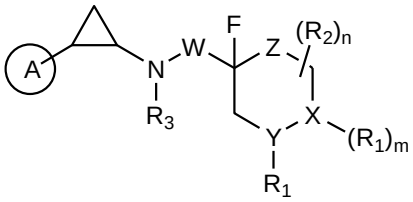
Claims

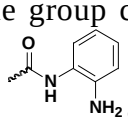
1. A fluorine-substituted cyclopropylamine compound having a structure represented by the following general formula I, and a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof:



Formula I

wherein:

A is selected from the group consisting of a substituted or unsubstituted aromatic benzene ring, or a substituted or unsubstituted 5-12 membered aromatic heterocyclic ring containing 1 to 4 heteroatoms selected from the group consisting of oxygen, sulfur and nitrogen; the aromatic heterocyclic ring is selected from thiophenyl and pyridinyl, wherein each of the substituted benzene ring or substituted aromatic heterocycles comprises 1 to 3 substituents, and the substituent is selected from the group consisting of hydrogen, hydrogen isotope, halogen, unsubstituted or substituted C1-C12 straight or branched alkyl;

each R_1 is independently selected from the group consisting of a substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl, hydrogen, substituted or unsubstituted C1-C6 alkyl, $-SO_2Ra$, $-NHC(O)Ra$, $-(CH_2)_mC(O)ORa$, $-C(O)O(CH_2)_m$ Ra, $-C(O)ORa$, $-C(O)Ra$, $-(CH_2)_mORa$, $-NRcRd$, substituted or unsubstituted aryl C1-C4 alkyl, and substituted or unsubstituted heteroaryl C1-C4 alkyl, wherein m is an integer from 1 to 3; the substituent is selected from the group consisting of carboxyl, cyano, C1-C4 alkyl ester group, C1-C4 alkylsulfonyl,  and aryl; wherein aryl is C6-C10 aryl; heteroaryl is selected from furyl, thienyl, pyridyl, pyrazolyl, pyrrolyl, pyrimidinyl, pyrazinyl, imidazolyl, tetrazolyl;

each Ra is independently hydrogen, a substituted or unsubstituted phenyl, substituted or unsubstituted C3-C7 cycloalkyl, substituted or unsubstituted C3-C7 heterocyclic group, , substituted or unsubstituted C1-C6 alkyl, substituted or unsubstituted C1-C6 alkenyl, substituted or unsubstituted 5-10 membered heteroaryl,; the substituent is selected from the group consisting of C1-C4 alkyl, halogen-substituted C1-C4 alkyl, phenyl-substituted C1-C4 alkyl, C1-C4 alkyl ester group, halogen, C1-C4 alkoxy, and carboxyl;

Rc is selected from hydrogen, an unsubstituted or halogen substituted C1-C3 straight or branched alkylR_d is hydrogen

R_3 is a C1-C4 alkyl, acyl, $-C(O)CF_3$ or hydrogen;

W is $-(CH_2)-$;

YR_1 is CH_2;

X is N; m is 1;

Z is $(CH_2)_q$, wherein q is 1;

n is 0.

2. The fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein A is an unsubstituted benzene ring.

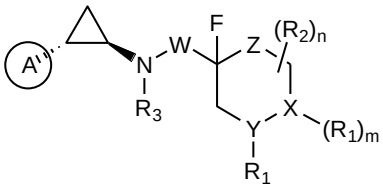
3. The fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein each R_1 is independently selected from: a substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl, hydrogen, substituted or unsubstituted C1-C4 alkyl, $-SO_2Ra$, $-NHC(O)Ra$, $-(CH_2)_mC(O)ORa$, $-C(O)ORa$, $-C(O)Ra$, $-(CH_2)_mORa$, $-C(O)NRaRb$, $-NRcRd$, substituted or unsubstituted aryl C1-C4 alkyl, and substituted or unsubstituted heteroaryl C1-C4 alkyl;

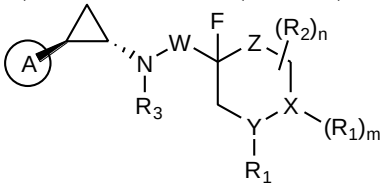
each Ra is independently hydrogen, a substituted or unsubstituted phenyl, substituted or unsubstituted C3-C7 cycloalkyl, substituted or unsubstituted C1-C4 alkyl, substituted or unsubstituted C1-C4 alkenyl, or substituted or unsubstituted 5-10 membered heteroaryl.

4. The fluorine-substituted cyclopropylamine compound, or the racemate, R-isomer, S-isomer, pharmaceutically acceptable salts thereof, or the mixtures thereof of claim 1, wherein R_1 attached to X is selected from a substituted or unsubstituted: aryl, heteroaryl, aryl C1-C4 alkyl, and heteroaryl C1-C4 alkyl.

5. The fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein R_1 is selected from a substituted or unsubstituted: aryl C1-C4 alkyl, and heteroaryl C1-C4 alkyl.

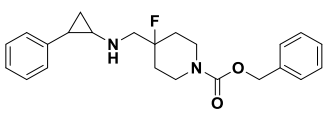
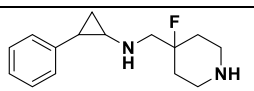
6. The fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein the structure of compound is shown in formula (1R, 2S)-Ia or formula (1R, 2S)-Ib.

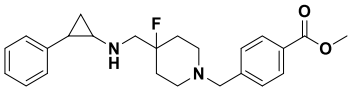
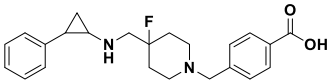
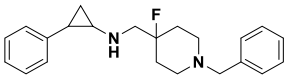
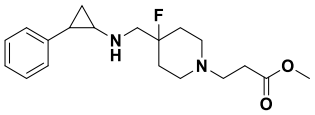
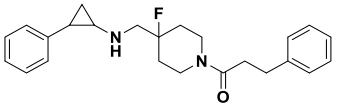
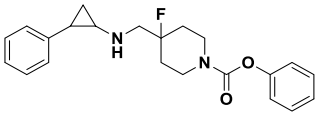
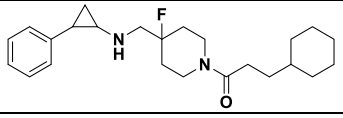
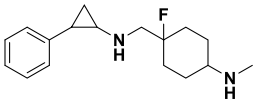
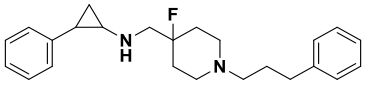
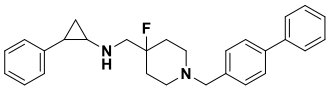
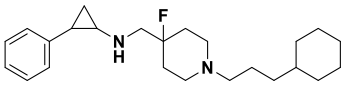
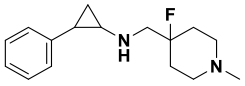
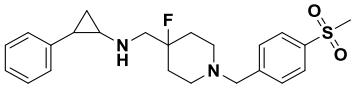
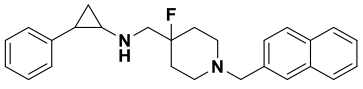
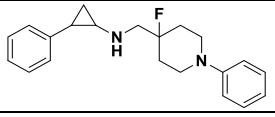


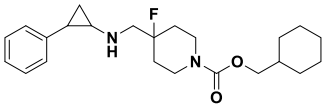
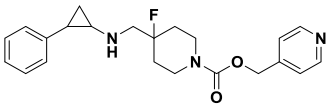
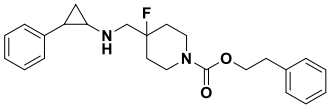
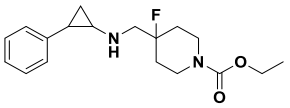
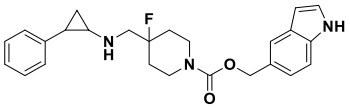
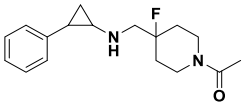
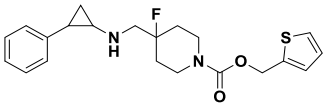
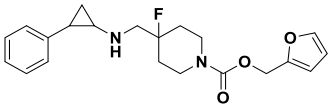
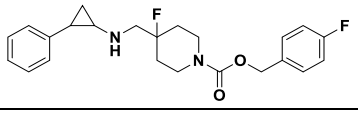
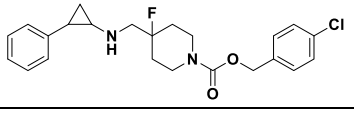
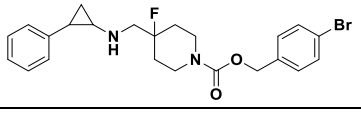
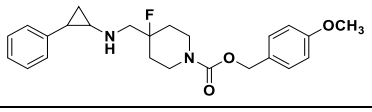
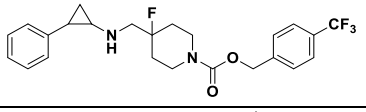
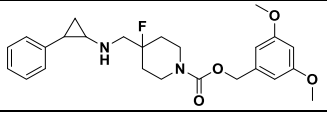
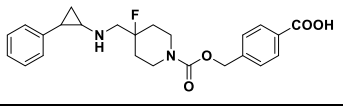


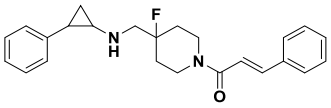
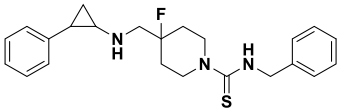
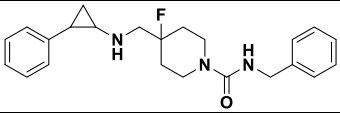
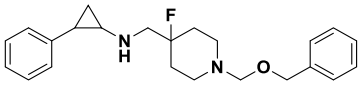
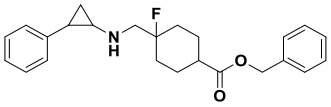
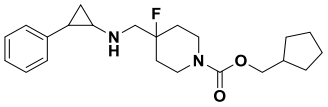
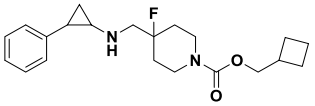
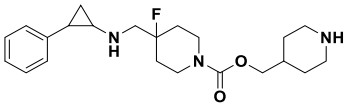
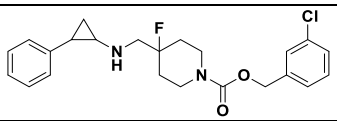
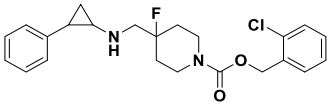
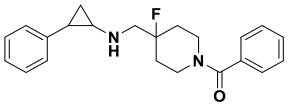
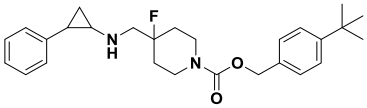
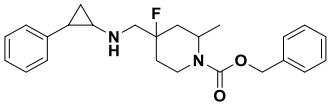
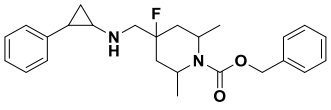
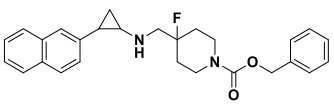
formula (1*R*, 2*S*)-Ia or formula (1*S*, 2*R*)-Ia

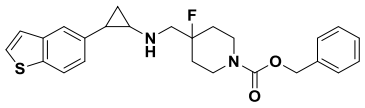
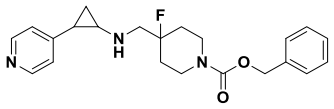
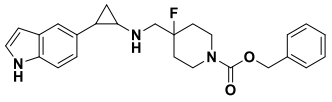
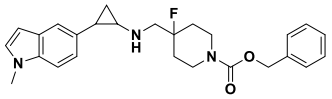
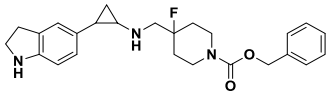
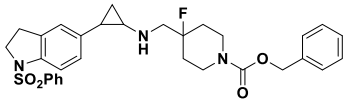
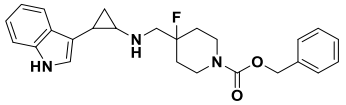
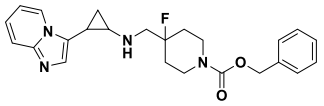
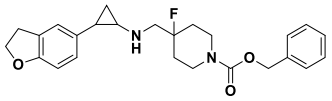
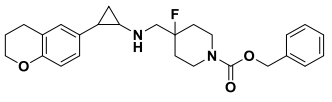
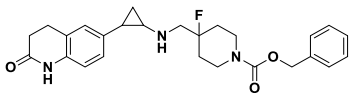
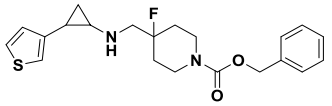
7. A fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein the fluorine-substituted cyclopropylamine compound is selected from the following compounds:

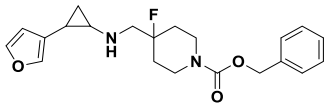
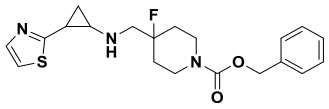
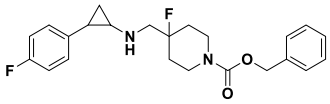
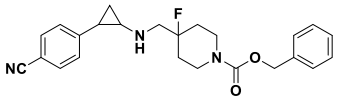
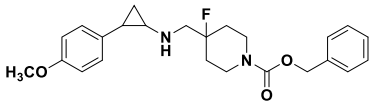
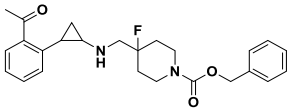
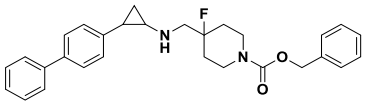
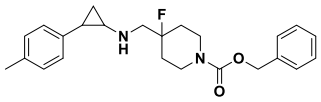
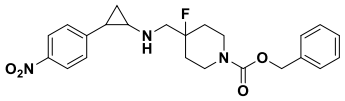
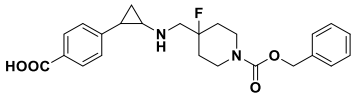
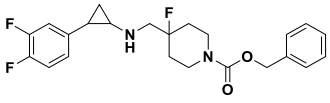
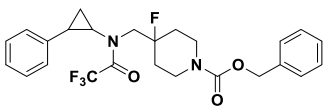
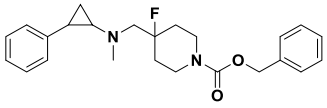
No.	Name	Structure
A1	Benzyl 4-fluoro-4-((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A2	*N*-((4-fluoropiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	

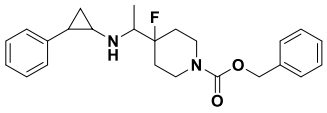
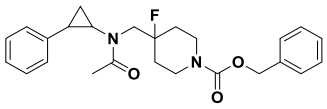
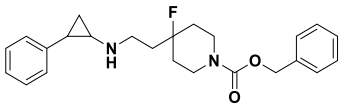
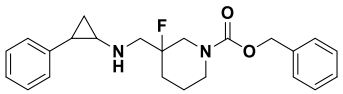
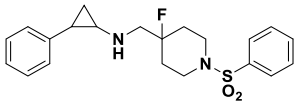
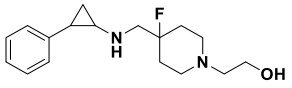
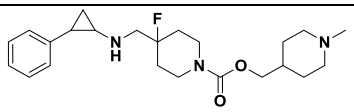
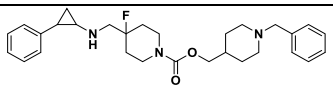
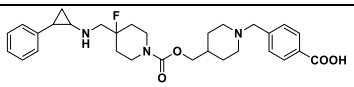
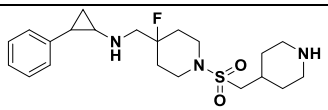
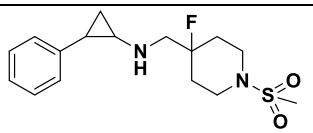
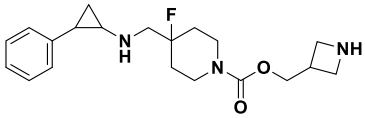
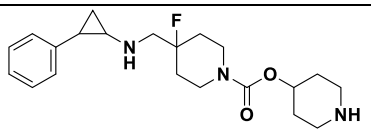
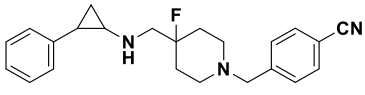
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A5	4-((4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoic acid	
A6	*N*-((1-benzyl-4-fluoropiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A7	Methyl 3-(4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)-propionate	
A8	1-(4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)-3-phenyl-1-propanone	
A9	Phenyl 4-fluoro-4-((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A10	3-cyclohexyl-1-(4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)-1-propanone	
A11	4-fluoro-*N*-methyl-4-(((trans-2-phenylcyclopropyl)amino)methyl)cyclohexane-1-amine	
A12	*N*-((4-fluoro-1-(3-phenylpropyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A13	*N*-((1-([1,1'-biphenyl]-4-methyl)-4-fluoropiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A14	*N*-((1-(3-cyclohexylpropyl)-4-fluoropiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A15	*N*-((4-fluoro-1-methylpiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A16	*N*-((4-fluoro-1-(4-(methylsulfonyl)benzyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A17	*N*-((4-fluoro-1-(naphthyl-2-methyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A20	*N*-((4-fluoro-1-phenylpiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	

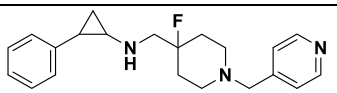
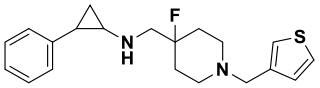
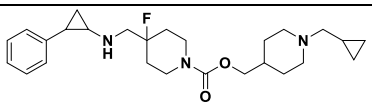
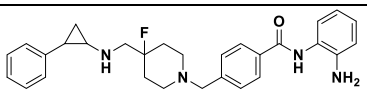
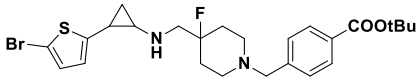
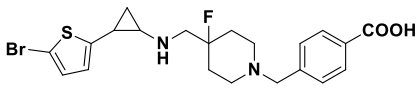
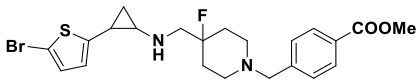
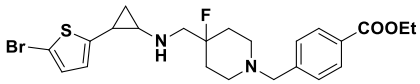
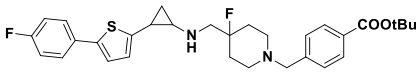
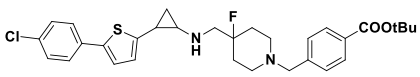
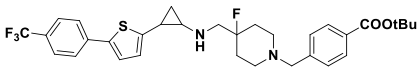
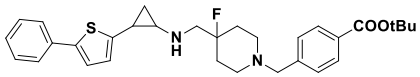
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A22	Pyridin-4-ylmethyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A23	Phenethyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A24	Ethyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A25	(1H-indol-5-yl)methyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A26	1-(4-Fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)pyridin-1-yl)-1-ethanone)	
A27	Thiophen-2-ylmethyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A28	Furan-2-ylmethyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A29	4-fluorobenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A30	4-chlorobenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A31	4-bromobenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A32	4-methoxybenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A33	4-trifluoromethylbenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A34	3,5-Dimethoxybenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A35	4-((4-Fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carbonyloxy)methyl)benzoic acid	

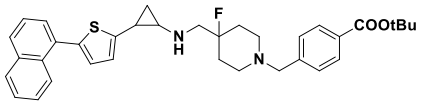
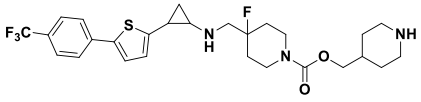
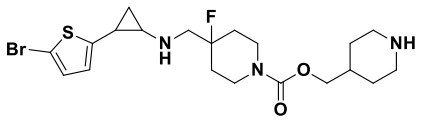
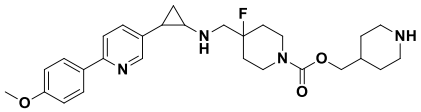
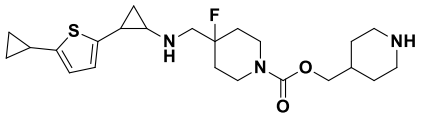
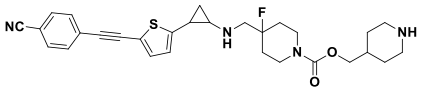
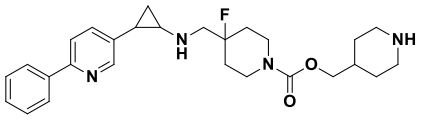
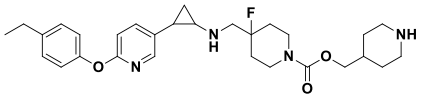
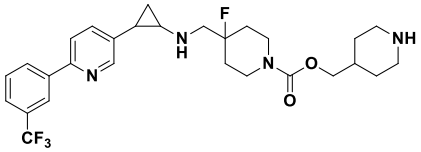
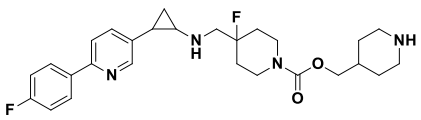
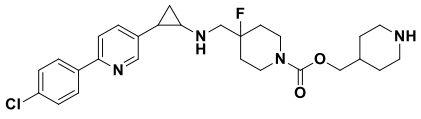
A36	(E)-1-(4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)-3-phenyl-2-ene-1-propanone	
A37	*N*-benzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-thioamide	
A38	*N*-benzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxamide	
A39	*N*-((1-((benzyloxy)methyl)-4-fluoropiperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A40	Benzyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)cyclohexane-1-carboxylate	
A41	Cyclopentylmethyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A42	Cyclobutylmethyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A43	Piperidin-4-ylmethyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A44	3-chlorobenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A45	2-chlorobenzyl-4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A46	(4-fluoro-4-((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)(phenyl)methanone	
A47	4-tert-butylbenzyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A48	Benzyl 4-fluoro-2-methyl-4-((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A49	Benzyl 4-fluoro-2,6-dimethyl-4-((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A50	Benzyl 4-fluoro-4-((trans-2-(naphthalen-2-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	

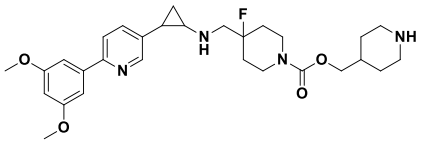
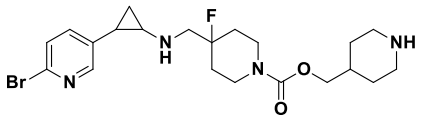
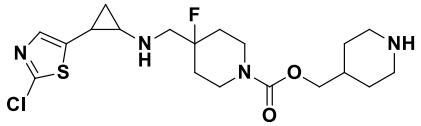
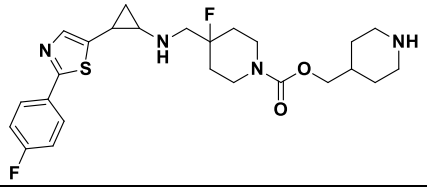
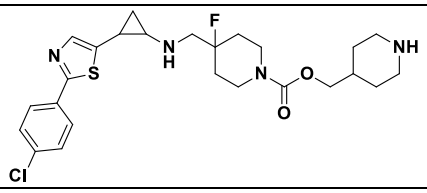
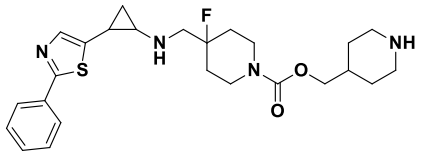
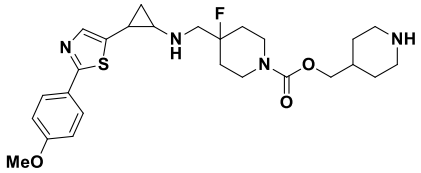
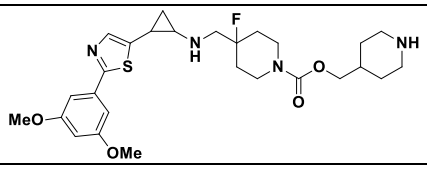
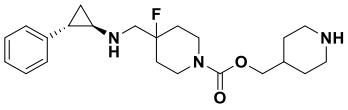
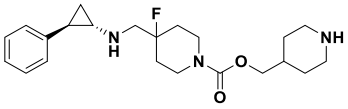
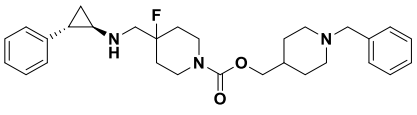
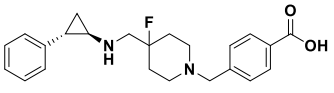
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A52	Benzyl 4-fluoro-4-((trans-2-(pyridin-4-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A53	Benzyl 4-fluoro-4-((trans-2-(1H-indol-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A54	Benzyl 4-fluoro-4-((trans-2-(1-methyl-1H-indol-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A55	Benzyl 4-fluoro-4-((trans-2-(indoline-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A56	Benzyl 4-fluoro-4-((trans-2-(1-(phenylsulfonyl)indoline-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A57	Benzyl 4-fluoro-4-((trans-2-(1H-indol-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A58	Benzyl 4-fluoro-4-((trans-2-(imidazo[1,2-α]pyridin-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A59	Benzyl 4-fluoro-4-((trans-2-(2,3-dihydrobenzofuran-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A60	benzyl 4-fluoro-4-((trans-2-(chroman-6-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A61	benzyl 4-fluoro-4-(((trans-2-(2-oxo-1,2,3,4-tetrahydroquinolin-6-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A62	Benzyl 4-fluoro-4-((trans-2-(thiophen-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	

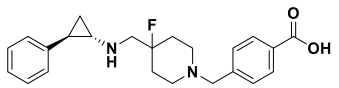
A63	Benzyl 4-fluoro-4-((trans-2-(furan-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A64	Benzyl 4-fluoro-4-((trans-2-(thiazol-2-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A65	Benzyl 4-fluoro-4-((trans-2-(4-fluorophenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A66	Benzyl 4-fluoro-4-((trans-2-(4-cyanophenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A67	Benzyl 4-fluoro-4-((trans-2-(4-methoxyphenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A68	Benzyl 4-fluoro-4-((trans-2-(2-acetylphenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A69	Benzyl 4-fluoro-4-((trans-2-([1,1'-biphenyl]-4-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A70	Benzyl 4-fluoro-4-((trans-2-(4-methylphenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A71	Benzyl 4-fluoro-4-((trans-2-(4-nitrophenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A72	4-(trans-2-((1-((benzyloxy))carbonyl)-4-fluoropiperidin-4-yl)methyl)amino)cyclopropyl)benzoic acid	
A73	Benzyl 4-fluoro-4-((trans-2-(3,4-difluorophenyl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A74	Benzyl 4-fluoro-4-((2,2,2-trifluoro-*N*-(trans-2-phenylcyclopropyl)acetamido)methyl)piperidine-1-carboxylate	
A75	Benzyl 4-fluoro-4-((methyl(trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	

A76	Benzyl 4-fluoro-4-(1-((trans-2-phenylcyclopropyl)amino)ethyl)piperidine-1-carboxylate	
A77	Benzyl 4-fluoro-4-((*N*-(trans-2-phenylcyclopropyl)acetamido)methyl)piperidine-1-carboxylate	
A80	Benzyl 4-fluoro-4-(2-((trans-2-phenylcyclopropyl)amino)ethyl)piperidine-1-carboxylate	
A81	Benzyl 3-fluoro-3-((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A82	*N*-((4-fluoro-1-(phenylsulfonyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A83	2-(4-Fluoro-4-(((trans-2-phenylcyclohexyl)amino)methyl)piperidin-1-yl)ethanol	
A89	(1-methylpiperidin-4-yl)methyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A90	(1-benzylpiperidin-4-yl)methyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A91	4-((4-(((4-Fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carbonyl)oxo)methyl)piperdin-1-yl)methyl)benzoic acid	
A92	*N*-((4-fluoro-1-(piperidin-4-ylmethyl)sulfonyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A93	*N*-((4-fluoro-1-(methylsulfonyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A94	Azetidin-3-ylmethyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A95	Piperidin-4-yl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A96	4-((4-Fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzonitrile	

A97	*N*-((4-fluoro-1-(piperidin-4-ylmethyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A98	*N*-((4-fluoro-1-(thien-3-ylmethyl)piperidin-4-yl)methyl)-trans-2-phenylcyclopropylamine	
A99	(1-(cyclopropylmethyl)piperidin-4-yl)methyl 4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
A100	*N*-(2-Aminophenyl)-4-((4-fluoro-4-(((trans-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzamide	
A101	tert-Butyl 4-((4-((2-(5-bromothien-2-yl))cyclopropyl)amino)methyl)-4-fluoropiperidin-1-yl)methyl)benzoate	
A102	4-((4-(((2-(5-Bromothiophen-2-yl))cyclopropyl)amino)methyl)-4-fluoropiperidin-1-yl)methyl)benzoic acid	
A103	Methyl 4-((4-(((2-(5-bromothiophen-2-yl))cyclopropyl)amino)methyl)-4-fluoropiperidin-1-yl)methyl)benzoate	
A104	Ethyl 4-((4-(((2-(5-bromothiophen-2-yl))cyclopropyl)amino)methyl)-4-fluoropiperidin-1-yl)methyl)benzoate	
A105	tert-Butyl 4-((4-fluoro-4-(((2-(5-(4-fluorophenyl)thiophen-2-yl)cyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoate	
A106	tert-Butyl 4-((4-(((2-(5-(4-chlorophenyl)thiophen-2-yl)cyclopropyl)amino)methyl)-4-fluoropiperidin-1-yl)methyl)benzoate	
A107	tert-Butyl 4-((4-fluoro-4-(((2-(5-(4-(trifluoromethyl)phenyl)thiophen-2-yl)cyclopropyl)amino)methyl)piperidine-1-yl)methyl)benzoate	
A108	tert-Butyl 4-((4-fluoro-4-(((2-(5-phenylthiophen-2-yl)cyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoic acid	

A109	tert-Butyl 4-((4-fluoro-4-(((2-(5-(naphthalen-1-yl)thiophen-2-yl)cyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoate	
A110	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(5-(4-(trifluoromethyl)phenyl)thiophen-2-yl)cyclopropyl)amino)methyl)piperdine-1-carboxylate	
A111	Piperidin-4-ylmethyl 4-(((2-(5-bromothien-2-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A112	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(6-(4-methoxyphenyl)pyridin-3-yl)cyclopropyl)amino)methyl)piperidin-1-carboxylate	
A113	Piperidin-4-ylmethyl 4-(((2-(5-cyclopropylthiophen-2-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A114	Piperidin-4-ylmethyl 4-(((2-(5-((4-cyanophenyl)ethynyl)thiophen-2-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A115	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(6-phenylpyridin-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A116	Piperidin-4-ylmethyl 4-(((2-(6-(4-ethylphenoxy)pyridin-3-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A117	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(6-(3-(trifluoromethyl)phenyl)pyridin-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A118	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(6-(4-fluorophenyl)pyridin-3-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A119	Piperidin-4-ylmethyl 4-(((2-(6-(4-chlorophenyl)pyridin-3-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	

A120	Piperidin-4-ylmethyl 4-(((2-(6-(3,5-dimethoxyphenyl)pyridin-3-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine 1-carboxylate	
A121	Piperidin-4-ylmethyl 4-(((2-(6-bromopyridin-3-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A122	Piperidin-4-ylmethyl 4-(((2-(2-chlorothiazol-5-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A123	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(2-(4-fluorophenyl)thiazol-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A124	Piperidin-4-ylmethyl 4-(((2-(2-(4-chlorophenyl)thiazol-5-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
A125	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(2-phenylthiazol-5-yl)cyclopropyl)amino)methyl)piperidine-1-carboxylate	
A126	Piperidin-4-ylmethyl 4-fluoro-4-(((2-(2-(4-methoxyphenyl)thiazol-5-yl)cyclopropyl)amino)methyl)piperidin-1-carboxylate	
A127	Piperidin-4-ylmethyl 4-(((2-(2-(3,5-dimethoxyphenyl)thiazol-5-yl)cyclopropyl)amino)methyl)-4-fluoropiperidine-1-carboxylate	
(1*R*,2*S*)-A43	Piperidin-4-ylmethyl 4-fluoro-4-((((1R,2S)-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
(1*S*,2*R*)-A43	Piperidin-4-ylmethyl 4-fluoro-4-((((1S,2R)-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
(1*R*,2*S*)-A90	(1-Benzylpiperidin-4-yl)methyl 4-fluoro-4-((((1R,2S)-2-phenylcyclopropyl)amino)methyl)piperidine-1-carboxylate	
(1*R*,2*S*)-A5	4-((4-fluoro-4-((((1*R*,2*S*)-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoic acid	

(1*S*,2*R*)-A5	4-((4-fluoro-4-((((1*S*,2*R*)-2-phenylcyclopropyl)amino)methyl)piperidin-1-yl)methyl)benzoic acid	

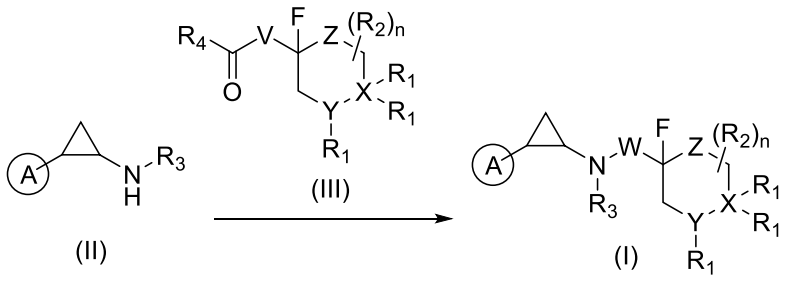
8. The fluorine-substituted cyclopropylamine compound, or a racemate, R-isomer, S-isomer, pharmaceutically acceptable salt, or a mixture thereof of claim 1, wherein,

the pharmaceutically acceptable salt is prepared by reacting a compound of formula I with an inorganic or organic acid, the inorganic acid is hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, aminosulfonic acid or phosphoric acid, and the organic acid is citric acid, tartaric acid, lactic acid, pyruvic acid, acetic acid, benzenesulfonic acid, p-toluenesulfonic acid, methanesulfonic acid, naphthalenesulfonic acid, ethanesulfonic acid, naphthalene disulfonic acid, maleic acid, malic acid, malonic acid, fumaric acid, succinic acid, propionic acid, oxalic acid, trifluoroacetic acid, stearic acid, pamoic acid, hydroxymaleic acid, phenylacetic acid, benzoic acid, salicylic acid, glutamic acid, ascorbic acid, p-anilinesulfonic acid, 2-acetoxybenzoic acid or isethionic acid; or sodium, potassium, calcium, aluminum or ammonium salts fromed from the compound of formula I with an inorganic base; or a salt formed from the compound of formula I with an organic base, such as methanamine salt, ethylamine salt or ethanolamine salt.

9. A process for the preparation of a fluorine-substituted cyclic amine compound of claim 1, wherein the process is selected from the following Scheme 1 or Scheme 2:

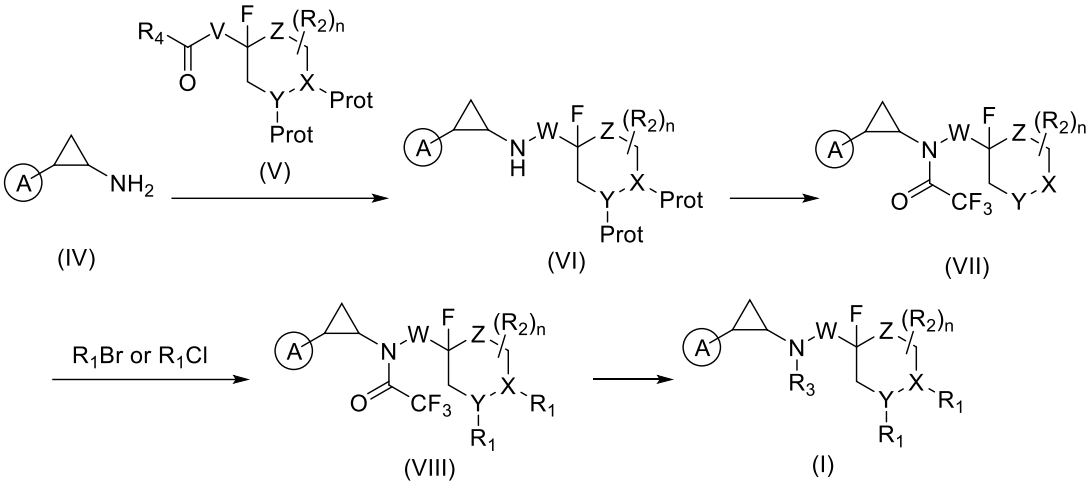
Scheme 1

Reacting a compound of formula (II) and (III) under reductive amination conditions to provide a compound of formula (I).



Scheme 2

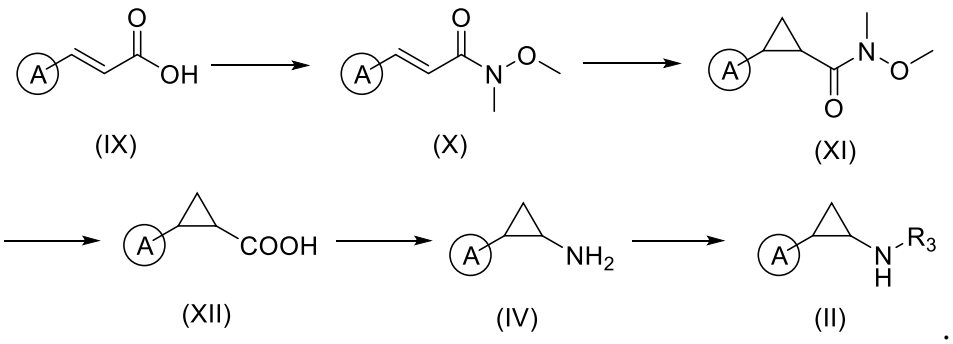
reacting a compound of formula (IV) with compound of formula (V) to afford a compound of formula (VI), and then the amino can be protected, and a compound of formula (VII) was obtained by removing the protecting group of the X and/or Y group. The compound of formula (VII) is functionalized with R_1 substituent to give a compound of formula (VIII), the amine deprotecting group is removed and the compound of formula (VIII) is functionalized with an R_3 group to give a compound of formula (I);



Wherein A, W, X, Y, Z, R_1, R_2, and R_3 are as described above, respectively, and R_4 is selected from the group consisting of H and methyl, and V is none.

10. The method of claim 9 wherein the method for preparing the compound of formula (II) comprises the step:a cinnamic acid compound of formula (IX) is condensed with dimethylhydroxylamine in the presence of a condensing agent and a base to obtain a amide compound of formula (X), which is then subjected to cyclopropylation to obtain a compound of formula (XI); the compound of formula (XI) is hydrolyzed to give a compound of formula (XII), which is then subjected to a reaction under Curtius rearrangement conditions to provide a compound of formula (IV), and then the compound of formula (IV) is functionalized with R_3 group to provide a compound of formula (II);

Scheme 3



11. A pharmaceutical composition comprising one or more of a therapeutically effective amount of the fluorine-substituted cyclic amine compound, or the pharmaceutically acceptable salt, racemate, R-isomer or S-isomer of claim 1, and optionally one or more pharmaceutically acceptable carriers, excipients, adjuvants, auxiliary substances, and/or diluents.

12. A lysine-specific demethylase 1 (LSD1) inhibitor comprising a therapeutically effective amount of the fluorine-substituted cyclopropylamine compound, pharmaceutically acceptable salt, racemic, R-isomer, S-isomer thereof of claim 1.

13. The fluorine-substituted cycloamine compound, racemate, R-isomer, S-isomer or pharmaceutically acceptable salt thereof of claim 1 for use in the treatment or prevention

of malignant tumor disease associated with methylase 1 (LSD1).

14. The fluorine-substituted cycloamine compound, racemate, R-isomer, S-isomer or pharmaceutically acceptable salt thereof for use of claim 14, wherein disease is a cancer associated with lysine-specific demethylase 1 (LSD1), wherein the cancer is selected from the group consisting of brain cancer (glioma), glioblastoma, leukemia, Bannayan-Zonana syndrome, Cowden's disease, cerebellar dysplastic ganglioneuroma, breast cancer, inflammatory breast cancer, Wilms' tumor, Ewing Sarcoma, rhabdomyosarcoma, ependymoma, medulloblastoma, colon cancer, head and neck cancer, kidney cancer, lung cancer, liver cancer, melanoma, kidney cancer, ovarian cancer, pancreatic cancer, prostate cancer, sarcoma, osteosarcoma, giant cell tumor of thyroid gland and bone.