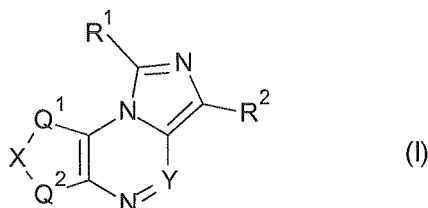


R^{Ar2} , R^{Ar3} , R^{Ar4} , R^{Ar5} and R^{Ar6} have one of the meanings given for R^{11} , R^{Ar7} and R^{Ar8} are as defined for R^{17} and R^{18} , and R^{Ar9} has one of the meanings given for R^{19} ;

R^z has one of the meanings given for R^x ;

the N-oxides, tautomers, the prodrugs and the pharmaceutically acceptable salts thereof.

In one aspect, there is provided a compound of formula I



where in formula I the variables X, Y, Q^1 , Q^2 , R^1 and R^2 have the following meanings:

X is $C-R^3$ or N;

Q^1 is S or O and Q^2 is $C-R^4$ or N and Q^2 is connected to X via a double bond while Q^1 is connected to X via a single bond; or

Q^2 is S or O and Q^1 is $C-R^4$ or N and Q^1 is connected to X via a double bond while Q^2 is connected to X via a single bond;

Y is $C-R^5$;

R^1 is selected from the group consisting of hydrogen, halogen, R^{11} and a moiety Z^1-Ar^1 ;

R^2 is trimethylsilyl, C_1 - C_8 -alkyl, C_3 - C_8 -cycloalkyl and C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, where the three last mentioned radicals may be unsubstituted, partially or completely halogenated or where the C_3 - C_8 -cycloalkyl radicals may carry 1, 2 or 3 radicals methyl groups;

R^3 is selected from the group consisting of hydrogen, halogen, R^{31} , and OR^{32} ;

R^4 is hydrogen, halogen, OR^{42} , or a group Z^4-Ar^4 ;

R^5 is hydrogen, halogen, C_1 - C_4 -alkyl which is unsubstituted or carries a hydroxyl group, or C_1 - C_4 -haloalkyl;

R^{11} is C_1 - C_8 -alkyl, C_3 - C_8 -cycloalkyl and C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, where the cycloalkyl moieties in the aforementioned radicals are unsubstituted or carry 1, 2 or 3 radicals selected from fluorine or chlorine;

R^{31} is trimethylsilyl, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_3 - C_6 -cycloalkyl, C_3 - C_6 -cycloalkylmethyl or C_3 - C_4 -alkenyl;

R^{32} is C_1 - C_4 -alkyl or C_1 - C_4 -haloalkyl,

R^{42} is C_1 - C_4 -alkyl or C_1 - C_4 -haloalkyl;

Ar^1 is selected from the group consisting of aryl, monocyclic 5- or 6-membered hetaryl and bicyclic 9- or 10-membered hetaryl, where hetaryl has 1, 2 or 3 heteroatoms as ring members which are selected from O, S and N, where aryl and hetaryl are unsubstituted or may carry 1, 2, 3 or 4 identical or different substituents R^{Ar} ;

Ar^4 is selected from the group consisting of C-bound 6-membered monocyclic hetaryl, which has 1 or 2 nitrogen atoms as ring members, and C-bound, 9- or 10-membered, fused bicyclic hetaryl, which has 1 or 2 nitrogen atoms as ring members and optionally a further heteroatom selected from O, S and N as ring member, where monocyclic hetaryl and bicyclic hetaryl may be unsubstituted or may carry 1, 2 or 3 substituents selected from halogen, C_1 - C_4 -alkyl, C_1 - C_2 -fluoroalkyl, C_1 - C_4 -alkoxy, C_1 - C_2 -fluoroalkoxy, C_3 - C_6 -cycloalkyl, and fluorinated C_3 - C_6 -cycloalkyl;

Z^1 is a single bond, O, CH_2 , CH_2CH_2 , CH_2O and OCH_2 ;

Z^4 is CH_2 , 1,2-ethanediyl, 1,3-propanediyl, CH_2O , OCH_2 , CH_2CH_2O or OCH_2CH_2 , wherein 1, 2, 3 or 4 hydrogen atoms may be replaced by a fluorine atom;

R^{Ar} is selected from the group consisting halogen, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, OH, SH, CN, CF_3 , O- CF_3 , COOH, O- CH_2 -COOH, C_1 - C_6 -alkoxy, C_1 - C_4 -haloalkoxy, C_1 - C_6 -alkylthio, C_3 - C_7 -cycloalkyl, COO- C_1 - C_6 -alkyl, $CONH_2$, $CONH$ - C_1 - C_6 -alkyl, SO_2NH - C_1 - C_6 -alkyl, CON -(C_1 - C_6 -alkyl) $_2$, SO_2N -(C_1 - C_6 -alkyl) $_2$, NH - SO_2 - C_1 - C_4 -alkyl, NH - SO_2 - C_1 - C_4 -haloalkyl, NH -CO- C_1 - C_4 -alkyl, NH -CO- C_1 - C_4 -haloalkyl, SO_2 - C_1 - C_4 -alkyl, SO_2 - C_1 - C_6 -haloalkyl, phenyl, O-phenyl, O- CH_2 -phenyl, $CONH$ -phenyl, SO_2NH -phenyl, SO_2 -phenyl, NH - SO_2 -phenyl, NH -CO-phenyl, $CONH$ -hetaryl, SO_2NH -hetaryl, NH - SO_2 -hetaryl and NH -CO-hetaryl, where hetaryl in the

for last mentioned radicals is 5- or 6-membered hetaryl having one heteroatom selected from O, S and N as ring member and optionally one further nitrogen atom as ring member, where phenyl and hetaryl in the last 11 radicals mentioned are unsubstituted or may have 1, 2 or 3 substituents which are selected from halogen, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy and C₁-C₄-haloalkoxy;

the N-oxides, tautomers, the prodrugs and the pharmaceutically acceptable salts thereof.

In one aspect, there is provided the compound as described herein for the use in the treatment of a medical disorder, selected from neurological and psychiatric disorders which can be treated by modulation of phosphodiesterase type 10 in a mammalian.

In one aspect, there is provided the compound as described herein for the use in the treatment of drug abuse in a mammalian.

In one aspect, there is provided a pharmaceutical composition which comprises a pharmaceutically acceptable carrier and a compound as described herein.

In one aspect, there is provided the use of at least one compound as described herein in the manufacture of a medicament for treating a medical disorder, selected from neurological and psychiatric disorders which can be treated by modulation of phosphodiesterase type 10.

In one aspect, there is provided the compound as described herein for use in treating, controlling, ameliorating or reducing the risk of depression in a mammalian.

In one aspect, there is provided the use of at least one compound as disclosed herein in the manufacture of a medicament for treating, controlling, ameliorating or reducing the risk of CNS disorders in a mammalian.

In one aspect, there is provided the use of at least one compound as disclosed herein in the manufacture of a medicament for treating, controlling, ameliorating or reducing the risk of schizophrenia in a mammalian, or

for treating, controlling, ameliorating or reducing cognitive dysfunction associated with schizophrenia in a mammalian; or

for treating, controlling, ameliorating or reducing the risk of bipolar disorders in a mammalian;

for treating, controlling, ameliorating or reducing the risk of depression in a mammalian; or

for treating, controlling, ameliorating or reducing cognitive dysfunction associated with Alzheimer's disease in a mammalian; or
for treating, controlling, ameliorating or reducing the risk of diet-induced obesity in a mammalian.

5 Brief Description of the Invention

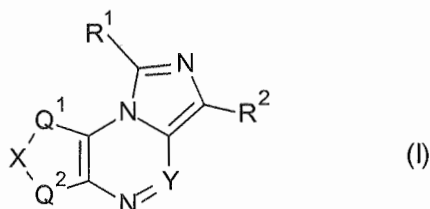
The present invention is thus based on the object of providing compounds which inhibit PDE10A at low concentrations.

10 The compounds are further intended to display at least one of the properties i. to viii. mentioned above, in particular high selectivity with regard to inhibition of PDE10A, high selectivity vis-à-vis other phosphodiesterases such as , enhanced metabolic stability, in particular microsomal stability, cytosolic stability or hepatocyte stability, low affinity to the HERG receptor, low inhibition of cytochrome P450 (CYP) enzymes, suitable solubility in water and suitable pharmacokinetics.

15 This object and further objects are achieved by the compounds of the general formula I described below, the N-oxides, the prodrugs, the hydrates and the tautomers thereof and the pharmaceutically suitable salts thereof:

We claim:

1. Compound of formula I



where in formula I the variables X, Y, Q¹, Q², R¹ and R² have the following meanings:

X is C-R³ or N;

Q¹ is S or O and Q² is C-R⁴ or N and Q² is connected to X via a double bond while Q¹ is connected to X via a single bond; or

Q² is S or O and Q¹ is C-R⁴ or N and Q¹ is connected to X via a double bond while Q² is connected to X via a single bond;

Y is C-R⁵ or N;

R¹ is selected from the group consisting of hydrogen, halogen, cyano, nitro, R¹¹, OH, OR¹², S(O)_qR¹³, C(O)H, C(O)R¹⁴, C(O)OH, C(O)OR¹⁵, OC(O)R¹⁶, Y¹-NR¹⁷R¹⁸, Y¹-N(R¹⁹)-Y³-NR¹⁷R¹⁸, Y¹-N(R¹⁹)-Y²-R^{15a} and a moiety Z¹-Ar¹;

R² is selected from the group consisting of hydrogen, halogen, cyano, nitro, R²¹, OH, OR²², S(O)_qR²³, C(O)H, C(O)R²⁴, C(O)OH, C(O)OR²⁵, OC(O)R²⁶, Y¹-NR²⁷R²⁸, Y¹-N(R²⁹)-Y³-NR²⁷R²⁸, Y¹-N(R¹⁹)-Y²-R^{25a} and a moiety Z²-Ar²;

provided that at least one of R¹ and R² is different from hydrogen;

R³ is selected from the group consisting of hydrogen, halogen, cyano, nitro, R³¹, OR³², S(O)_qR³³, C(O)H, C(O)R³⁴, C(O)OH, C(O)OR³⁵, OC(O)R³⁶, Y¹-NR³⁷R³⁸, Y¹-N(R³⁹)-Y³-NR³⁷R³⁸, Y¹-N(R³⁹)-Y²-R^{35a} and a moiety Z³-Ar³;

R⁴ is selected from the group consisting of hydrogen, halogen, cyano, nitro, R⁴¹, OR⁴², S(O)_qR⁴³, C(O)H, C(O)R⁴⁴, C(O)OH, C(O)OR⁴⁵, OC(O)R⁴⁶,

$Y^1-NR^{47}R^{48}$, $Y^1-N(R^{49})-Y^3-NR^{47}R^{48}$, $Y^1-N(R^{49})-Y^2-R^{45a}$ and a moiety Z^4-Ar^4 ;

R^5 is selected from the group consisting of hydrogen, halogen, cyano, nitro, R^{51} , OR^{52} , $S(O)_qR^{53}$, $C(O)H$, $C(O)R^{54}$, $C(O)OH$, $C(O)OR^{55}$, $OC(O)R^{56}$, $Y^1-NR^{57}R^{58}$, $Y^1-N(R^{59})-Y^3-NR^{57}R^{58}$, $Y^1-N(R^{59})-Y^2-R^{55a}$ and a moiety Z^5-Ar^5 ;

R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{21} , R^{22} , R^{23} , R^{24} , R^{25} , R^{26} , R^{31} , R^{32} , R^{33} , R^{34} , R^{35} , R^{36} , R^{41} , R^{42} , R^{43} , R^{44} , R^{45} , R^{46} , R^{51} , R^{52} , R^{53} , R^{54} , R^{55} and R^{56} , independently of each other, are selected from the group consisting of C_1 - C_8 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkynyl, C_3 - C_8 -cycloalkyl, C_5 - C_8 -cycloalkenyl, C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, where the 6 aforementioned substituents may be unsubstituted, partially or completely halogenated or carry 1, 2 or 3 radicals R^y , and C-bound 5- to 8-membered heterocyclyl, which is saturated or partially unsaturated and has 1 or 2 heteroatom moieties as ring members, which are selected from the group consisting of O, N, S, $S(O)$, $S(O)_2$ or $N-R^x$, where heterocyclyl is unsubstituted or carries 1, 2, 3 or 4 radicals R^{yy} ;

R^{17} and R^{18} , independently of each other, are selected from the group consisting of hydrogen, tri- C_1 - C_4 -alkylsilyl, C_1 - C_8 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkynyl, C_3 - C_8 -cycloalkyl, C_5 - C_8 -cycloalkenyl, C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, where the 6 aforementioned substituents may be unsubstituted, partially or completely halogenated or carry 1, 2 or 3 radicals R^y , C_1 - C_8 -alkylcarbonyl, C_1 - C_4 -haloalkylcarbonyl, C_1 - C_8 -alkylsulfonyl, C_1 - C_4 -haloalkylsulfonyl, and C-bound 5- to 8-membered heterocyclyl, which is saturated or partially unsaturated and has 1 or 2 heteroatom moieties as ring members, which are selected from the group consisting of O, N, S, $S(O)$, $S(O)_2$ or $N-R^x$, where heterocyclyl is unsubstituted or carries 1, 2, 3 or 4 radicals R^{yy} or R^{17} and R^{18} , together with the nitrogen atom, to which they are attached, form an N-bound 5- to 8-membered heterocyclyl, which is saturated, partially unsaturated or aromatic and in addition to the nitrogen atom may have 1 or 2 further heteroatom moieties as ring members, which are selected from the group consisting of O, N, S, $S(O)$, $S(O)_2$ or $N-R^x$, where heterocyclyl is unsubstituted or carries 1, 2, 3 or 4 radicals R^{yy} ;

R^{19} , R^{29} , R^{39} , R^{49} and R^{59} , independently of each other, are hydrogen or have one of the meanings given for R^{11} ;

R^{27} and R^{28} are as defined for R^{17} and R^{18} ;

R^{37} and R^{38} are as defined for R^{17} and R^{18} ;

R^{47} and R^{48} are as defined for R^{17} and R^{18} ;

R^{57} and R^{58} are as defined for R^{17} and R^{18} ;

5 R^{15a} , R^{25a} , R^{35a} , R^{45a} and R^{55a} , independently of each other, have one of the meanings given for R^{11} ;

q is 0, 1 or 2

10 Ar^1 , Ar^2 , Ar^3 , Ar^4 and Ar^5 , independently of each other, are selected from the group consisting of aryl, monocyclic 5- or 6-membered hetaryl and bicyclic 9 or 10 membered hetaryl, where hetaryl has 1, 2 or 3 heteroatoms as ring members which are selected from O, S and N, where aryl and hetaryl are unsubstituted or may carry 1, 2, 3 or 4 identical or different substituents R^{Ar} ;

Y^1 is a single bond, C_1 - C_4 -alkylene, Y^5 -O- Y^6 , Y^5 -S(O)_q- Y^6 , Y^5 -C(O)- Y^6 , Y^5 -C(S)- Y^6 , Y^5 -C(O)O- Y^6 , Y^5 -OC(O)- Y^6 , or Y^5 -N(R^Z)- Y^4 ;

15 Y^2 is a single bond, C_1 - C_4 -alkylene, Y^5 -O- Y^6 , Y^5 -S(O)_q- Y^6 , Y^5 -C(O)- Y^6 , Y^5 -C(S)- Y^6 , Y^5 -C(O)O- Y^6 , Y^5 -OC(O)- Y^6 , or Y^5 -N(R^Z)- Y^4 ;

Y^3 is a single bond, C_1 - C_4 -alkylene, Y^5 -S(O)_q- Y^6 , Y^5 -C(O)- Y^6 , Y^5 -C(S)- Y^6 , Y^5 -C(O)O- Y^6 , or Y^5 -OC(O)- Y^6 ;

20 Y^4 is a C_1 - C_4 -alkylene, Y^5 -S(O)_q- Y^6 , Y^5 -C(O)- Y^6 , Y^5 -C(S)- Y^6 , Y^5 -C(O)O- Y^6 , or Y^5 -OC(O)- Y^6 ;

Y^5 is a single bond or C_1 - C_4 -alkylene;

Y^6 is a single bond or C_1 - C_4 -alkylene;

25 Z^1 , Z^2 , Z^3 , Z^4 and Z^5 are independently of each other selected from a single bond, C_1 - C_4 -alkylene, Y^5 -O- Y^6 , Y^5 -S(O)_q- Y^6 , Y^5 -C(O)- Y^6 , Y^5 -C(S)- Y^6 , Y^5 -C(O)O- Y^6 , Y^5 -OC(O)- Y^6 and Y^5 -N(R^Z)- Y^4 ;

30 R^x is selected from the group consisting of hydrogen, C_1 - C_8 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkynyl, C_3 - C_8 -cycloalkyl, C_5 - C_8 -cycloalkenyl, C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, where the 6 aforementioned substituents may be unsubstituted, partially or completely halogenated or carry 1, 2 or 3 radicals R^y , phenyl and phenyl- C_1 - C_4 -alkyl, where phenyl and phenyl- C_1 - C_4 -alkyl are unsubstituted or may carry 1, 2, 3 or 4 radicals R^{yy} ;

R^y is selected from the group consisting of cyano, OH, OR^{y2} , $S(O)_qR^{y3}$, $C(O)H$, $C(O)R^{y4}$, $C(O)OH$, $C(O)OR^{y5}$, $OC(O)R^{y6}$, $Y^1-NR^{y7}R^{y8}$, $Y^1-N(R^{y9})-Y^3-NR^{y7}R^{y8}$ and $Y^1-N(R^{y9})-Y^2-R^{y0}$;

5 R^{yy} is selected from the group consisting of cyano, halogen, R^{y1} , OH, OR^{y2} , $S(O)_qR^{y3}$, $C(O)H$, $C(O)R^{y4}$, $C(O)OH$, $C(O)OR^{y5}$, $OC(O)R^{y6}$, $Y^1-NR^{y7}R^{y8}$, $Y^1-N(R^{y9})-Y^3-NR^{y7}R^{y8}$ and $Y^1-N(R^{y9})-Y^2-R^{y0}$;

10 R^{y0} , R^{y2} , R^{y3} , R^{y4} , R^{y5} and R^{y6} , independently of each other, are selected from the group consisting of C_1 - C_8 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkynyl, C_3 - C_8 -cycloalkyl, C_5 - C_8 -cycloalkenyl, C_3 - C_8 -cycloalkyl- C_1 - C_4 -alkyl, and C-bound 5- to 8-membered heterocyclyl, which is saturated or partially unsaturated and has 1 or 2 heteroatom moieties as ring members, which are selected from the group consisting of O, N, S, $S(O)$, $S(O)_2$, NH or or N-(C_1 - C_4 -alkyl);

15 R^{y7} and R^{y8} are as defined for R^{y0} or, together with the nitrogen atom, to which they are attached, form an N-bound 5- to 8-membered heterocyclyl, which is saturated or partially unsaturated and in addition to the nitrogen atom may have 1 or 2 further heteroatom moieties as ring members, which are selected from the group consisting of O, N, S, $S(O)$, $S(O)_2$, NH or or N-(C_1 - C_4 -alkyl), where heterocyclyl is unsubstituted or carries 1, 2, 3 or 4 radicals selected from C_1 - C_4 -alkyl;

20 R^{y9} is hydrogen or has one of the meanings given for R^{y0} ;

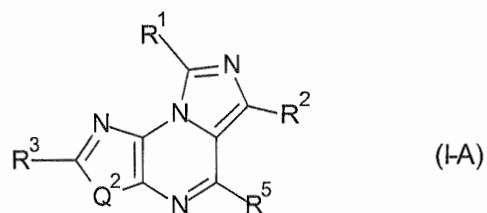
25 R^{Ar} is selected from the group consisting of halogen, cyano, nitro, OH, $C(O)NH_2$, R^{Ar1} , OR^{Ar2} , $S(O)_qR^{Ar3}$, $C(O)H$, $C(O)R^{Ar4}$, $C(O)OH$, $C(O)OR^{Ar5}$, $OC(O)R^{Ar6}$, $Y^1-NR^{Ar7}R^{Ar8}$, $Y^1-N(R^{Ar9})-Y^3-NR^{Ar7}R^{Ar8}$, $Y^1-N(R^{Ar9})-Y^2-R^{Ar0}$, where R^{Ar0} , R^{Ar1} , R^{Ar2} , R^{Ar3} , R^{Ar4} , R^{Ar5} and R^{Ar6} have one of the meanings given for R^{11} , R^{Ar7} and R^{Ar8} are as defined for R^{17} and R^{18} , and R^{Ar9} has one of the meanings given for R^{19} ;

30 R^z has one of the meanings given for R^x ;
the N-oxides, tautomers, the prodrugs and the pharmaceutically acceptable salts thereof.

2. The compound of claim 1, where R^1 is a radical R^{11} or a moiety Z^1-Ar^1 .

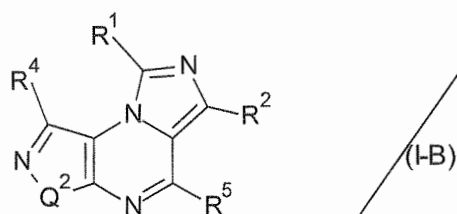
3. The compound of claim 1, where R^1 is a moiety Z^1-Ar^1 , where Z^1 is a single bond.
4. The compound of claim 1, where R^1 is a moiety Z^1-Ar^1 , where Ar^1 is selected from the group consisting of phenyl, thienyl, pyrazolyl, isoxazolyl, thiazolyl,
5 1,2,4-oxadiazolyl and pyridyl, where phenyl, thienyl, pyrazolyl, isoxazolyl, 1,2,4-oxadiazolyl, thiazolyl and pyridyl are unsubstituted or carry 1, 2, 3 or 4 identical or different substituents R^{Ar} .
5. The compound of any of the preceding claims, where R^2 is a radical R^{21} , in
10 particular a radical selected from the group consisting of trimethylsilyl, C_1-C_8 -alkyl, C_3-C_8 -cycloalkyl and C_3-C_8 -cycloalkyl- C_1-C_4 -alkyl, where the three last mentioned radicals may be unsubstituted, partially or completely halogenated or where the C_3-C_8 -cycloalkyl radicals may carry 1, 2 or 3 radicals methyl groups and where R^2 is especially methyl.
15
6. The compound of any of the preceding claims, where Q^1 is N and X is $C-R^3$.
7. The compound of claim 6, where R^3 is selected from the group consisting of hydrogen, halogen, R^{31} and OR^{32} and wherein R^3 is in particular hydrogen, C_1-C_4 -
20 alkyl or C_1-C_4 -alkoxy.
8. The compound of claim 6, where R^3 is a group Z^3-Ar^3 .
9. The compound of any of claims 1 to 5, where Q^1 is $C-R^4$ and X is N.
25
10. The compound of claim 9, where R^4 is hydrogen or halogen, methoxy, methyl or ethyl, in particular hydrogen.
11. The compound of any of claims 6 to 10, where Q^2 is S.
30
12. The compound of any of claims 6 to 10, where Q^2 is O.

13. The compound of any of claims 1 to 5, where Q^2 is N and X is C- R^3 .
14. The compound of claim 13, where R^3 is selected from the group consisting of hydrogen, halogen, R^{31} and OR^{32} and wherein R^3 is in particular hydrogen, C₁-C₄-alkyl or C₁-C₄-alkoxy.
15. The compound of claim 13, where R^3 is a group Z^3 -Ar³.
16. The compound of any of claims 1 to 5, where Q^2 is C- R^4 and X is N.
17. The compound of claim 16, where R^4 is hydrogen or halogen, methoxy, methyl or ethyl, in particular hydrogen.
18. The compound of claim 16, where R^4 is a group Z^4 -Ar⁴.
19. The compound of any of claims 13 to 18, where Q^1 is S.
20. The compound of any of claims 13 to 18, where Q^1 is O.
21. The compound as claimed in any of the preceding claims, where Y is C- R^5 .
22. The compound as claimed in claim 9, where R^5 is hydrogen, halogen or a radical R^{51} , in particular methyl, CH₂F, CHF₂, CF₃ or CH₂OH.
23. The compound as claimed in claim 9, where R^5 is a radical Y^1 -NR⁵⁷R⁵⁸, Y^1 -N(R⁵⁹)-Y³-NR⁵⁷R⁵⁸ or Y^1 -N(R⁵⁹)-Y²-R^{55a}.
24. The compound as claimed in any of claims 1 to 8, where Y is N.
25. The compound as claimed in claim 1 which is a compound of the formula I-A



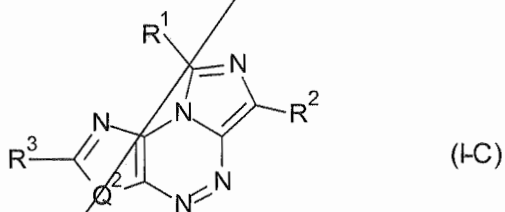
where Q^2 , R^1 , R^2 , R^3 and R^5 are as defined in any of the preceding claims.

26. The compound as claimed in claim 1 which is a compound of the formula I-B



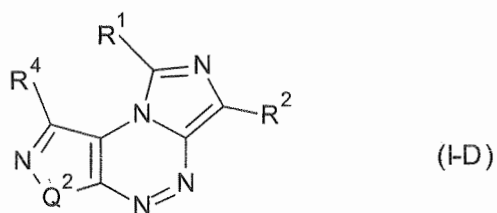
where Q^2 , R^1 , R^2 , R^4 and R^5 are as defined in any of the preceding claims.

27. The compound as claimed in claim 1 which is a compound of the formula I-C



where Q^2 , R^1 , R^2 and R^3 are as defined in any of the preceding claims.

28. The compound as claimed in claim 1 which is a compound of the formula I-D



where Q^2 , R^1 , R^2 and R^4 are as defined in any of the preceding claims.

29. The compound as claimed in claim 1, which is selected from the group consisting of

5,6-dimethyl-8-(3-nitrophenyl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(2-methylpyridin-3-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(3-methylpyridin-4-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(6-methylpyridin-3-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5 5,6-dimethyl-8-bromo-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-3-thia-1,4,7,8a-tetraaza-as-indacene

2,5,6-trimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

2-methoxy-5,6-dimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-Dimethyl-8-propyl-1-thia-3,4,7,8a-tetraaza-as-indacene

10 3-(5,6-Dimethyl-3-thia-1,4,7,8a-tetraaza-as-indacen-8-yl)-benzamide

5,6-Dimethyl-8-(2-methyl-pyridin-4-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

and the N-oxides, the tautomers, the hydrates, the prodrugs and the pharmaceutically acceptable salts thereof.

15 30. The compound as claimed in any of claims 1 to 29 for the use in the treatment of a medical disorder, selected from neurological and psychiatric disorders which can be treated by modulation of phosphodiesterase type 10 in a mammalian.

20 31. The compound as claimed in any of claims 1 to 29 for the use in the treatment of drug abuse in a mammalian.

32. Pharmaceutical composition which comprises a pharmaceutically acceptable carrier and a compound as claimed in any one of claims 1 to 29.

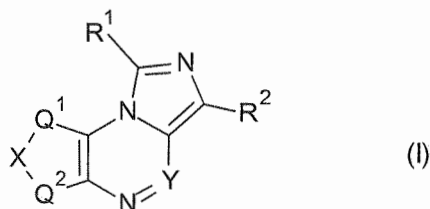
25 33. Use of at least one compound as claimed in any of claims 1 to 29 in the manufacture of a medicament for treating a medical disorder, selected from neurological and psychiatric disorders which can be treated by modulation of phosphodiesterase type 10,.

30 34. The use of claim 33 for treating, controlling, ameliorating or reducing the risk of CNS disorders in a mammalian.

35. The use of claim 33 for treating, controlling, ameliorating or reducing the risk of schizophrenia in a mammalian.
- 5 36. The use of claim 33 for treating, controlling, ameliorating or reducing cognitive dysfunction associated with schizophrenia in a mammalian.
37. The use of claim 33 for treating, controlling, ameliorating or reducing the risk of bipolar disorders in a mammalian.
- 10 38. The compound as claimed in any of claims 1 to 29 for use in treating, controlling, ameliorating or reducing the risk of depression in a mammalian.
39. The use of claim 33 for treating, controlling, ameliorating or reducing cognitive dysfunction associated with Alzheimer's disease in a mammalian.
- 15 40. The use of claim 33 for treating, controlling, ameliorating or reducing the risk of diet-induced obesity in a mammalian.

We claim:

1. Compound of formula I



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where in formula I the variables X, Y, Q¹, Q², R¹ and R² have the following meanings:

- X is C-R³ or N;
- Q¹ is S or O and Q² is C-R⁴ or N and Q² is connected to X via a double bond while Q¹ is connected to X via a single bond; or
- Q² is S or O and Q¹ is C-R⁴ or N and Q¹ is connected to X via a double bond while Q² is connected to X via a single bond;
- Y is C-R⁵;
- R¹ is selected from the group consisting of hydrogen, halogen, R¹¹ and a moiety Z¹-Ar¹;
- R² is trimethylsilyl, C₁-C₈-alkyl, C₃-C₈-cycloalkyl and C₃-C₈-cycloalkyl-C₁-C₄-alkyl, where the three last mentioned radicals may be unsubstituted, partially or completely halogenated or where the C₃-C₈-cycloalkyl radicals may carry 1, 2 or 3 radicals methyl groups;
- R³ is selected from the group consisting of hydrogen, halogen, R³¹, and OR³²;
- R⁴ is hydrogen, halogen, OR⁴², or a group Z⁴-Ar⁴;
- R⁵ is hydrogen, halogen, C₁-C₄-alkyl which is unsubstituted or carries a hydroxyl group, or C₁-C₄-haloalkyl;
- R¹¹ is C₁-C₈-alkyl, C₃-C₈-cycloalkyl and C₃-C₈-cycloalkyl-C₁-C₄-alkyl, where the cycloalkyl moieties in the aforementioned radicals are unsubstituted or carry 1, 2 or 3 radicals selected from fluorine or chlorine;
- R³¹ is trimethylsilyl, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₃-C₆-cycloalkyl, C₃-C₆-cycloalkylmethyl or C₃-C₄-alkenyl;

- R^{32} is C_1 - C_4 -alkyl or C_1 - C_4 -haloalkyl,
 R^{42} is C_1 - C_4 -alkyl or C_1 - C_4 -haloalkyl;
 Ar^1 is selected from the group consisting of aryl, monocyclic 5- or 6-membered
 5 hetaryl and bicyclic 9- or 10-membered hetaryl, where hetaryl has 1, 2 or 3
 heteroatoms as ring members which are selected from O, S and N, where
 aryl and hetaryl are unsubstituted or may carry 1, 2, 3 or 4 identical or
 different substituents R^{Ar} ;
 Ar^4 is selected from the group consisting of C-bound 6-membered monocyclic
 10 hetaryl, which has 1 or 2 nitrogen atoms as ring members, and C-bound, 9-
 or 10-membered, fused bicyclic hetaryl, which has 1 or 2 nitrogen atoms as
 ring members and optionally a further heteroatom selected from O, S and N
 as ring member, where monocyclic hetaryl and bicyclic hetaryl may be
 unsubstituted or may carry 1, 2 or 3 substituents selected from halogen, C_1 -
 C_4 -alkyl, C_1 - C_2 -fluoroalkyl, C_1 - C_4 -alkoxy, C_1 - C_2 -fluoroalkoxy, C_3 - C_6 -
 15 cycloalkyl, and fluorinated C_3 - C_6 -cycloalkyl;
 Z^1 is a single bond, O, CH_2 , CH_2CH_2 , CH_2O and OCH_2 ;
 Z^4 is CH_2 , 1,2-ethanediyl, 1,3-propanediyl, CH_2O , OCH_2 , CH_2CH_2O or
 OCH_2CH_2 , wherein 1, 2, 3 or 4 hydrogen atoms may be replaced by a
 fluorine atom;
 R^{Ar} is selected from the group consisting halogen, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl,
 20 OH, SH, CN, CF_3 , O- CF_3 , COOH, O- CH_2 -COOH, C_1 - C_6 -alkoxy, C_1 - C_4 -
 haloalkoxy, C_1 - C_6 -alkylthio, C_3 - C_7 -cycloalkyl, COO- C_1 - C_6 -alkyl, $CONH_2$,
 $CONH$ - C_1 - C_6 -alkyl, SO_2NH - C_1 - C_6 -alkyl, CON -(C_1 - C_6 -alkyl) $_2$,
 SO_2N -(C_1 - C_6 -alkyl) $_2$, NH - SO_2 - C_1 - C_4 -alkyl, NH - SO_2 - C_1 - C_4 -haloalkyl, NH -
 25 CO- C_1 - C_4 -alkyl, NH -CO- C_1 - C_4 -haloalkyl, SO_2 - C_1 - C_4 -alkyl, SO_2 - C_1 - C_6 -
 haloalkyl, phenyl, O-phenyl, O- CH_2 -phenyl, $CONH$ -phenyl, SO_2NH -
 phenyl, SO_2 -phenyl, NH - SO_2 -phenyl, NH -CO-phenyl, $CONH$ -hetaryl,
 SO_2NH -hetaryl, NH - SO_2 -hetaryl and NH -CO-hetaryl, where hetaryl in the
 for last mentioned radicals is 5- or 6-membered hetaryl having one
 30 heteroatom selected from O, S and N as ring member and optionally one
 further nitrogen atom as ring member, where phenyl and hetaryl in the last
 11 radicals mentioned are unsubstituted or may have 1, 2 or 3 substituents
 which are selected from halogen, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -

alkoxy and C₁-C₄-haloalkoxy;

the N-oxides, tautomers, the prodrugs and the pharmaceutically acceptable salts thereof.

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2. The compound of claim 1, where R¹ is a radical R¹¹ or a moiety Z¹-Ar¹.
3. The compound of claim 1, where R¹ is a moiety Z¹-Ar¹, where Z¹ is a single bond.

- 10 4. The compound of claim 1, where R¹ is a moiety Z¹-Ar¹, where Ar¹ is selected from the group consisting of phenyl, thienyl, pyrazolyl, isoxazolyl, thiazolyl, 1,2,4-oxadiazolyl and pyridyl, where phenyl, thienyl, pyrazolyl, isoxazolyl, 1,2,4-oxadiazolyl, thiazolyl and pyridyl are unsubstituted or carry 1, 2, 3 or 4 identical or different substituents R^{Ar}.

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5. The compound of any of the preceding claims, where R² is methyl.
6. The compound of any of the preceding claims, where Q¹ is N and X is C-R³.

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7. The compound of claim 6, where R³ is hydrogen, C₁-C₄-alkyl or C₁-C₄-alkoxy.
8. The compound of claim 6, where Q² is S.
9. The compound of claim 6, where Q² is O.

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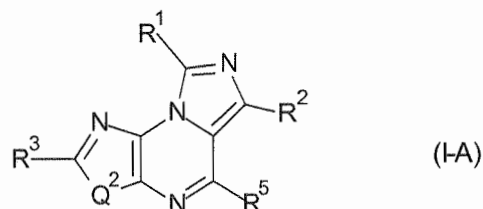
10. The compound of any of claims 1 to 5, where Q² is N and X is C-R³.
11. The compound of claim 10, where R³ is hydrogen, C₁-C₄-alkyl or C₁-C₄-alkoxy.

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12. The compound of any of claims 10 or 11, where Q¹ is S.
13. The compound of any of claims 10 or 11, where Q¹ is O.

14. The compound as claimed in claim 1, where R^5 is methyl, CH_2F , CHF_2 , CF_3 or CH_2OH .

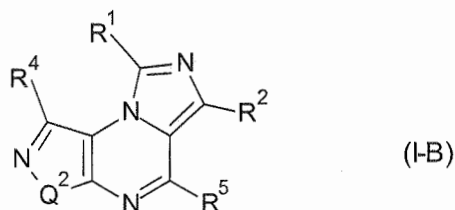
15. The compound as claimed in claim 1 which is a compound of the formula I-A



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where Q^2 , R^1 , R^2 , R^3 and R^5 are as defined in any of the preceding claims.

16. The compound as claimed in claim 1 which is a compound of the formula I-B



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where Q^2 , R^1 , R^2 , R^4 and R^5 are as defined in any of the preceding claims.

17. The compound as claimed in claim 1, which is selected from the group consisting of

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5,6-dimethyl-8-(3-nitrophenyl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(2-methylpyridin-3-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(3-methylpyridin-4-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-(6-methylpyridin-3-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-dimethyl-8-bromo-3-thia-1,4,7,8a-tetraaza-as-indacene

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5,6-dimethyl-3-thia-1,4,7,8a-tetraaza-as-indacene

2,5,6-trimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

2-methoxy-5,6-dimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene

5,6-Dimethyl-8-propyl-1-thia-3,4,7,8a-tetraaza-as-indacene

3-(5,6-Dimethyl-3-thia-1,4,7,8a-tetraaza-as-indacen-8-yl)-benzamide

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5,6-Dimethyl-8-(2-methyl-pyridin-4-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene

and the N-oxides, the tautomers, the hydrates, the prodrugs and the pharmaceutically acceptable salts thereof.

18. The compound of claim 1, that is 5,6-dimethyl-8-propyl-3-thia-1,4,7,8a-tetraaza-as-indacene, or an N-oxide, tautomer, hydrate, prodrug or pharmaceutically acceptable salt thereof.
19. The compound of claim 1, that is 3-(5,6-dimethyl-3-thia-1,4,7,8a-tetraaza-as-indacen-8-yl)-benzamide, or an N-oxide, tautomer, hydrate, prodrug or pharmaceutically acceptable salt thereof.
20. The compound of claim 1, that is 5,6-Dimethyl-8-(2-methyl-pyridin-3-yl)-3-thia-1,4,7,8a-tetraaza-as-indacen, or an N-oxide, tautomer, hydrate, prodrug or pharmaceutically acceptable salt thereof.
21. The compound of claim 1, that is of 5,6-Dimethyl-8-(2-methyl-pyridin-4-yl)-3-thia-1,4,7,8a-tetraaza-as-indacene or an N-oxide, tautomer, hydrate, prodrug or pharmaceutically acceptable salt thereof.
22. The compound as claimed in any of claims 1 to 21 for the use in the treatment of a medical disorder, selected from neurological and psychiatric disorders which can be treated by modulation of phosphodiesterase type 10 in a mammalian.
23. The compound as claimed in any of claims 1 to 21 for the use in the treatment of drug abuse in a mammalian.
24. Pharmaceutical composition which comprises a pharmaceutically acceptable carrier and a compound as claimed in any one of claims 1 to 20.
25. The use of at least one compound as claimed in any of claims 1 to 21 in the manufacture of a medicament for treating, controlling, ameliorating or reducing the risk of CNS disorders in a mammalian.

26. The use of at least one compound as claimed in any of claims 1 to 21 in the manufacture of a medicament for treating, controlling, ameliorating or reducing the risk of schizophrenia in a mammalian, or
- 5 for treating, controlling, ameliorating or reducing cognitive dysfunction associated with schizophrenia in a mammalian; or
- for treating, controlling, ameliorating or reducing the risk of bipolar disorders in a mammalian;
- for treating, controlling, ameliorating or reducing the risk of depression in a mammalian; or
- 10 for treating, controlling, ameliorating or reducing cognitive dysfunction associated with Alzheimer's disease in a mammalian; or
- for treating, controlling, ameliorating or reducing the risk of diet-induced obesity in a mammalian.