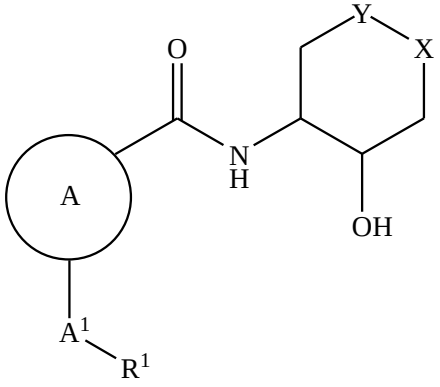
We Claim:

1. A compound of formula (I),



(I)

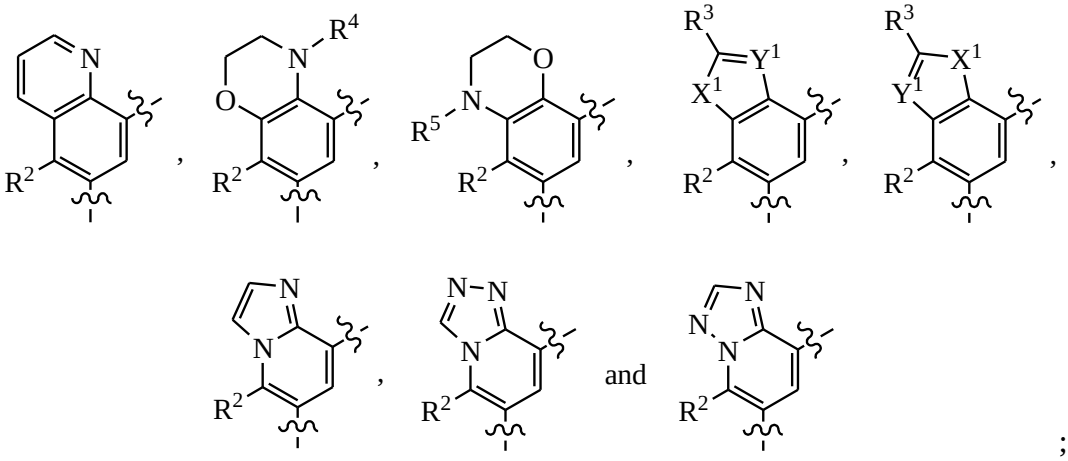
wherein:

R^1 is –(C_{6-10})-aryl or –(C_{5-10})-heteroaryl; each of which is optionally substituted with one or more substituents selected from halogen, –OH, –O–(C_{1-6})–alkyl, –S–(C_{1-6})–alkyl, –N(CH_3)$_2$, –(C_{1-6})–alkyl, –(C_{3-6})–cycloalkyl, halo(C_{1-6})–alkyl, –NH_2, –CN and R^{1a};

R^{1a} is –(C_{6-10})-aryl or –(C_{5-10})-heteroaryl; each of which is optionally substituted with one or more substituents selected from the group consisting of halogen, –OH, –NH_2, –CN, –O–(C_{1-6})–alkyl, –S–(C_{1-6})–alkyl, –(C_{1-6})–alkyl and –(C_{3-6})-cycloalkyl;

A^1 is CH_2 or CHF;

ring A is selected from the group consisting of:



;

"〰" represents point of attachment;

R^2 is hydrogen, –(C_{1-6})–alkyl or –(C_{3-6})–cycloalkyl;

R^3 is hydrogen, halogen, –OH, –(C_{1-6})–alkyl, –O–(C_{1-6})–alkyl or halo(C_{1-6})–alkyl;

R^4 is hydrogen, –(C_{1-6})–alkyl or halo(C_{1-6})–alkyl;

R^5 is hydrogen, –(C_{1-6})–alkyl or halo(C_{1-6})–alkyl;

X^1 is independently selected from O, S, NH or NCH_3;

Y^1 is independently selected from N or CH;

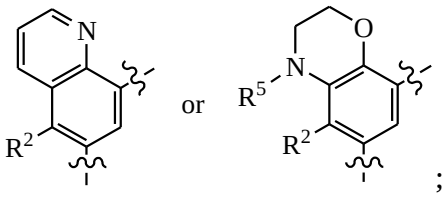
X is independently selected from CH_2, O, NH or NCH_3; and

Y is independently selected from CH_2, O, NH or NCH_3;

or an isotopic form, a stereoisomer, a tautomer or a pharmaceutically acceptable salt thereof.

2. The compound of formula (I) as claimed in claim 1, wherein:

ring A is selected from the group consisting of;



;

R^1 is –(C_{6-10})-aryl or –(C_{5-10})-heteroaryl; each of which is optionally substituted with one or more substituents selected from halogen and R^{1a};

R^{1a} is –(C_{5-10})-heteroaryl; which is optionally substituted with –(C_{1-6})–alkyl;

A^1 is CH_2;

"∿∿∿" represents point of attachment;

R^2 is hydrogen or –(C_{1-6})–alkyl;

R^5 is hydrogen;

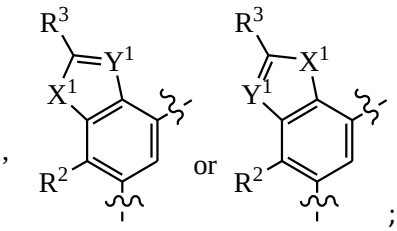
X is independently selected from CH_2 or O; and

Y is independently selected from CH_2;

or an isotopic form, a stereoisomer, a tautomer or a pharmaceutically acceptable salt thereof.

3. The compound of formula (I) as claimed in claim 1, wherein:

ring A is selected from the group consisting of;



;

R^1 is –(C_{6-10})-aryl or –(C_{5-10})-heteroaryl; each of which is optionally substituted with one or more substituents selected from halogen and R^{1a};

R^{1a} is –(C_{5-10})-heteroaryl; which is optionally substituted with –(C_{1-6})–alkyl;

A^1 is CH_2;

"〰" represents point of attachment;

R^2 is hydrogen or –(C_{1-6})–alkyl;

R^3 is hydrogen, or –(C_{1-6})–alkyl;

X^1 is independently selected from O, or NH;

Y^1 is independently selected from N or CH;

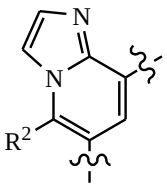
X is independently selected from CH_2; and

Y is independently selected from CH_2;

or an isotopic form, a stereoisomer, a tautomer or a pharmaceutically acceptable salt thereof.

4. The compound of formula (I) as claimed in claim 1, wherein:

ring A is



;

R^1 is –(C_{6-10})-aryl; which is optionally substituted with one or more substituents selected from halogen, and R^{1a};

R^{1a} is –(C_{6-10})-aryl or –(C_{5-10})-heteroaryl; each of which is optionally substituted with –(C_{1-6})–alkyl;

A^1 is CH_2;

"〰" represents point of attachment;

R^2 is hydrogen or –(C_{1-6})–alkyl;

X is independently selected from CH_2;

Y is independently selected from CH_2;

or an isotopic form, a stereoisomer, a tautomer or a pharmaceutically acceptable salt thereof.

5. The compound as claimed in claim 1, wherein the compound is selected from the group consisting of:

N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2-chloropyridin-4-ylmethyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2,3-difluorobenzyl)-5-methylquinoline-8-carboxamide;
N-(cis-3S,4S-3-Hydroxytetrahydropyran-4-yl)-6-(2-chloropyridin-5-ylmethyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2-fluoropyridin-4-ylmethyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2-fluorobenzyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2-chloropyridin-5-ylmethyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2-(1-methyl-1H-pyrazol-4-yl)-pyridin-5-ylmethyl]-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2,3-difluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[3-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(4-pyrazol-1-yl-benzyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(4-thiazol-4-yl-benzyl)-5-methylquinoline-8-carboxamide;
N-(cis-3S,4S-3-Hydroxytetrahydropyran-4-yl)-6-(4-thiazol-4-yl-benzyl)-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-benzyl-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-5-methylquinoline-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-5-methyl-3,4-dihydro-2H-benzo[1,4]oxazine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(4-pyrazol-1-yl-benzyl)-5-methyl-3,4-dihydro-2H-benzo[1,4]oxazine-8-carboxamide;

N-(cis-1S,2S-2-Hydroxycyclohexyl)-5-methyl-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-5-methyl-6-(4-pyrazol-1-yl-benzyl)-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-5-methyl-6-[2-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2,3-difluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(2,3-difluorobenzyl)-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(4-thiazol-4-yl-benzyl)-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-(4-phenyl-benzyl)-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-imidazo[1,2-a]pyridine-8-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-(4-pyrazol-1-yl-benzyl)-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)- 6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[2-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[2-chloropyridin-3-ylmethyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[4-(thiazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[2,3-difluorobenzyl]-1H-benzimidazole-4-carboxamide;

N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[3,4-difluorobenzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[6-(1-methyl-1H-pyrazol-4-yl)-pyridin-3-ylmethyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-7-methyl-6-[2,3-difluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-6-[2,3-difluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-2,7-dimethyl-6-(4-pyrazol-1-yl-benzyl)-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-2,7-dimethyl-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-2,7-dimethyl-6-(4-thiazol-4-yl-benzyl)-1H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-3,7-dimethyl-6-[2-fluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-3H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-3,7-dimethyl-6-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-3H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-3,7-dimethyl-6-[2,3-difluoro-4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-3H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-3,7-dimethyl-6-[6-(1-methyl-1H-pyrazol-4-yl)-pyridin-3-ylmethyl]-3H-benzimidazole-4-carboxamide;
N-(cis-1S,2S-2-Hydroxycyclohexyl)-3,7-dimethyl-6-[4-(thiazol-4-yl)-benzyl]-3H-benzimidazole-4-carboxamide; and
N-(cis-1S,2S-2-Hydroxycyclohexyl)-2,4-dimethyl-5-[4-(1-methyl-1H-pyrazol-4-yl)-benzyl]-benzofuran-7-carboxamide;
or a pharmaceutically acceptable salt thereof.

6. A pharmaceutical composition comprising the compound of formula (I) or a pharmaceutically acceptable salt thereof as claimed in any one of the claims 1 to 5 and pharmaceutically acceptable excipients.

7. The pharmaceutical composition as claimed in claim 6, for use in the treatment of disease or disorder mediated by muscarinic M1 receptor, wherein said disease or disorder is

selected from the group consisting of cognitive disorders, Alzheimer’s disease, schizophrenia, pain or sleep disorders.

8. A compound of formula (I) or a pharmaceutically acceptable salt thereof as claimed in any one of the claims 1 to 5, for use in the treatment of disease or disorder mediated by muscarinic M1 receptor, wherein the disease or disorder is selected from the group consisting of cognitive disorders, Alzheimer’s disease, schizophrenia, pain or sleep disorders.

9. The compound for use as claimed in claim 8, wherein the cognitive disorder is selected from the group consisting of dementia in Alzheimer's disease, dementia in Parkinson's disease, dementia in Huntington's disease, dementia associated with Down syndrome, dementia associated with Tourette’s syndrome, dementia associated with post menopause, frontotemporal dementia, Lewy body dementia, Vascular dementia, dementia in HIV, dementia in Creutzfeldt-Jakob disease, substance–induced persisting dementia, dementia in Pick’s disease, dementia in schizophrenia, senile dementia and dementia in general medical conditions.

10. Use of the pharmaceutical composition as claimed in claim 6, in the manufacture of a medicament for the treatment of disease or disorder selected from cognitive disorders, Alzheimer’s disease, schizophrenia, pain or sleep disorders.

11. Use of the compound of formula (I) as claimed in any one of the claims 1 to 5, in the manufacture of medicament for the treatment of disease or disorder selected from cognitive disorders, Alzheimer’s disease, schizophrenia, pain or sleep disorders.

12. A combination comprising the compound of formula (I) as claimed in any one the claims 1 to 5, with one or more therapeutic agents selected from acetylcholinesterase inhibitors and NMDA receptor antagonist.

13. The combination as claimed in claim 12, wherein the acetylcholinesterase inhibitor is selected from the group consisting of donepezil, rivastigmine, tacrine and galantamine or a pharmaceutically acceptable salt thereof.

14. The combination as claimed in claim 12, wherein the NMDA receptor antagonist is memantine or a pharmaceutically acceptable salt thereof.

15. The combination as claimed in claim 12, for use in the treatment of cognitive disorders, Alzheimer’s disease, schizophrenia, pain or sleep disorders in a patient.