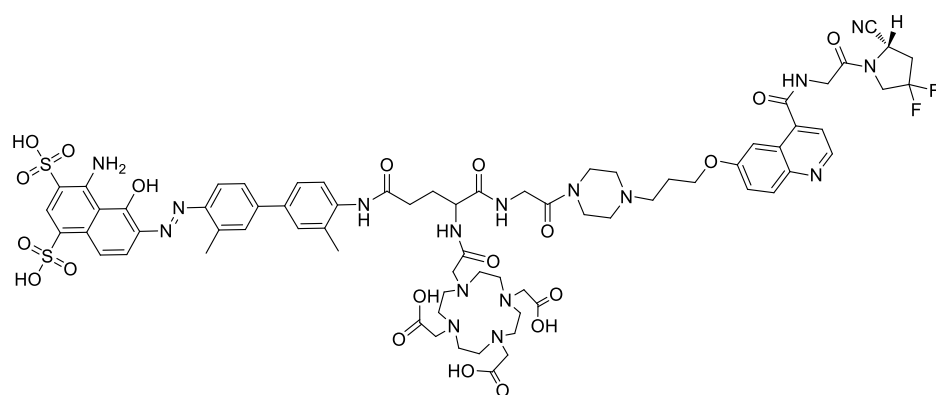
Formula

(II-5),



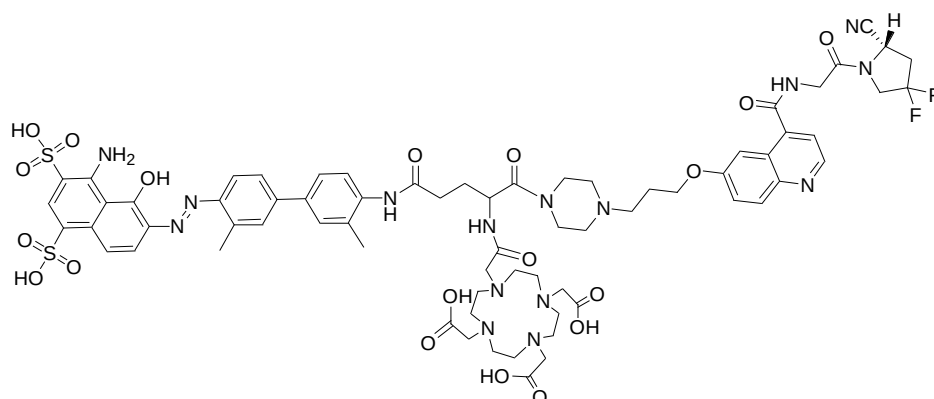
Formula (II-

5 6),



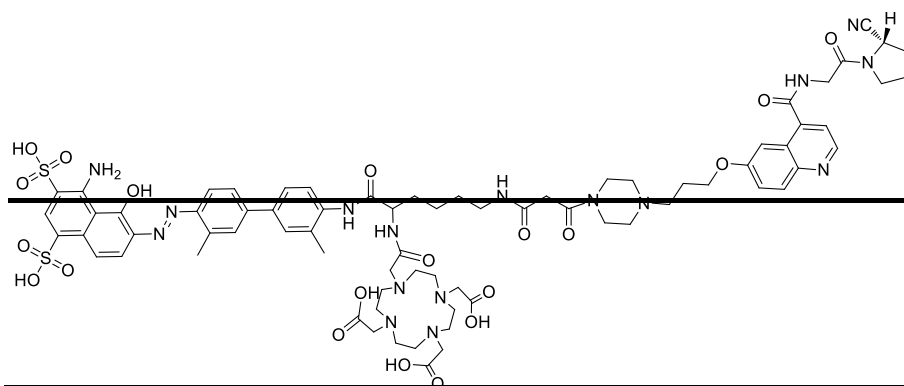
Formula (II-7), or

10

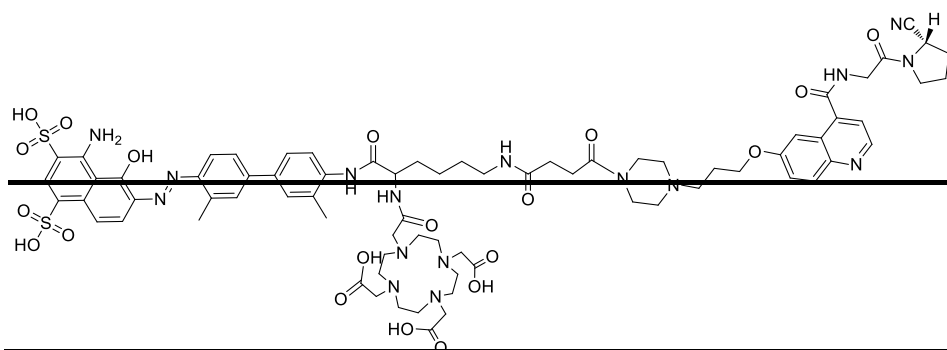


Formula (II-8);

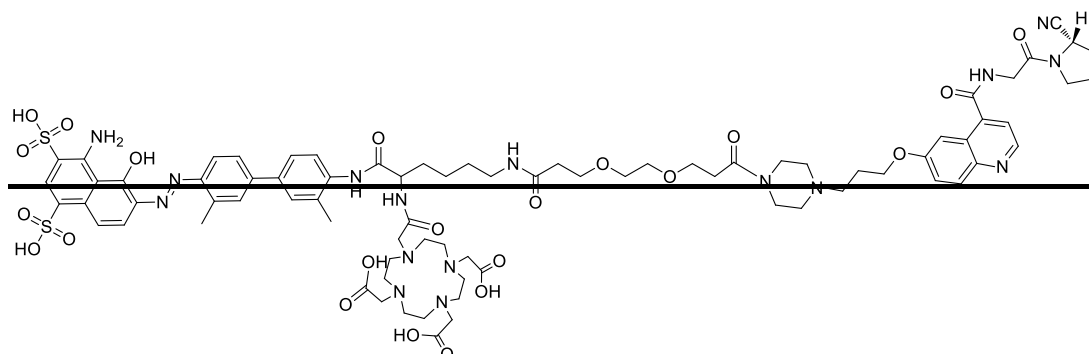
15



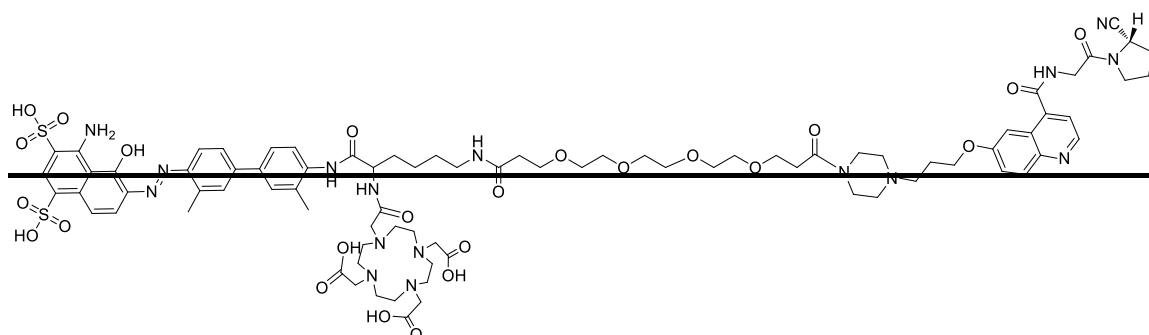
Formula (II-9),

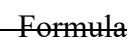
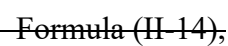
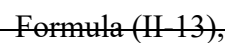


Formula (II-10),

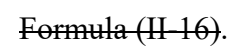
~~Formula (II-11),~~

5

~~Formula (II-12),~~



or

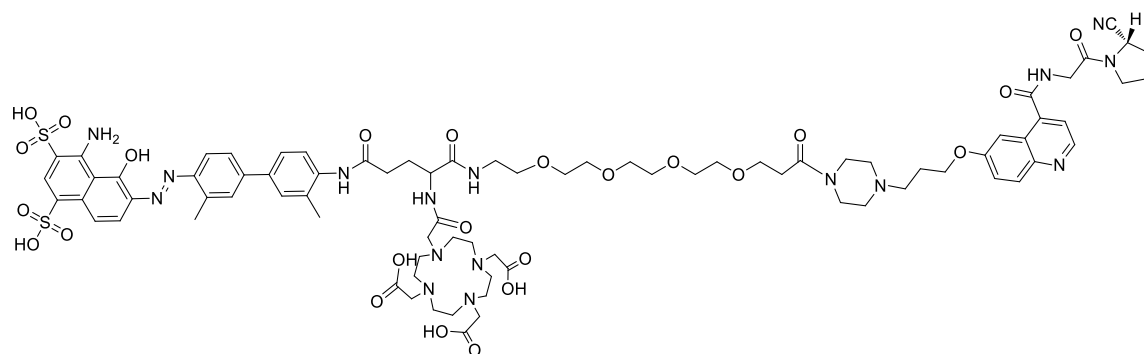


39. A method for preparing a truncated Evans Blue modified fibroblast activation protein inhibitor, comprising the following steps:

(1) reacting 6-hydroxy-4-quinolinecarboxylic acid with tert-butyl glycinate by amide condensation, followed by reactions with 1-bromo-3-chloropropane and tert-butyl 1-piperazinecarboxylate in sequence; then, removing Boc and tert-butyl protective groups under the action of TFA, and introducing a Boc protective group to amino, followed by an amide condensation reaction with (S)-pyrrolidine-2-carbonitrile hydrochloride; then, removing the Boc protective group using p-toluenesulfonic acid, followed by a condensation reaction with 5,8,11,14-tetraoxa-2-azaheptadecanedioic acid-1-tert-butyl ester; and removing the Boc protective group again under the action of p-toluenesulfonic acid to obtain an intermediate compound A;

(2) introducing a Boc protective group to one end of 4,4'-diamino-3,3'-dimethyl biphenyl, followed by a reaction with monosodium 1-amino-8-naphthol-2,4-disulfonate to prepare a truncated Evans Blue derivative; removing the Boc protective group, followed by an amide condensation reaction with N-tert-butyloxycarbonyl-L-glutamic acid-1-tert-butyl ester; then, removing Boc and tert-butyl protective groups under the action of TFA; and then carrying out a reaction with di-tert-butyl dicarbonate, and introducing a Boc protective group to amino to obtain an intermediate compound B; and

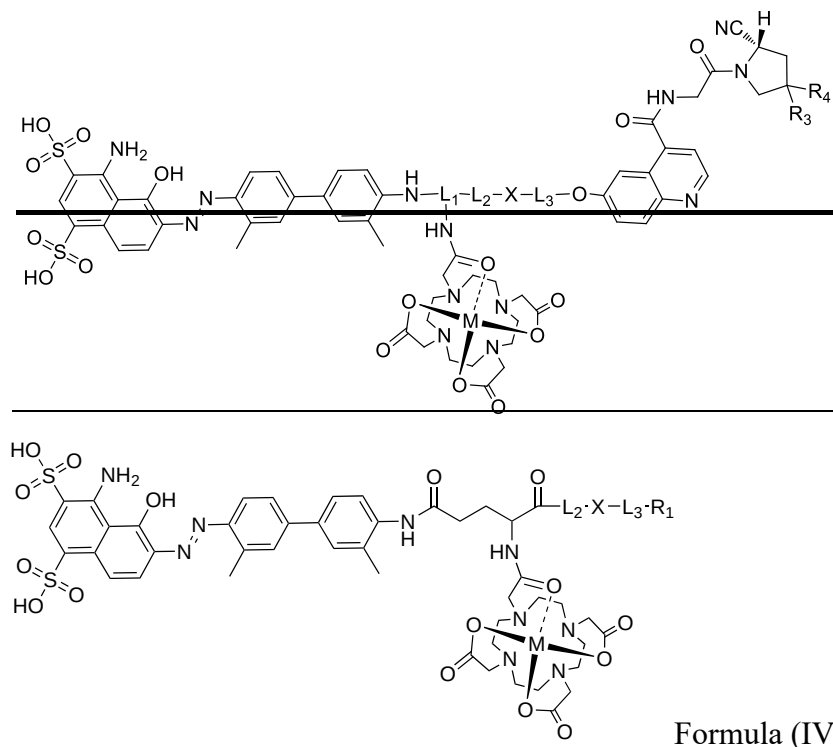
(3) reacting the intermediate compound A obtained in step (1) with the intermediate compound B obtained in step (2) by amide condensation; then removing the Boc protective group using p-toluenesulfonic acid; and finally, carrying out a reaction with DOTA-NHS to obtain a truncated Evans Blue modified fibroblast activation protein inhibitor compound having the following structure shown in Formula (II-1)



Formula (II-1).

~~10. A radiolabeled complex of truncated Evans Blue modified fibroblast activation protein inhibitor, wherein the complex is obtained by using the compound shown in Formula (I) according to claim 1 as a ligand and labeling the ligand with a radionuclide; the radionuclide is preferably any one of ^{177}Lu , ^{90}Y , ^{18}F , ^{64}Cu , ^{68}Ga , ^{62}Cu , ^{67}Cu , ^{86}Y , ^{89}Zr , $^{99\text{m}}\text{Tc}$, ^{89}Sr , ^{153}Sm , ^{149}Tb , ^{161}Tb , ^{186}Re , ^{188}Re , ^{212}Pb , ^{213}Bi , ^{223}Ra , ^{225}Ac , ^{226}Th , ^{227}Th , ^{131}I , ^{211}At , or ^{111}In ; and the radionuclide is further preferably ^{68}Ga , ^{177}Lu , or ^{90}Y .~~

444. A radiolabeled complex of truncated Evans Blue modified Fibroblast activation protein inhibitor, having the following structure shown in Formula (IV):



Formula (IV)

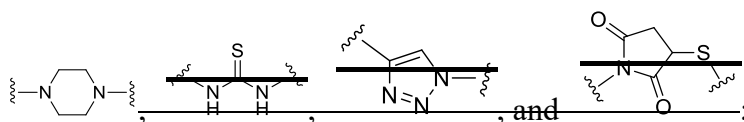
5 wherein

L_1 is a lysine or glutamic acid structure, or a derivative compound structure containing a lysine or glutamic acid structure;

L_2 is $-(CH_2)_0-$ 、 $-NH-CH_2-(CO)-$ 、 $-NH-CH_2-(OCH_2CH_2)-O-CH_2(CO)-$ 或 $NH-CH_2-(OCH_2CH_2)_3-O-CH_2(CO)-$ $(CH_2)_n$, wherein n is an integer from 0 to 30, and wherein each CH_2 may be individually substituted or unsubstituted with $-O$ 、 $-NH$ 、 (CO) 、 $NH(CO)$ 、or $(CO)-NH$, provided that no two adjacent CH_2 groups are substituted;

L_3 is $-(CH_2)_3-$ $(CH_2)_m$, wherein m is an integer from 0 to 30, and wherein each CH_2 may be individually substituted or unsubstituted with $-O$ or (CO) , provided that no two adjacent CH_2 groups are substituted;

15 X is selected from N 、 C 、 O 、 S , or the following structures:



R_3 and R_4 are the same or different, and are independently selected from both H or both F;

and M is a radionuclide selected from any one of ^{68}Ga 、 ^{177}Lu , or ^{90}Y .

20 12. The complex according to claim 11, wherein the L_2 in Formula (IV) is $-(CH_2)_n$; n is an integer from 0 to 16, is more preferably an integer from 0 to 12, and is further preferably 0, 3,

or 10; and wherein each CH_2 may be individually substituted or unsubstituted with O , NH , or (CO) , provided that no two adjacent CH_2 groups are substituted.

13. The complex according to claim 11, wherein the L_2 in Formula (IV) is $(\text{CH}_2)_0$, $\text{NH}-\text{CH}_2(\text{CO})$, $\text{NH}-\text{CH}_2(\text{CH}_2\text{OCH}_2)_2-\text{CH}_2(\text{CO})$, $\text{NH}-\text{CH}_2(\text{CH}_2\text{OCH}_2)_4-\text{CH}_2(\text{CO})$, $(\text{CO})-\text{CH}_2(\text{CO})$, $(\text{CO})-(\text{CH}_2)_2-(\text{CO})$, $(\text{CO})-\text{CH}_2(\text{CH}_2\text{OCH}_2)_2-\text{CH}_2(\text{CO})$, or $(\text{CO})-\text{CH}_2(\text{CH}_2\text{OCH}_2)_4-\text{CH}_2(\text{CO})$.

14. The complex according to claim 11, wherein the L_3 in Formula (IV) is $(\text{CH}_2)_m$; m is an integer from 0 to 20, is more preferably an integer from 1 to 6, and is further preferably 2 or 3; and wherein each CH_2 may be individually substituted or unsubstituted with O , provided that no two adjacent CH_2 groups are substituted.

15. The compound according to claim 11, wherein the L_3 in Formula (IV) is $(\text{CH}_2)_3$.

16. A method for preparing a radiolabeled complex of truncated Evans Blue modified Fibroblast activation protein inhibitor, comprising the following steps: dissolving the compound shown in Formula (II-1) according to claim 1 or the compound shown in Formula (II-2) ~ Formula (II-8) according to claim 2 in a buffer solution or deionized water; and adding a radionuclide solution to the obtained solution for a reaction under closed conditions for 5-40 min to produce a radionuclide labeled complex.

17. A method for preparing a radiolabeled complex of truncated Evans Blue modified Fibroblast activation protein inhibitor, comprising the following steps: dissolving the compound shown in Formula (II-1) according to claim 1 or the compound shown in Formula (II-2) ~ Formula (II-8) according to claim 2 in a buffer solution or deionized water; treating the obtained solution by aseptic filtration, followed by loading into a container, freeze-drying and sealing with a stopper to obtain a freeze-dried medicine box; and then adding an appropriate amount of an acetic acid solution or a buffer solution to the freeze-dried medicine box for dissolution, and adding a corresponding radionuclide solution for a reaction under closed conditions for 5-40 min to produce a radionuclide labeled complex.

18. Application of the compound according to any one of claims 1-28 or a pharmacologically acceptable salt thereof in preparation of medicines in nuclide therapy or imaging of tumors with high expression of FAP.

19. Application of the complex according to any one of claims 10-154 in nuclide therapy or imaging of tumors with high expression of FAP.

20. The application according to any one of claims 18-196-7, wherein the compound or the complex is formulated as an injection and then intravenously injected into patients with tumors with high expression of FAP; and the tumors with high expression of FAP comprise, but

are not limited to, breast cancer, ovarian cancer, lung cancer, colorectal cancer, gastric cancer or pancreatic cancer.