X is H, X′, -C_1-C_6 alkylene-X′, or -C_1-C_6 alkylene-C(O)-X′, wherein X′ is selected from the group consisting of:

(i) C_3-C_6 cycloalkyl;

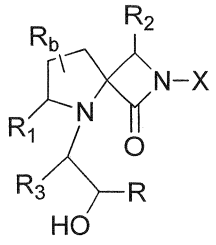
(ii) heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C_1-C_3 alkyl), O, and S;

(iii) phenyl; and

(iv) 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 X' is optionally substituted by one or more substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6 alkyl and C_1-C_6 alkoxy.

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



(I)

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

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

R is H or C_1-C_6 alkyl;

R_1 is H or C_1-C_6 alkyl;

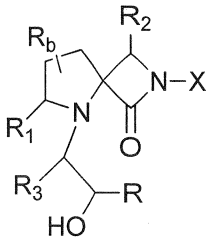
R_2 is H or C_1-C_6 alkyl;

R_3 is selected from the group consisting of H, C_1-C_6 alkyl, -OH, C_1-C_6 alkoxy, -CO_2H, or -CONR′R′, wherein R′ for each occurrence is selected from H, C_1-C_6 alkyl or a nitrogen protecting group; and

X is H or -C_1-C_6 alkylene-C(O)-X′, wherein X′ is selected from the group consisting of C_3-C_6 cycloalkyl, a 4- to 6-membered heterocycloalkyl ring having 1, 2, or 3 heteroatoms selected from O, S, or N, phenyl and 4- to 6-membered heteroaryl ring having 1, 2, or 3 heteroatoms selected from O, S, or N, wherein X' is optionally substituted by one or more

What is claimed is:

1. A compound represented by formula I:



(I)

or a pharmaceutically acceptable salt thereof, wherein

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

R is H or 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_6 alkyl, -OH, C_1-C_6 alkoxy, -CO_2H, or -CONR′R′, wherein R′ for each occurrence is independently selected from H, C_1-C_6 alkyl or a nitrogen protecting group; and

X is H, X′, -C_1-C_6 alkylene-X′, or -C_1-C_6 alkylene-C(O)-X′, wherein X′ is selected from the group consisting of:

(i) C_3-C_6 cycloalkyl;

(ii) 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;

(iii) phenyl; and

(iv) 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 X' is optionally substituted by one or more substituents independently selected from the group consisting of halogen, hydroxyl, C_1-C_6 alkyl and C_1-C_6 alkoxy.

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

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

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

5. The compound of any one of claims 1-4, wherein R_1 is H.

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

7. The compound of any one of claims 1-6, wherein R_3 is -CONR′R′.

8. The compound of claim 7, wherein R′ for each occurrence is independently selected from H and a nitrogen protecting group.

9. The compound of claim 7 or 8, wherein R′ for each occurrence is H.

10. The compound of claim 7 or 8, wherein one R′ is H, and the other is a nitrogen protecting group.

11. The compound of claim 7, wherein the nitrogen protecting group is *para*-methoxyphenyl (PMP).

12. The compound of any one of claims 1-11, wherein X is H.

13. The compound of any one of claims 1-11, wherein X is X′ or -C_1-C_6 alkylene-X′.

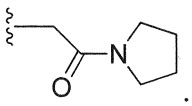
14. The compound of claim 13, wherein X is X′ or –CH_2-X′.

15. The compound of claim 13 or 14, wherein X′ is phenyl that is optionally substituted with halogen, hydroxyl, C_1-C_6 alkyl or C_1-C_6 alkoxy.

16. The compound of claim 15, wherein X′ is *para*-methoxyphenyl (PMP).

17. The compound of any one of claims 1-11, wherein X is -C_1-C_6 alkylene-C(O)-X′.

18. The compound of claim 17, wherein X′ is 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~~1-C~~3~~3 alkyl), O, and S.

19. The compound of claim 18, wherein X is 

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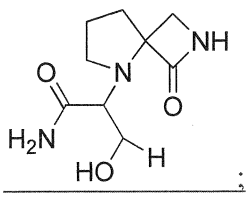
20. The compound of claim 1, wherein the compound is selected from: ~~the compounds delineated in Table 1.~~



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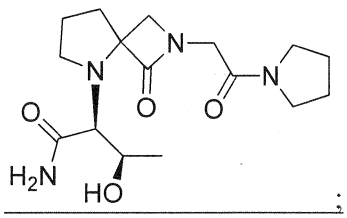

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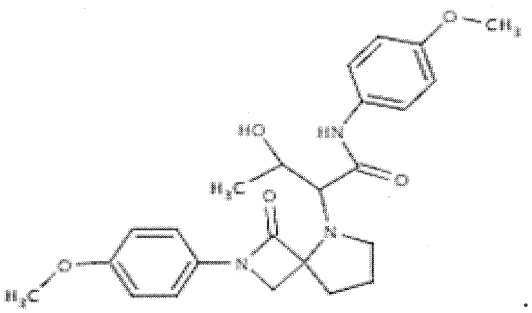

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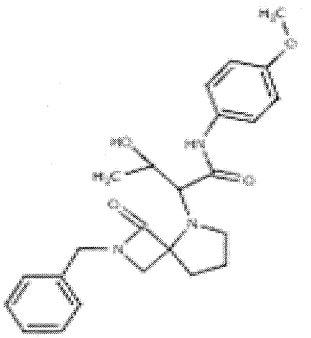

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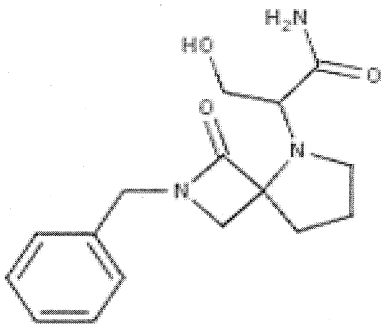

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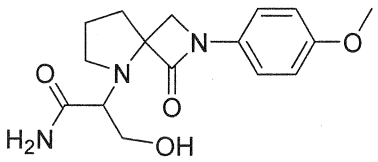
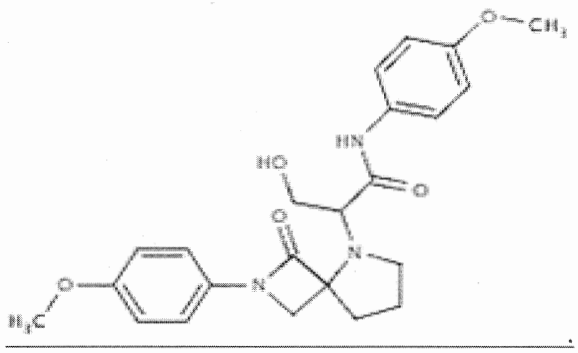


; and



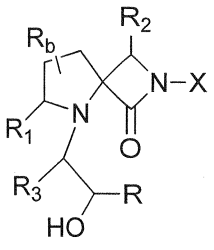
21. A pharmaceutical composition comprising a compound of any one of claims 1-20, and a pharmaceutically acceptable excipient.

22. The pharmaceutical composition of claim 21, suitable for oral administration.

23. The pharmaceutical composition of claim 21, suitable for intravenous administration.

24. Use of a compound of any one of claims 1-20 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.

25. A compound represented by formula I:



(I)

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

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

R is H or 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_6 alkyl, -OH, C_1-C_6 alkoxy, $-CO_2H$, or -CONR'R', wherein R' for each occurrence is selected from H, C_1-C_6 alkyl or a nitrogen protecting group; and

X is H or -C_1-C_6 alkylene-C(O)-X', wherein X' is selected from the group consisting of C_3-C_6 cycloalkyl, a 4- to 6-membered heterocycloalkyl ring having 1, 2, or 3 heteroatoms selected from O, S, or N, phenyl and 4- to 6-membered heteroaryl ring having 1, 2, or 3 heteroatoms selected from O, S, or N, wherein X' is optionally substituted by one or more substituents selected from the group consisting of halogen, hydroxyl, C_1-C_6 alkyl and C_1-C_6 alkoxy.

26. The compound of claim 25, wherein R is C_1-C_2 alkyl.

27. The compound of claim 25, wherein R is methyl.

28. The compound of any one of claims 25-27, wherein R_1 is H.

29. The compound of any one of claims 25-28, wherein R_2 is H.

34. A pharmaceutical composition comprising a compound of any one of claims 25-33, and a pharmaceutically acceptable excipient.

35. The pharmaceutical composition of claim 34, suitable for oral administration.

36. The pharmaceutical composition of claim 34, suitable for intravenous administration.

37. Use of a compound of any one of claims 25-33 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.