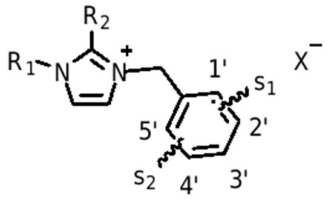
Claims

1. A compound having the general formula:



wherein, R_1 is selected from: C14-C18 alkyl substituted by 7, 9, 11, 13 or 15 fluorine atoms;

R_2 is selected from: H, C1-C6 alkyl, and C3-C6 cycloalkyl;

S_1 is selected from: 1'-halogen, and 1'-C1-C6 alkoxy;

S_2 is selected from: 4'-halogen, and 5'-halogen;

X^- is an anion of a pharmaceutically acceptable inorganic or organic acid salt; preferably, X^- is chloride ion, bromide ion, iodide ion, bisulfate ion, sulfate ion, phosphate ion, maleate ion, fumarate ion, tartrate ion, palmitate ion, oxalate ion, citrate ion, succinate ion, methanesulfonate ion, benzenesulfonate ion, and p-toluenesulfonate ion;

or a stereoisomer thereof, a pharmaceutically acceptable salt thereof or a pharmaceutically acceptable solvate thereof.

2. The compound according to claim 1, wherein R_1 is selected from: $C_{16}FH_{32}$-, $C_{14}F_7H_{22}$-, $C_{15}F_9H_{22}$-, $C_{16}F_{11}H_{22}$-, and $C_{17}F_{13}H_{22}$-.

3. The compound according to claim 1, wherein R_1 is selected from: n-$C_{16}FH_{32}$-, n-$C_{14}F_7H_{22}$-, n-$C_{15}F_9H_{22}$-, n-$C_{16}F_{11}H_{22}$-, and n-$C_{17}F_{13}H_{22}$-.

4. The compound according to claim 1, wherein R_2 is selected from: H, C1-C3 alkyl, and C3-C4 cycloalkyl.

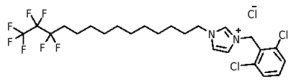
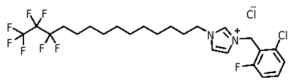
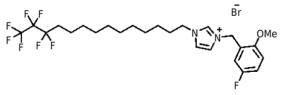
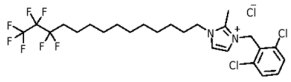
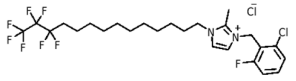
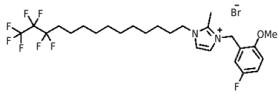
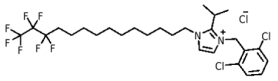
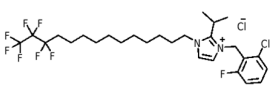
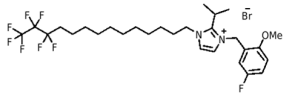
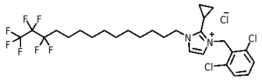
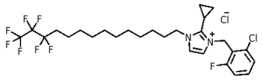
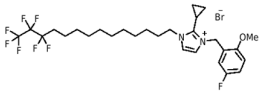
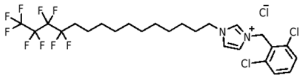
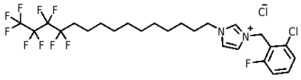
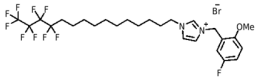
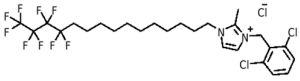
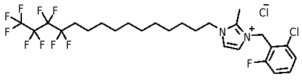
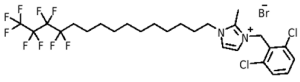
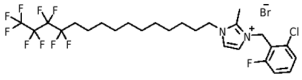
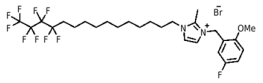
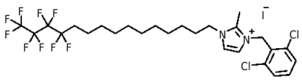
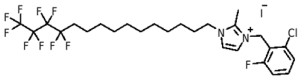
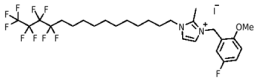
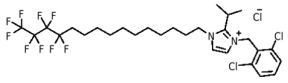
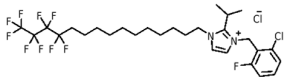
5. The compound according to claim 1, wherein R_2 is selected from: H, methyl, isopropyl, and cyclopropyl.

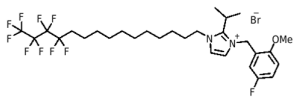
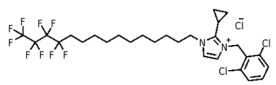
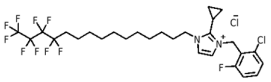
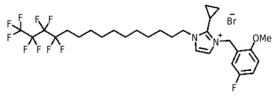
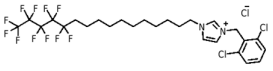
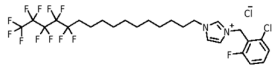
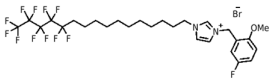
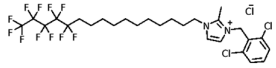
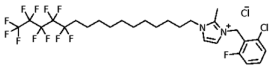
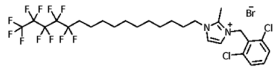
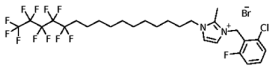
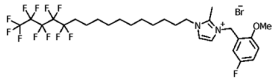
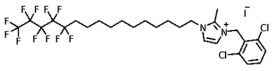
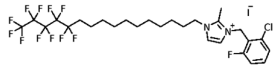
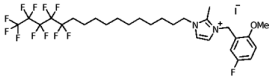
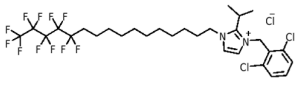
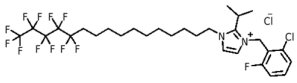
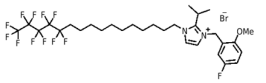
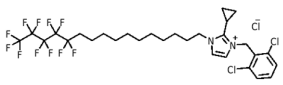
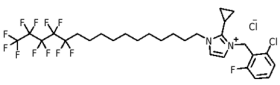
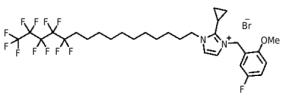
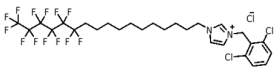
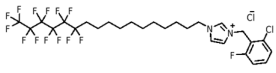
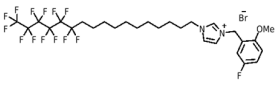
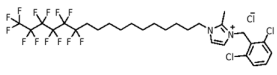
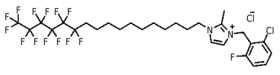
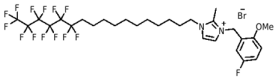
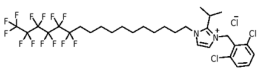
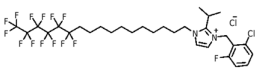
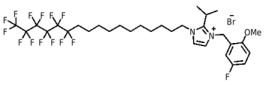
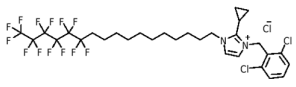
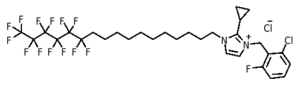
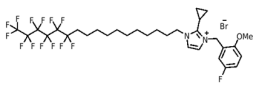
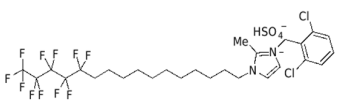
6. The compound according to claim 1, wherein S_1 is selected from: 1'-halogen, and 1'-C1-C3 alkoxy.

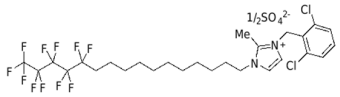
7. The compound according to claim 1, wherein S_1, S_2 each are selected from: 1'-halogen, 5'-halogen, or 1'-C1-C6 alkoxy, and 4'-halogen.

8. The compound according to claim 1, wherein S_1, S_2 each are selected from: 1'-halogen, 5'-halogen, or 1'-C1-C3 alkoxy, and 4'-halogen.

9. A compound according to claim 1, which is selected from:

No.	Structure	No.	Structure
		IB-1	
IB-2		IB-3	
IB-4		IB-5	
IB-6		IB-7	
IB-8		IB-9	
IB-10		IB-11	
IB-12		IB-13	
IB-14		IB-15	
IB-16		IB-17	
IB-18		IB-19	
IB-20		IB-21	
IB-22		IB-23	
IB-24		IB-25	

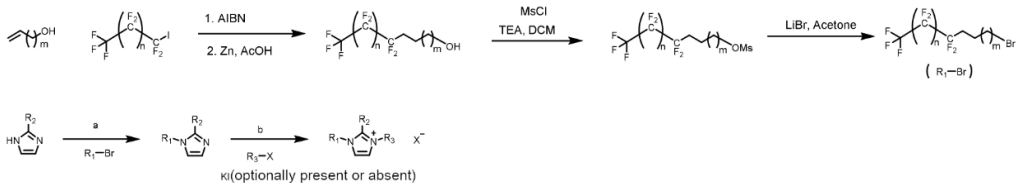
IB-26		IB-27	
IB-28		IB-29	
IB-30		IB-31	
IB-32		IB-33	
IB-34		IB-35	
IB-36		IB-37	
IB-38		IB-39	
IB-40		IB-41	
IB-42		IB-43	
IB-44		IB-45	
IB-46		IB-47	
IB-48		IB-49	
IB-50		IB-51	
IB-52		IB-53	
IB-54		IB-55	
IB-56		IB-57	
IB-58		IB-59	

IB-60			

or a stereoisomer thereof, a pharmaceutically acceptable salt thereof or a pharmaceutically acceptable solvate thereof.

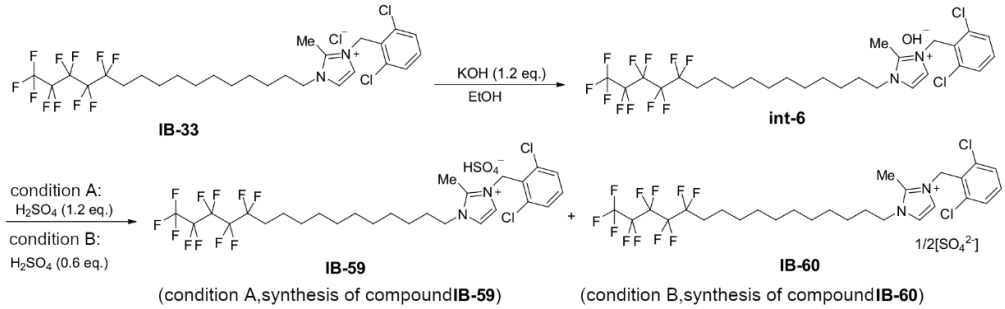
10. A preparation method of the compound according to claim 9, wherein,

compounds IB-1 to IB-58 are prepared according to the following scheme:



reaction conditions: (a) substitution reaction of brominated hydrocarbons under alkaline condition; (b) substitution reaction of brominated hydrocarbons;

compounds IB-59 and IB-60 are prepared according to the following scheme:



compound IB-33 is dissolved in ethanol, cooled, to which is added potassium hydroxide; the reaction system is further stirred at 0~5℃; after completion of the reaction, the reaction system is filtered to give a clear filtrate;

condition A: the filtrate is cooled to 0℃, to which is added dropwise 98% concentrated sulfuric acid; the reaction system is further stirred at 0~5℃; after completion of the reaction, the reaction system is concentrated, and recrystallized, to obtain compound IB-59;

condition B: the filtrate is cooled, preferably cooled to 0℃, to which is added dropwise 98% concentrated sulfuric acid; the reaction system is further stirred at 0~5℃; after completion of the reaction, the reaction system is concentrated, and recrystallized, to obtain compound IB-60.

11. The preparation method according to claim 10, wherein the alkaline condition is sodium hydride or sodium t-butoxide.

12. The preparation method according to claim 10, wherein the compound IB-33 is dissolved in ethanol, cooled to 0 ℃.

13. The preparation method according to claim 10, wherein in condition A or B, the reaction system is concentrated, and recrystallized with methyl t-butyl ether.

14. A pharmaceutical composition comprising the compound according to any one of claims 1-9, a stereoisomer thereof, a pharmaceutically acceptable salt thereof or a pharmaceutically acceptable solvate thereof and optionally a pharmaceutically acceptable excipient.

15. Use of the compound according to any one of claims 1-9, a stereoisomer thereof, a pharmaceutically acceptable salt thereof or a pharmaceutically acceptable solvate thereof or the pharmaceutical composition according to claim 14 in the manufacture of a medicament for activating 5'-adenosine monophosphate-activated protein kinase (AMPK), the medicament for activating 5'-adenosine monophosphate-activated protein kinase is a medicament for preventing and/or treating obesity and type II diabetes, for preventing and/or treating tumor, for preventing and/or treating Parkinson's disease, or for preventing and/or treating Alzheimer's disease.

16. Use of the compound according to any one of claims 1-9, a stereoisomer thereof, a pharmaceutically acceptable salt thereof or a pharmaceutically acceptable solvate thereof or the pharmaceutical composition according to claim 14 in the manufacture of a medicament for preventing and/or treating obesity and type II diabetes, for preventing and/or treating tumor, for preventing and/or treating Parkinson's disease, or for preventing and/or treating Alzheimer's disease.