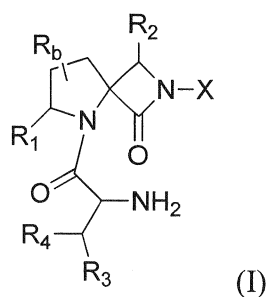


substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-C₃-C₁₀ cycloalkyl wherein the C₃-C₁₀ cycloalkyl is optionally substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and -CH₂-pyridyl; and

R₃₂ is selected from the group consisting of: H; C₁-C₆ alkyl; C₁-C₆ haloalkyl; phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and pyridyl.

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



or a pharmaceutically acceptable salt thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C₁-C₆ alkyl;

R₁ is H or C₁-C₆ alkyl;

R₂ is H or C₁-C₆ alkyl;

R₃ is selected from the group consisting of H, C₁-C₆alkyl, -OH, C₁-C₆alkoxy, -OC(O)-C₁-C₆ alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy);

R₄ is H or C₁-C₆ alkyl;

X is selected from the group consisting of:

(i) hydrogen;

(ii) -C₁₋₆alkylene-C₃₋₆cycloalkyl;

(~~iii~~) -C₁₋₆alkylene- 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(C₁-C₃ alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of

(~~iviii~~) -C₁₋₆alkylene- 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(C₁-C₃ alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of

(~~viv~~) -C₁₋₆alkylene- 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(C₁-C₃ alkyl), O, and S; wherein the heteroaryl is optionally substituted by one, two or three substituents independently selected from the group consisting of

(~~viv~~) branched unsubstituted C₃-C₆ alkyl; and

(~~viiiv~~) branched C₃-C₆ alkyl substituted with -C(O)NH₂ on one carbon and -OH on another carbon;

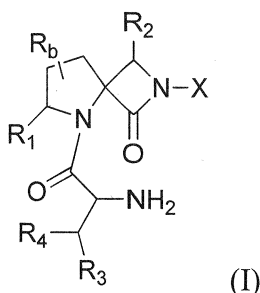
and wherein the -NH₂ group attached to the carbon adjacent to -CH(R₃)(R₄) is optionally substituted with a substituent selected from -C(O)OR₃₁ and -C(O) R₃₂, wherein:

R₃₁ is selected from the group consisting of: C₁-C₆ alkyl; C₁-C₆ haloalkyl; C₂-C₆ alkenyl; C₂-C₆ alkynyl; C₃-C₁₀ cycloalkyl, wherein the C₃-C₁₀ cycloalkyl is optionally substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-C₃-C₁₀ cycloalkyl wherein the C₃-C₁₀ cycloalkyl is optionally substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and -CH₂-pyridyl; and

R₃₂ is selected from the group consisting of: H; C₁-C₆ alkyl; C₁-C₆ haloalkyl; phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from

C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and pyridyl.

[0008b] In another aspect of the present disclosure, there is provided a compound represented by formula 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 C₁-C₆ alkyl;

R₁ is H or C₁-C₆ alkyl;

R₂ is H or C₁-C₆ alkyl;

R₃ is selected from the group consisting of H, C₁-C₆alkyl, -OH, C₁-C₆alkoxy, -OC(O)-C₁-C₆ alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy);

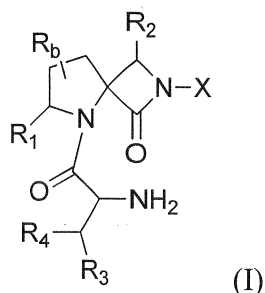
R₄ is H or C₁-C₆ alkyl; and

X is selected from the group consisting of hydrogen, -C₁₋₆alkylene-C₃₋₆cycloalkyl; C₁₋₆alkylene- heterocycle (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy), and -C₁₋₆alkylene- heteroaryl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy).

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

What is claimed is:

1. A compound represented by formula I:



or a pharmaceutically acceptable salt thereof, wherein

R_b is selected from the group consisting of H, halogen, hydroxyl, cyano and C₁-C₆ alkyl;

R₁ is H or C₁-C₆ alkyl;

R₂ is H or C₁-C₆ alkyl;

R₃ is selected from the group consisting of H, C₁-C₆alkyl, -OH, C₁-C₆alkoxy, -OC(O)-C₁-C₆ alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy);

R₄ is H or C₁-C₆ alkyl;

X is selected from the group consisting of:

(i) hydrogen;

(ii) -C₁₋₆alkylene-C₃₋₆cycloalkyl;

(iii) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy);

(iv) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy);

(~~vi~~iv) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy;

(~~vii~~v) branched unsubstituted C₃-C₆ alkyl; and

(~~viii~~vi) branched C₃-C₆ alkyl substituted with -C(O)NH₂ on one carbon and -OH on another carbon;

and wherein the -NH₂ group attached to the carbon adjacent to -CH(R₃)(R₄) is optionally substituted with a substituent selected from -C(O)OR₃₁ and -C(O) R₃₂, wherein:

R₃₁ is selected from the group consisting of: C₁-C₆ alkyl; C₁-C₆ haloalkyl; C₂-C₆ alkenyl; C₂-C₆ alkynyl; C₃-C₁₀ cycloalkyl, wherein the C₃-C₁₀ cycloalkyl is optionally substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-C₃-C₁₀ cycloalkyl wherein the C₃-C₁₀ cycloalkyl is optionally substituted with from 1-3 independently selected C₁-C₃ alkyl; -CH₂-phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and -CH₂-pyridyl; and

R₃₂ is selected from the group consisting of: H; C₁-C₆ alkyl; C₁-C₆ haloalkyl; phenyl, wherein the phenyl is optionally substituted with from 1-2 substituents independently selected from C₁-C₃ alkyl; C₁-C₃ haloalkyl; C₁-C₃ alkoxy; C₁-C₃ haloalkoxy; nitro; halo; SO₂Me, cyano; and -OC(O)CH₃; and pyridyl.

2. The compound of claim 1, wherein R₁ is H.
3. The compound of claim 1, wherein R₁ is C₁-C₆ alkyl.
4. The compound of claim 1, wherein R₁ is methyl.
5. The compound of any one of claims 1-4, wherein R₂ is H.
6. The compound of any one of claims 1-5, wherein R₃ is -OH.

7. The compound of any one of claims 1-6, wherein R₄ is C₁-C₆ alkyl.

8. The compound of any one of claims 1-6, wherein R₄ is methyl.

~~9. The compound of any one of claims 1-8, wherein X is hydrogen.~~

~~109.~~ 10. The compound of any one of claims 1-8, wherein X is selected from the group consisting of:

(~~iii~~) -C₁₋₆alkylene-C₃₋₆cycloalkyl;

(~~iiii~~) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy);

(~~iviii~~) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy); and

(~~viiv~~) -C₁₋₆alkylene- 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(C₁-C₃ 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, C₁-C₆alkyl, and C₁-C₆alkoxy.

~~110.~~ 11. The compound of any one of claims 1-8, wherein X is selected from the group consisting of:

(~~iii~~) -C₁₋₆alkylene-C₃₋₆cycloalkyl;

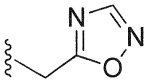
(~~iiii~~) -C₁₋₆alkylene- heterocyclyl including from 3 to 6 ring atoms wherein 1, 2, or 3 of the ring atoms are independently selected from the group consisting of N, NH, N(C₁-C₃ alkyl), O, and S; wherein the heterocyclyl is optionally substituted by one, two or three substituents independently selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy); and

(viii) -C₁₋₆alkylene- 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(C₁₋₃ 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, C₁₋₆alkyl, and C₁₋₆alkoxy.

~~12~~11. The compound of any one of claims 1-8, wherein X is -C₁₋₆alkylene- 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(C₁₋₃ 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, C₁₋₆alkyl, and C₁₋₆alkoxy.

~~13~~12. The compound of any one of claims 1-8, wherein X is C₁₋₂alkylene- 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(C₁₋₃ 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, C₁₋₆alkyl, and C₁₋₆alkoxy.

~~14~~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.

~~15~~14. The compound of any one of claims 1-8 and 10-14, wherein X is .

~~16~~15. The compound of claim 1, wherein R₁ is H; R₂ is H; R₃ is -OH; and R₄ is methyl; ~~and X~~ is hydrogen.

~~17~~16. The compound of claim 1, wherein R₁ is methyl; R₂ is H; R₃ is -OH; and R₄ is methyl; ~~and X~~ is hydrogen.

~~18~~17. The compound of any one of claims 1-~~17~~16, wherein the -NH₂ group attached to the carbon adjacent to -CH(R₃)(R₄) is not substituted.

~~19~~18. The compound of any one of claims 1-~~17~~16, wherein the -NH₂ group attached to the carbon adjacent to -CH(R₃)(R₄) is substituted with a substituent selected from -C(O)OR₃₁ and -C(O) R₃₂.

~~20~~19. The compound of claim ~~19~~18, wherein the -NH₂ group attached to the carbon adjacent to -CH(R₃)(R₄) is substituted with -C(O)OR₃₁.

2420. The compound of claim 2019, wherein R_{31} is C_1 - C_6 alkyl.

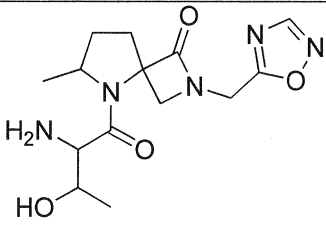
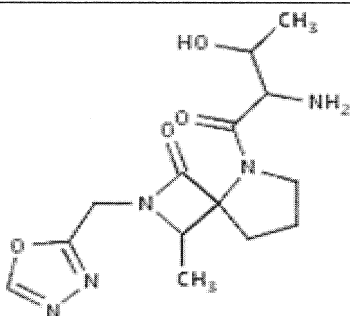
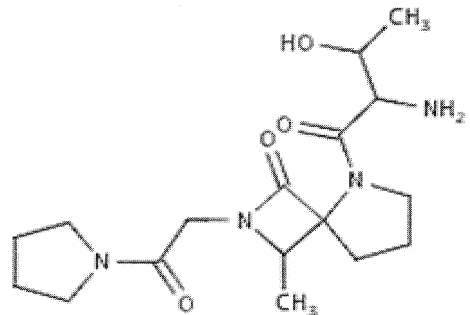
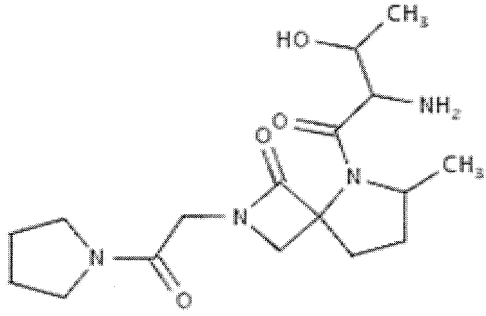
2221. The compound of claim 2420, wherein R_{31} is *tert*-butyl.

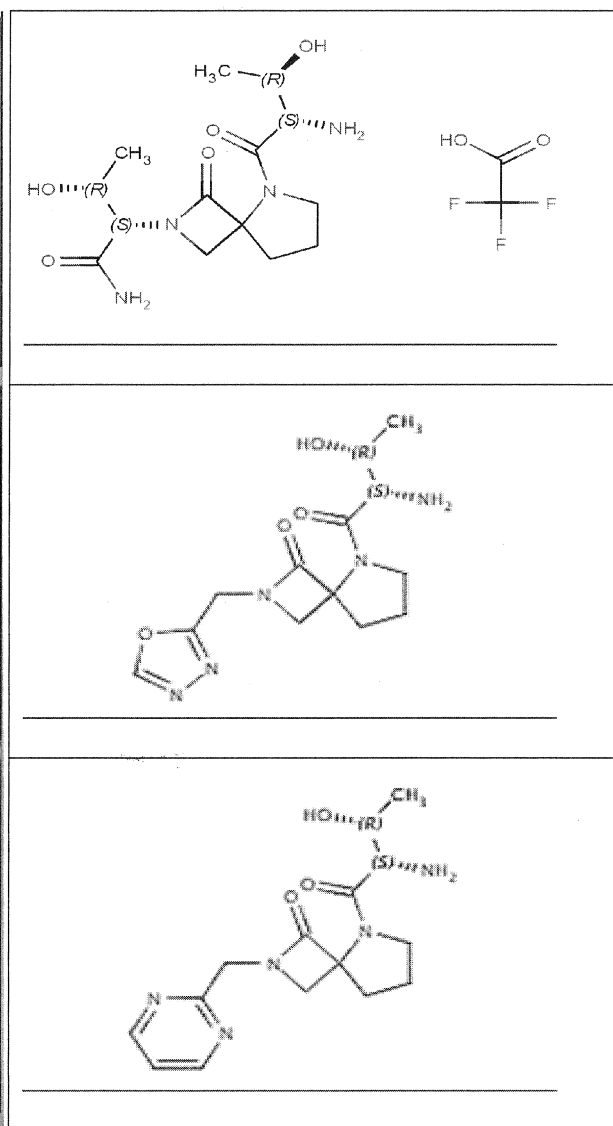
2322. The compound of claim 1918, wherein the $-NH_2$ group attached to the carbon adjacent to $-CH(R_3)(R_4)$ is substituted with $-C(O)R_{32}$.

2423. The compound of claim 2322, wherein R_{32} is C_1 - C_6 alkyl.

2524. The compound of claim 2322, wherein R_{32} is $-CH_3$ or *iso*-propyl.

2625. The compound of claim 1, wherein the compound is selected from: ~~the compounds~~ delineated in Table 1.



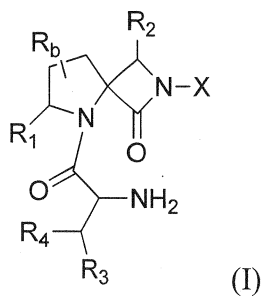
2726. A pharmaceutical composition comprising a compound of any one of claims 1-2625, and a pharmaceutically acceptable excipient.

2827. The pharmaceutical composition of claim 2726, suitable for oral administration.

2928. The pharmaceutical composition of claim 2726, suitable for intravenous administration.

3029. Use of a compound of any one of claims 1-2625 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.

3130. A compound represented by formula 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 C₁-C₆ alkyl;

R₁ is H or C₁-C₆ alkyl;

R₂ is H or C₁-C₆ alkyl;

R₃ is selected from the group consisting of H, C₁-C₆alkyl, -OH, C₁-C₆alkoxy, -OC(O)-C₁-C₆ alkyl and -OC(O)-phenyl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy);

R₄ is H or C₁-C₆ alkyl; and

X is selected from the group consisting of hydrogen, -C₁₋₆alkylene-C₃₋₆cycloalkyl; C₁₋₆alkylene- heterocycle (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy), and -C₁₋₆alkylene- heteroaryl (optionally substituted by one, two or three substituents selected from the group consisting of halogen, hydroxyl, C₁-C₆alkyl, and C₁-C₆alkoxy).

~~3231~~. The compound of claim ~~3130~~, wherein R₁ is C₁-C₆ alkyl.

~~3332~~. The compound of claim ~~3130~~, wherein R₁ is methyl.

~~3433~~. The compound of any one of claims ~~31-3330-32~~, wherein R₂ is H.

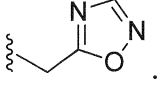
~~3534~~. The compound of any one of claims ~~31-3430-33~~, wherein R₃ is -OH.

~~3635~~. The compound of any one of claims ~~31-3530-34~~, wherein R₄ is C₁-C₆ alkyl.

~~3736~~. The compound of any one of claims 30-35, wherein R₄ is methyl.

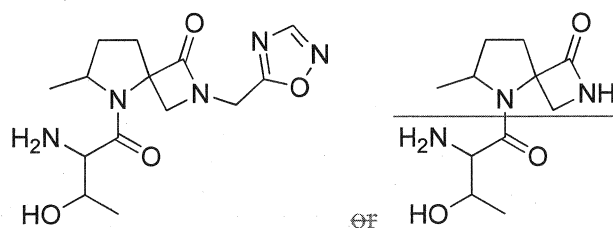
~~3837~~. The compound of any one of claims ~~31-3730-36~~, wherein X is hydrogen.

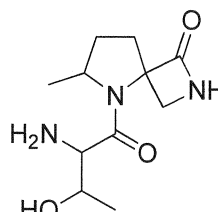
~~3938~~. The compound of any one of claims ~~31-3730-36~~, wherein X is C₁₋₂alkylene- heteroaryl.

~~4039~~. The compound of any one of claims ~~31-3730-36~~, wherein X is .

~~4140~~. The compound of claim ~~3130~~, wherein R₁ is methyl; R₂ is H; R₃ is -OH; R₄ is methyl; and X is hydrogen.

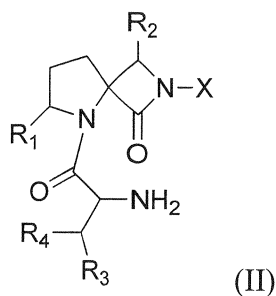
~~4241~~. The compound of claim 1, wherein the compound is





42. The compound of claim 30, wherein the compound is HO.

43. A compound represented by formula II:



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

R₁ is H or C₁-C₆ alkyl;

R₂ is H or C₁-C₆ alkyl;

R₃ is selected from the group consisting of H, C₁-C₆ alkyl, -OH, C₁-C₆ alkoxy, -OC(O)-C₁-C₆ alkyl and -OC(O)-phenyl;

R₄ is H or C₁-C₆ alkyl; and

X is -C₁-C₆alkylene-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, C₁-C₆alkyl, and C₁-C₆alkoxy.

44. A pharmaceutical composition comprising a compound of any one of claims ~~31~~30-43, and a pharmaceutically acceptable excipient.
45. The pharmaceutical composition of claim 44, suitable for oral administration.
46. The pharmaceutical composition of claim 44, suitable or intravenous administration.
47. Use of a compound of any one of claims ~~31~~30-43 in the manufacture of a medicament for treating depression, Alzheimer's disease, attention deficit disorder, schizophrenia, or anxiety, in a patient in need thereof.