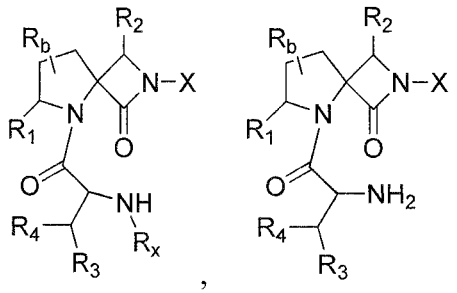
substituted with from 1-3 independently selected C_1-C_3 alkyl; -CH_2-C_3-C_{10} cycloalkyl wherein the C_3-C_{10} cycloalkyl is optionally substituted with from 1-3 independently selected C_1-C_3 alkyl; -CH_2-phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C_1-C_3 alkyl; C_1-C_3 haloalkyl; C_1-C_3 alkoxy; C_1-C_3 haloalkoxy; nitro; halo; SO_2Me, cyano; and -$OC(O)CH_3$; and -CH_2-pyridyl; and

R_{32} is selected from the group consisting of: H; C_1-C_6 alkyl; C_1-C_6 haloalkyl; phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C_1-C_3 alkyl; C_1-C_3 haloalkyl; C_1-C_3 alkoxy; C_1-C_3 haloalkoxy; nitro; halo; SO_2Me, cyano; and -$OC(O)CH_3$; and pyridyl.

[0008a] In one aspect of the present disclosure, there is provided a compound represented by:



or a pharmaceutically acceptable salt, a steroisomer, and/or an N-oxide thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C_1-C_6 alkyl;

R_1 is H or C_1-C_6 alkyl;

R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6alkyl, -OH, C_1-C_6alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl, wherein the phenyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy;

R_4 is H or C_1-C_6 alkyl;

X is selected from the group consisting of:

(i) -C_{1-6}alkylene-C_{3-6}cycloalkyl;

(ii) -C_{1-6}alkylene-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

(iii) -C_{1-6}alkylene-C(O)-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

(iv) -C_{1-6}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy; and

(v) branched C_3-C_6 alkyl substituted with –C(O)NH_2 on one carbon and –OH on another carbon;

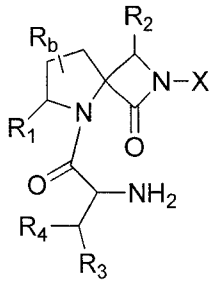
and wherein R_x is selected from the group consisting of H, –C(O)OR_{31} and –C(O) R_{32}, wherein:

R_{31} is selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_{10} cycloalkyl, -CH_2-C_3-C_{10} cycloalkyl, -CH_2-phenyl, and -CH_2-pyridyl, wherein the C_3-C_{10} cycloalkyl is optionally substituted with from 1-3 independently selected C_1-C_3 alkyl, and wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkoxy, nitro, halo, SO_2Me, cyano, and -OC(O)CH_3; and

R_{32} is selected from the group consisting of H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, phenyl, and pyridyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from

C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkoxy, nitro, halo, SO_2Me, cyano, and -$OC(O)CH_3$.

[0008b] In another aspect of the present disclosure, there is provided a compound represented by formula I:



(I)

or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C_1-C_6 alkyl;

R_1 is C_1-C_6 alkyl;

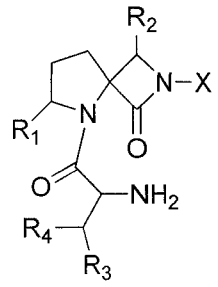
R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6alkyl, -OH, C_1-C_6alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

R_4 is H or C_1-C_6 alkyl; and

X is selected from the group consisting of -$C_{1\text{-}6}$alkylene-$C_{3\text{-}6}$cycloalkyl; $C_{1\text{-}6}$alkylene-heterocycle (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy), and -$C_{1\text{-}6}$alkylene-heteroaryl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy).

[0009] Further disclosed herein are compounds represented by the formula:



(II)

and pharmaceutically acceptable salts, stereoisomers, and N-oxides thereof, wherein

R_1 is H or C_1-C_6 alkyl;

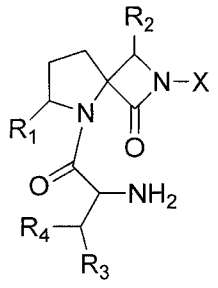
R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6 alkyl, -OH, C_1-C_6 alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl;

R_4 is H or C_1-C_6 alkyl; and

X is –C_1-C_6alkylene-X′, wherein X′ is a 4- to 6-membered heteroaryl having 1, 2, or 3 heteroatoms selected from O, N, or S, where X' is optionally substituted on a free carbon by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

[0009a] In another aspect of the present disclosure, there is provided a compound represented by formula II:



(II),

or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof, wherein

R_1 is H or C_1-C_6 alkyl;

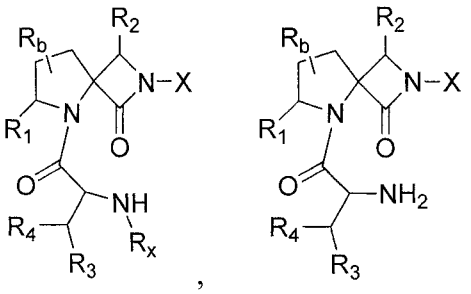
R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6 alkyl, -OH, C_1-C_6 alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl;

R_4 is H or C_1-C_6 alkyl; and

What is claimed is:

1. A compound represented by:



or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C_1-C_6 alkyl;

R_1 is H or C_1-C_6 alkyl;

R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6alkyl, -OH, C_1-C_6alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl, wherein the phenyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy;

R_4 is H or C_1-C_6 alkyl;

X is selected from the group consisting of:

(i) -C_{1-6}alkylene-C_{3-6}cycloalkyl;

(ii) -C_{1-6}alkylene-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

(iii) -C_{1-6}alkylene-C(O)-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by

one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

(iv) -C_{1-6}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy; and

(v) branched C_3-C_6 alkyl substituted with –C(O)NH_2 on one carbon and –OH on another carbon;

and wherein R_x is selected from the group consisting of H, –C(O)OR_{31} and –C(O) R_{32}, wherein:

R_{31} is selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_{10} cycloalkyl, -CH_2-C_3-C_{10} cycloalkyl, -CH_2-phenyl, and CH_2-pyridyl, wherein the C_3-C_{10} cycloalkyl is optionally substituted with from 1-3 independently selected C_1-C_3 alkyl, and wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkoxy, nitro, halo, SO_2Me, cyano, and -OC(O)CH_3; and

R_{32} is selected from the group consisting of H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, phenyl, and pyridyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkoxy, nitro, halo, SO_2Me, cyano, and -OC(O)CH_3.

2. The compound of claim 1, wherein R_1 is H.

3. The compound of claim 1, wherein R_1 is C_1-C_6 alkyl.

4. The compound of claim 1, wherein R_1 is methyl.

5. The compound of any one of claims 1-4, wherein R_2 is H.

6. The compound of any one of claims 1-5, wherein R_3 is –OH.

7. The compound of any one of claims 1-6, wherein R_4 is C_1-C_6 alkyl.

8. The compound of any one of claims 1-6, wherein R_4 is methyl.

9. The compound of any one of claims 1-8, wherein X is selected from the group consisting of:

(i) -C_{1-6}alkylene-C_{3-6}cycloalkyl;

(ii) -C_{1-6}alkylene-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

(iii) -C_{1-6}alkylene-C(O)-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy); and

(iv) -C_{1-6}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

10. The compound of any one of claims 1-8, wherein X is selected from the group consisting of:

(i) -C_{1-6}alkylene-C_{3-6}cycloalkyl;

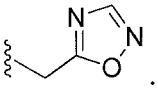
(ii) -C_{1-6}alkylene-heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy); and

(iv) -C_{1-6}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

11. The compound of any one of claims 1-8, wherein X is -C_{1-6}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

12. The compound of any one of claims 1-8, wherein X is C_{1-2}alkylene-heteroaryl including from 5 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

13. The compound of any one of claims 1-8 and 10-13, wherein the heteroaryl is selected from the group consisting of 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridyl, and pyrimidinyl.

14. The compound of any one of claims 1-8 and 10-14, wherein X is  .

15. The compound of claim 1, wherein R_1 is H; R_2 is H; R_3 is –OH; and R_4 is methyl.

16. The compound of claim 1, wherein R_1 is methyl; R_2 is H; R_3 is –OH; and R_4 is methyl.

17. The compound of any one of claims 1-16, wherein R_x is H.

18. The compound of any one of claims 1-16, wherein the R_x is selected from the group consisting of –C(O)OR_{31} and –C(O) R_{32}.

19. The compound of claim 18, wherein R_x is –C(O)OR_{31}.

20. The compound of claim 19, wherein R_{31} is C_1-C_6 alkyl.

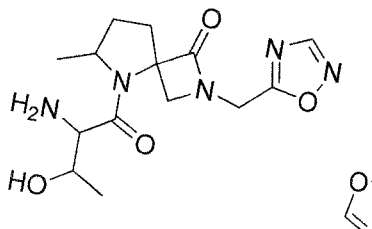
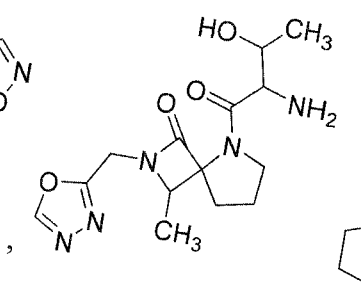
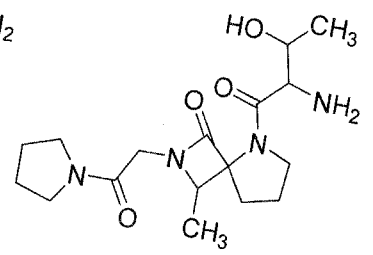
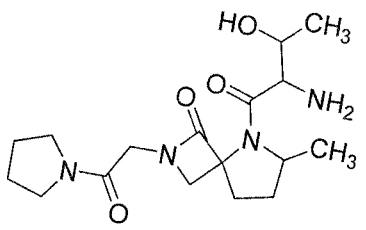
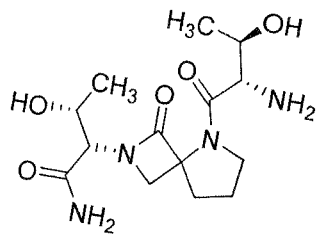
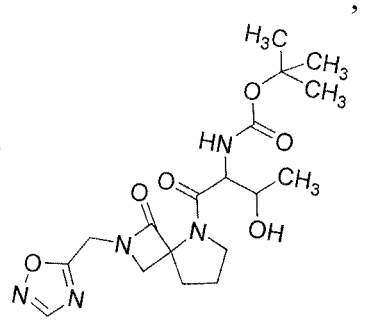
21. The compound of claim 20, wherein R_{31} is *tert*-butyl.

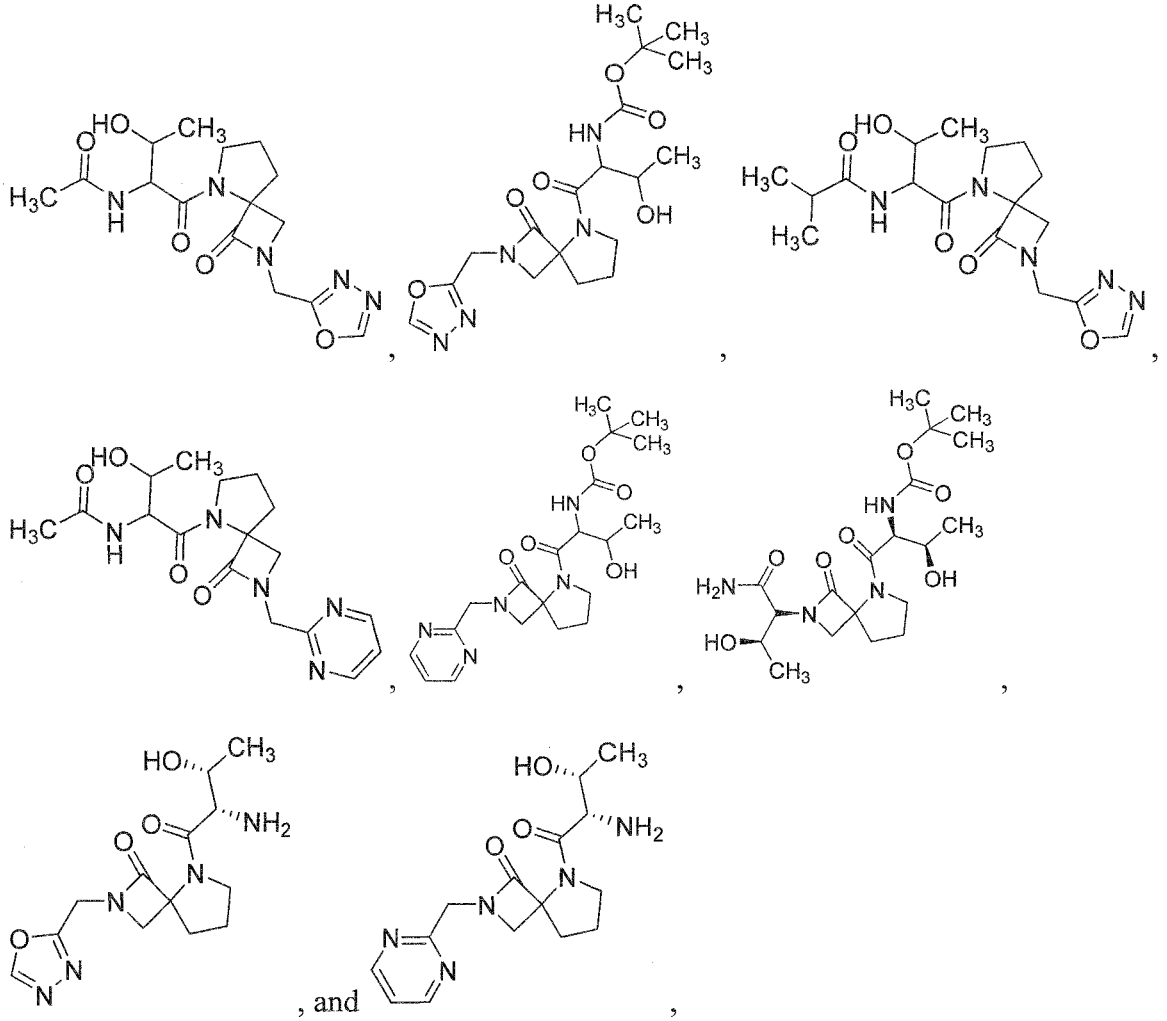
22. The compound of claim 18, wherein R_x is $-C(O)R_{32}$.

23. The compound of claim 22, wherein R_{32} is C_1-C_6 alkyl.

24. The compound of claim 22, wherein R_{32} is $-CH_3$ or *iso*-propyl.

25. The compound of claim 1, wherein the compound is selected from:



or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof.

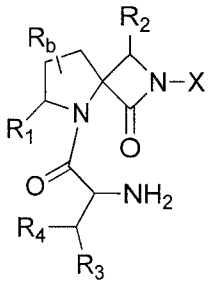
26. A pharmaceutical composition comprising a compound of any one of claims 1-25, and a pharmaceutically acceptable excipient.

27. The pharmaceutical composition of claim 26, wherein the pharmaceutical composition is an oral dosage form.

28. The pharmaceutical composition of claim 26, wherein the pharmaceutical composition is an intravenous dosage form.

29. Use of a compound of any one of claims 1-25 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.

30. A compound represented by formula I:



(I)

or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C_1-C_6 alkyl;

R_1 is C_1-C_6 alkyl;

R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6alkyl, -OH, C_1-C_6alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy);

R_4 is H or C_1-C_6 alkyl; and

X is selected from the group consisting of -C_{1-6}alkylene-C_{3-6}cycloalkyl; C_{1-6}alkylene-heterocycle (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy), and -C_{1-6}alkylene-heteroaryl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy).

31. The compound of claim 30, wherein R_1 is C_1-C_6 alkyl.

32. The compound of claim 30, wherein R_1 is methyl.

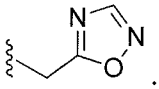
33. The compound of any one of claims 30-32, wherein R_2 is H.

34. The compound of any one of claims 30-33, wherein R_3 is –OH.

35. The compound of any one of claims 30-34, wherein R_4 is C_1-C_6 alkyl.

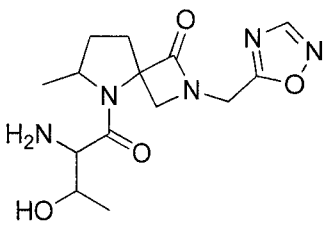
36. The compound of any one of claims 30-35, wherein R_4 is methyl.

37. The compound of any one of claims 30-36, wherein X is C_{1-2}alkylene-heteroaryl.

38. The compound of any one of claims 30-36, wherein X is  .

39. The compound of claim 30, wherein R_1 is methyl; R_2 is H; R_3 is –OH; and R_4 is methyl.

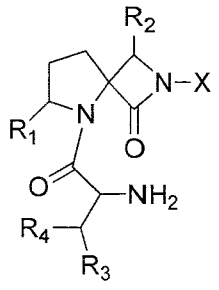
40. The compound of claim 1, wherein the compound is



,

or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof.

41. A compound represented by formula II:



(II),

or a pharmaceutically acceptable salt, a stereoisomer, and/or an N-oxide thereof, wherein

R_1 is H or C_1-C_6 alkyl;

R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6 alkyl, -OH, C_1-C_6 alkoxy, -OC(O)-C_1-C_6 alkyl and -OC(O)-phenyl;

R_4 is H or C_1-C_6 alkyl; and

X is –C_1-C_6alkylene-X′, wherein X′ is a 4- to 6-membered heteroaryl having 1, 2, or 3 heteroatoms selected from O, N, or S, where X' is optionally substituted on a free carbon by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6alkyl, and C_1-C_6alkoxy.

42. A pharmaceutical composition comprising a compound of any one of claims 30-41, and a pharmaceutically acceptable excipient.

43. The pharmaceutical composition of claim 42, wherein the pharmaceutical composition is an oral dosage form.

44. The pharmaceutical composition of claim 42, wherein the pharmaceutical composition is an intravenous dosage form.

45. Use of a compound of any one of claims 30-41 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.