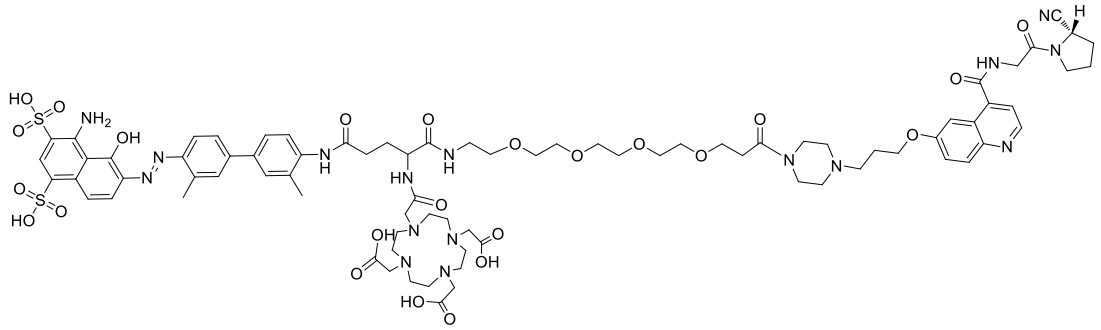
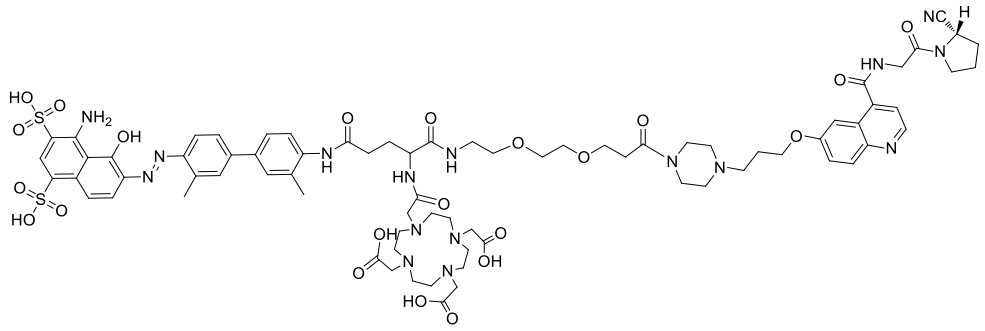
CLAIMS

1. A truncated Evans Blue modified fibroblast activation protein inhibitor compound or a pharmaceutically available salt thereof, wherein the molecular structure of the compound has the following structures shown in Formula (II-1):

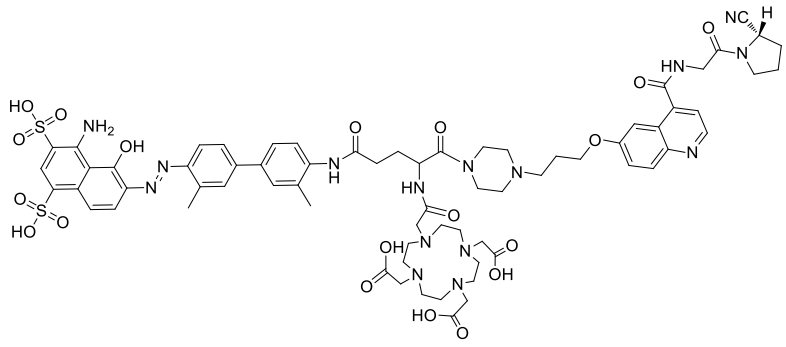


Formula (II-1).

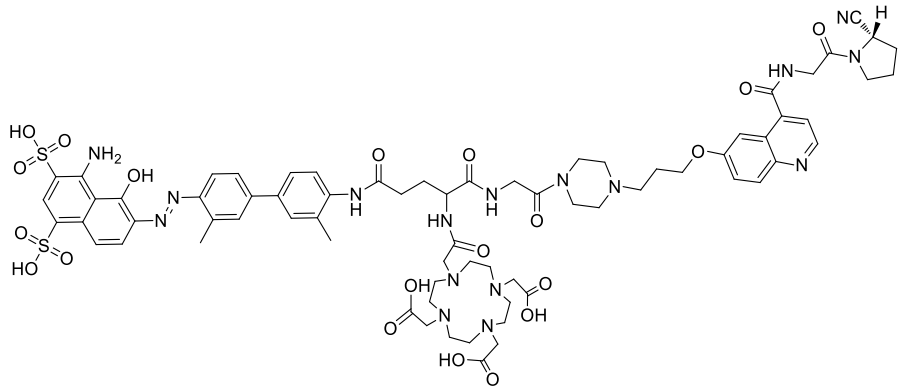
2. A truncated Evans Blue modified fibroblast activation protein inhibitor compound or a pharmaceutically available salt thereof, wherein the molecular structure of the compound has any one of the following structures shown in Formula (II-2) to Formula (II-8):



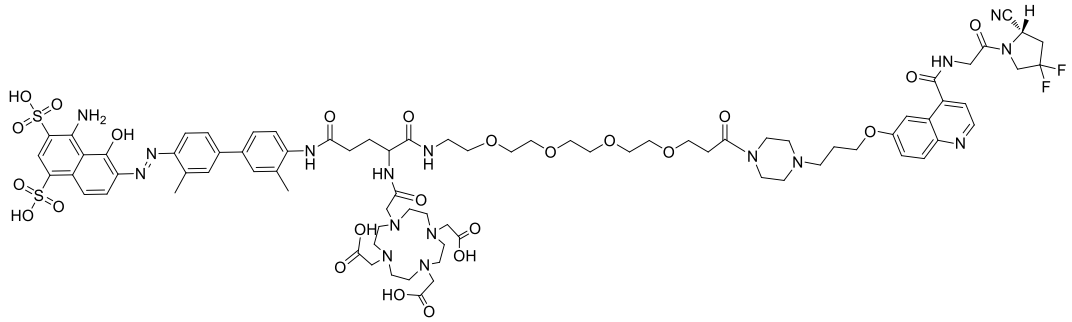
Formula (II-2),



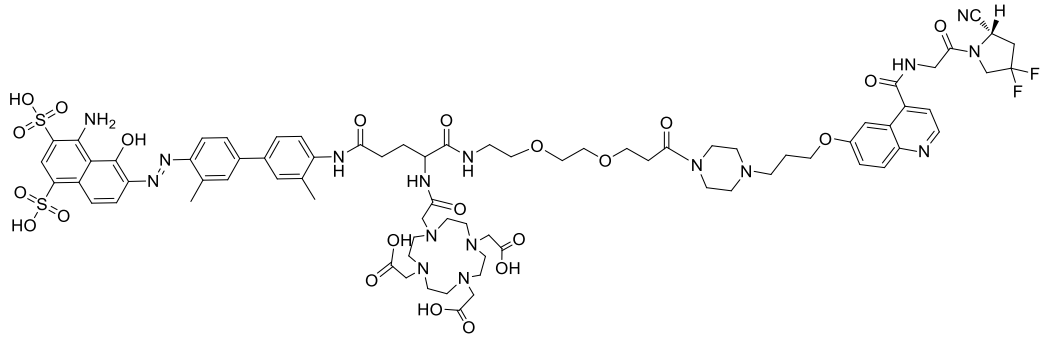
Formula (II-3),



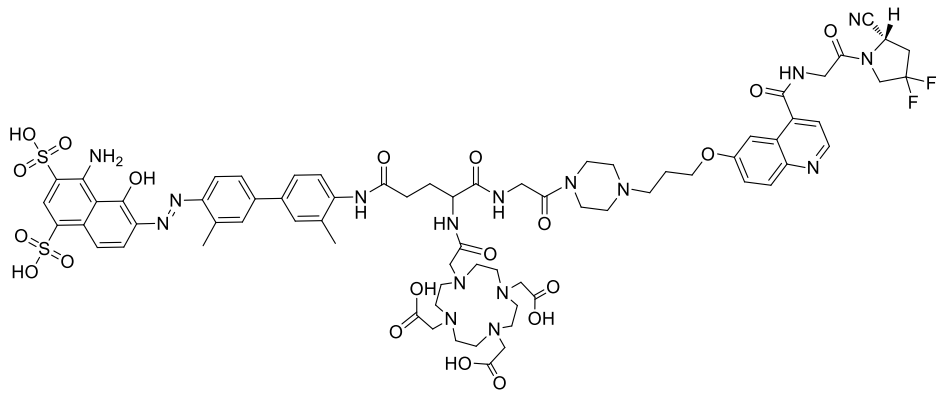
Formula (II-4),



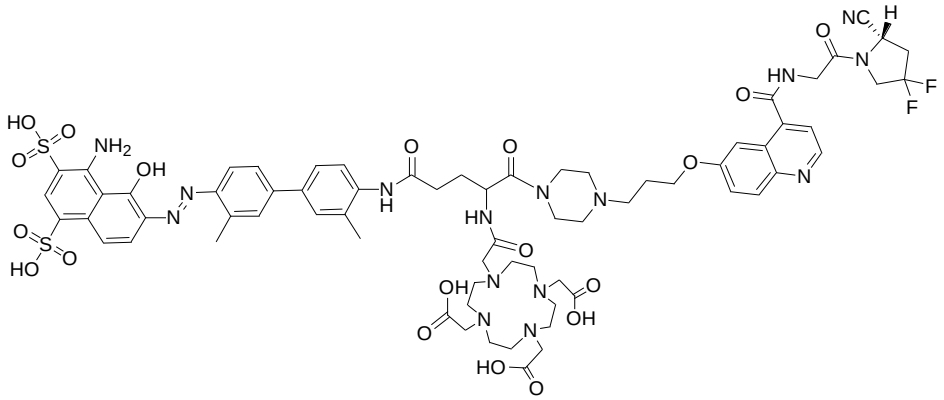
Formula (II-5),



Formula (II-6),



Formula (II-7), or



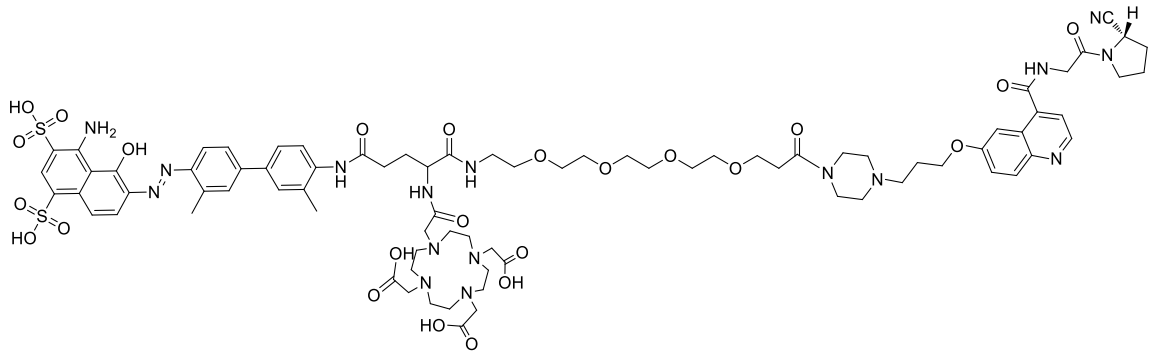
Formula (II-8).

3. 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)-pyrrolidene-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;

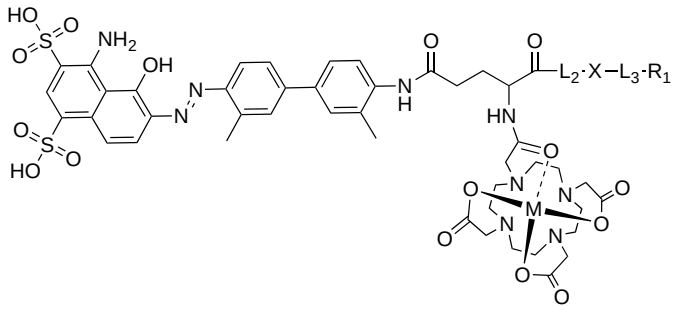
(2) introducing a Boc protective group to one end of 4,4'-diamino-3,3'-dimethyl biphenyl, followed by a reaction with monosodium 1-amino-8-naphthol-2,4-disulfonate to prepare a truncated Evans Blue derivative; removing the Boc protective group, followed by an amide condensation reaction with N-tert-butyloxycarbonyl-L-glutamic 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).

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

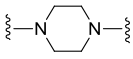


Formula (IV)

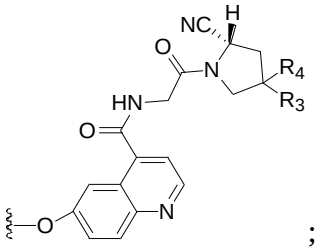
wherein

L_2 is $-(CH_2)_0-$、$-NH-CH_2-(CO)-$、$-NH-CH_2-(OCH_2CH_2)-O-CH_2(CO)-$或$NH-CH_2-(OCH_2CH_2)_3-O-CH_2(CO)-$;

L_3 is $-(CH_2)_3-$;

X is ;

R_1 is

;

R_3 and R_4 are both H or both F;

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

5. 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,

or, 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.

6. Application of the compound according to any one of claims 1-2 or a pharmacologically acceptable salt thereof in preparation of medicines in nuclide therapy or imaging of tumors with high expression of FAP.

7. Application of the complex according to claims 4 in nuclide therapy or imaging of tumors with high expression of FAP.

8. The application according to any one of claims 6-7, 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.