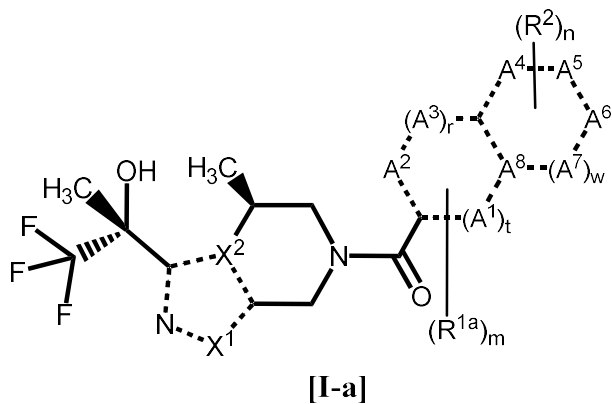
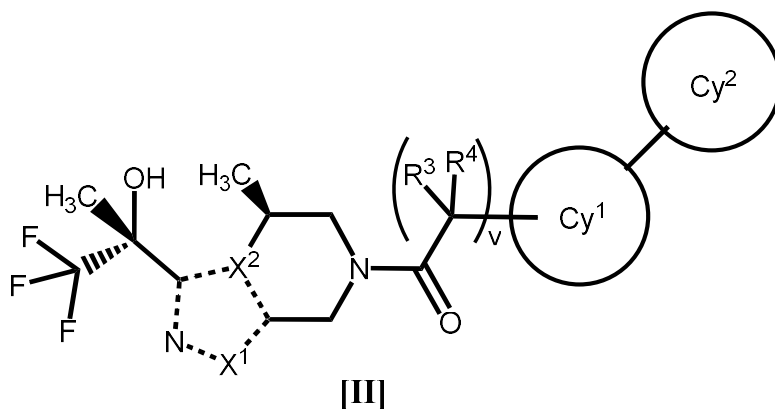


CLAIMS

1. A compound of the formula [I-a] or the formula [II], or a pharmaceutically acceptable salt thereof:



5



wherein

a bond in a dotted line is a single bond or a double bond,

X¹ is a carbon atom, a nitrogen atom or an oxygen atom,

10 X² is a carbon atom or a nitrogen atom,

R^{1a} is C₁₋₄ alkyl or C₁₋₄ alkylcarbonyl,

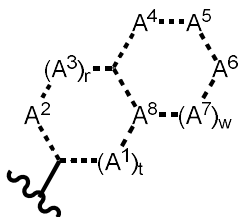
R² is halogen, cyano or C₁₋₄ alkyl,

m is 0 or 1,

n is 0, 1 or 2, when n is 2, each R² is the same or different,

15 A¹, A², A³, A⁴, A⁵, A⁶ and A⁷ are each independently selected from a carbon atom, a nitrogen atom and an oxygen atom, A⁸ is selected from a carbon atom and a nitrogen atom, and a total number of the nitrogen atom and the oxygen atom contained in a partial structural

formula:



is 0, 1, 2 or 3,

t is 0 or 1,

5 r is 0, 1 or 2, and a total of t and r is 1 or 2,

w is 0 or 1,

R³ and R⁴ are each independently hydrogen or C₁₋₄ alkyl,

Cy¹ is

- (1) (i) C₄₋₆ cycloalkyl or (ii) 4- to 6-membered saturated or
10 partially saturated heterocyclyl having one nitrogen atom, the C₄₋₆
cycloalkyl and the saturated or partially saturated heterocyclyl is
optionally substituted by one substituent independently selected
from the group consisting of C₁₋₄ alkyl and oxo, or
(2) (i) phenyl or (ii) 5- or 6-membered heteroaryl having 1, 2 or 3
15 hetero atoms independently selected from the group consisting of a
nitrogen atom and an oxygen atom, the phenyl and the heteroaryl are
optionally substituted by 1 or 2 substituents independently selected
from the group consisting of halogen, cyano, carboxy, C₁₋₄ alkyl,
haloC₁₋₄ alkyl and C₃₋₆ cycloalkyl,

20 Cy² is

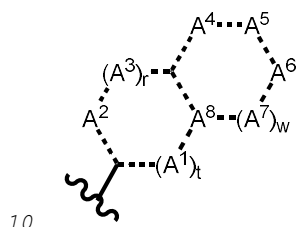
- (1) (i) C₃₋₆ cycloalkyl or (ii) 4- to 6-membered saturated
heterocyclyl having 1 or 2 hetero atoms independently selected from
the group consisting of a nitrogen atom and an oxygen atom, and the
C₃₋₆ cycloalkyl and the saturated heterocyclyl are optionally
25 substituted by 1 or 2 substituents independently selected from the
group consisting of halogen, hydroxy and C₁₋₄ alkyl, or
(2) (i) phenyl or (ii) 5- or 6-membered heteroaryl having 1, 2, 3 or
4 nitrogen atoms, and the phenyl and the heteroaryl are optionally
substituted by 1 or 2 substituents independently selected from the
30 group consisting of halogen, cyano, C₁₋₄ alkyl, C₁₋₄ alkoxy and C₁₋₄

alkylsulfonyl, and

v is 0 or 1.

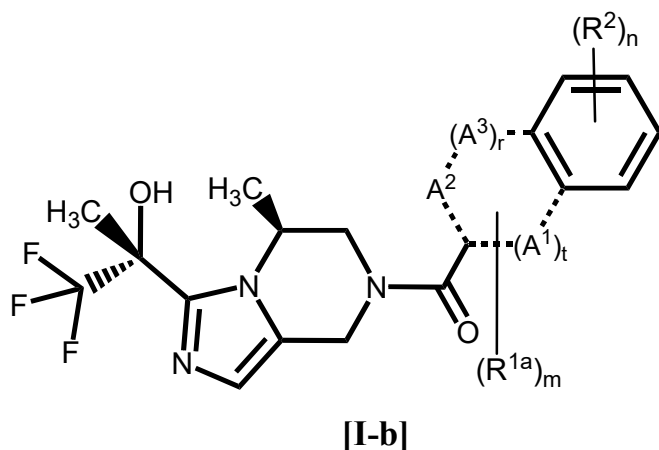
2. The compound according to claim 1 wherein X^1 is a carbon atom, and
5 X^2 is a nitrogen atom, or a pharmaceutically acceptable salt thereof.

3. The compound according to claim 1 or 2 wherein, in the formula
[I-a], the total number of the nitrogen atom and the oxygen atom
contained in the partial structural formula:



wherein each symbol is as defined in claim 1, is 2, or a
pharmaceutically acceptable salt thereof.

4. The compound according to any one of claims 1 to 3, which is a
15 compound of the formula [I-b]:



[I-b]

wherein each symbol is as defined in claim 1, or a pharmaceutically
acceptable salt thereof.

20 5. The compound according to claim 1 wherein v is 0, or a
pharmaceutically acceptable salt thereof.

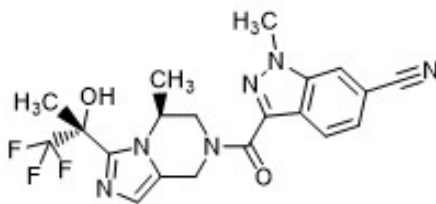
6. The compound according to claim 1 or 5 wherein Cy¹ is 5- or 6-membered heteroaryl having 1, 2 or 3 hetero atoms independently selected from the group consisting of a nitrogen atom and an oxygen atom, and the heteroaryl is optionally substituted by 1 or 2 substituents independently selected from the group consisting of halogen, cyano, C₁₋₄ alkyl, haloC₁₋₄ alkyl and C₃₋₆ cycloalkyl, or a pharmaceutically acceptable salt thereof.

7. The compound according to any one of claims 1, 5 and 6 wherein Cy² is

(1) C₃₋₆ cycloalkyl optionally substituted by 1 or 2 substituents independently selected from the group consisting of halogen, hydroxy and C₁₋₄ alkyl, or

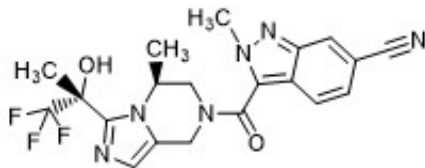
(2) phenyl optionally substituted by 1 or 2 substituents independently selected from the group consisting of halogen, cyano, C₁₋₄ alkyl, C₁₋₄ alkoxy and C₁₋₄ alkylsulfonyl, or a pharmaceutically acceptable salt thereof.

8. A compound represented by formula:



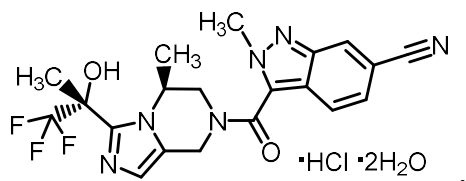
or a pharmaceutically acceptable salt thereof.

9. A compound represented by formula:

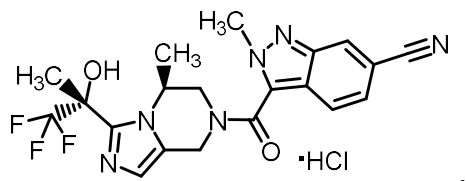


or a pharmaceutically acceptable salt thereof.

10. A compound represented by formula:

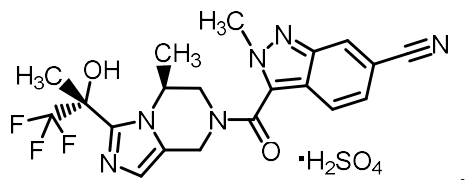


11. A compound represented by formula:

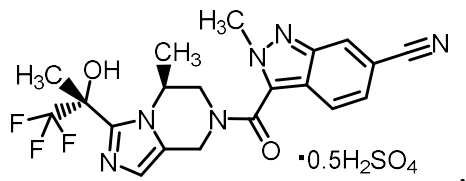


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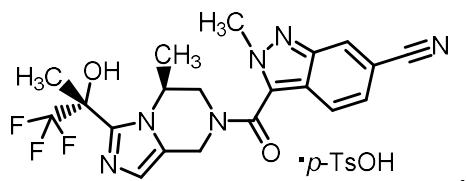
12. A compound represented by formula:



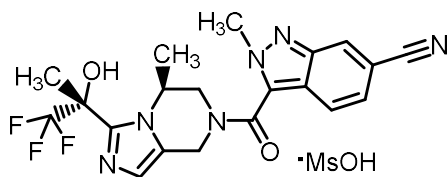
13. A compound represented by formula:



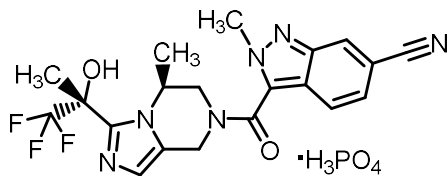
10 14. A compound represented by formula:



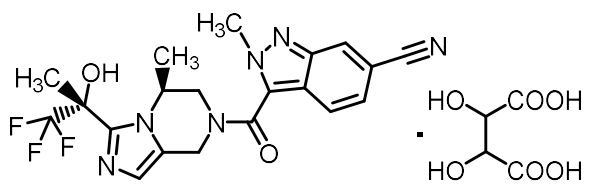
15. A compound represented by formula:



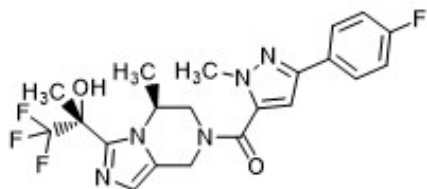
16. A compound represented by formula:



5 17. A compound represented by formula:

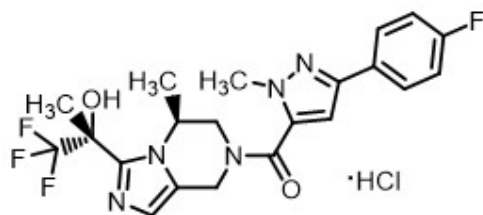


18. A compound represented by formula:

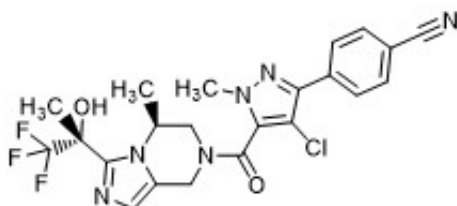


or a pharmaceutically acceptable salt thereof.

19. A compound represented by formula:

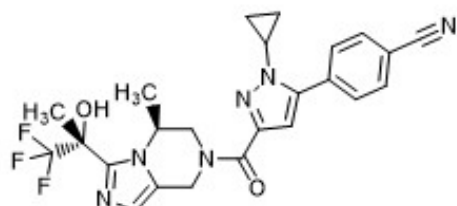


20. A compound represented by formula:



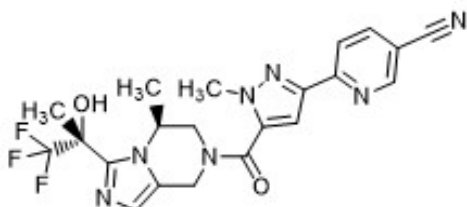
5 or a pharmaceutically acceptable salt thereof.

21. A compound represented by formula:



or a pharmaceutically acceptable salt thereof.

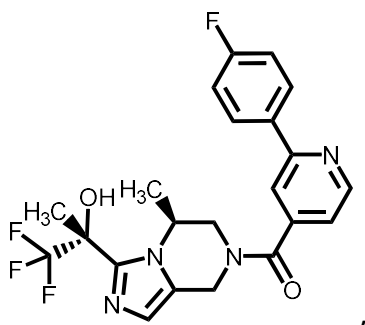
22. A compound represented by formula:



10

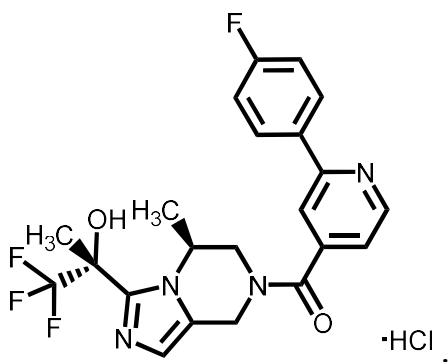
or a pharmaceutically acceptable salt thereof.

23. A compound represented by formula:



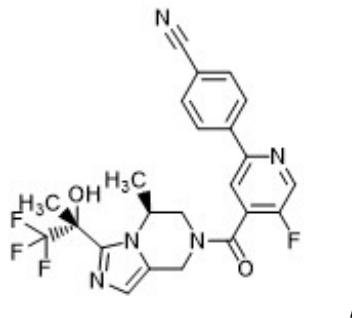
or a pharmaceutically acceptable salt thereof.

24. A compound represented by formula:



5

25. A compound represented by formula:



or a pharmaceutically acceptable salt thereof.

26. A pharmaceutical composition comprising the compound according to any one of claims 1 to 25, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

5 27. An agent for the treatment or prophylaxis of diabetes, insulin resistance syndrome, metabolic syndrome, hyperglycemia, hyperlactacidemia, diabetic complication, cardiac failure, cardiomyopathy, myocardial ischemia, myocardial infarction, angina pectoris, dyslipidemia, atherosclerosis, peripheral arterial disease,
10 intermittent claudication, chronic obstructive pulmonary disease, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer or pulmonary hypertension, the agent comprises the compound according to any one of claims 1 to 25, or a pharmaceutically acceptable salt thereof.

15

28. The agent according to claim 27 wherein diabetes is type 1 diabetes or type 2 diabetes.

29. The agent according to claim 27 wherein diabetic complication is
20 selected from the group consisting of diabetic neuropathy, diabetic retinopathy, diabetic nephropathy and cataract.

30. The agent according to claim 27 wherein cardiac failure is acute cardiac failure or chronic cardiac failure.

25

31. The agent according to claim 27 wherein pulmonary hypertension is pulmonary arterial hypertension.

32. A method for treating or preventing a disease selected from the
30 group consisting of diabetes, insulin resistance syndrome, metabolic syndrome, hyperglycemia, hyperlactacidemia, diabetic complication, cardiac failure, cardiomyopathy, myocardial ischemia, myocardial infarction, angina pectoris, dyslipidemia, atherosclerosis, peripheral arterial disease, intermittent claudication, chronic

obstructive pulmonary diseases, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer and pulmonary hypertension, the method comprising administering a therapeutically effective amount of the compound according to any
5 one of claims 1 to 25 or a pharmaceutically acceptable salt thereof to a mammal.

33. The method according to claim 32 wherein diabetes is type 1 diabetes or type 2 diabetes.

10

34. The method according to claim 32 wherein diabetic complication is selected from the group consisting of diabetic neuropathy, diabetic retinopathy, diabetic nephropathy and cataract.

15 35. The method according to claim 32 wherein cardiac failure is acute cardiac failure or chronic cardiac failure.

36. The method according to claim 32 wherein pulmonary hypertension is pulmonary arterial hypertension.

20

37. Use of the compound according to any one of claims 1 to 25 or a pharmaceutically acceptable salt thereof in the production of an agent for the treatment or prophylaxis of a disease selected from the group consisting of diabetes, insulin resistance syndrome,
25 metabolic syndrome, hyperglycemia, hyperlactacidemia, diabetic complication, cardiac failure, cardiomyopathy, myocardial ischemia, myocardial infarction, angina pectoris, dyslipidemia, atherosclerosis, peripheral arterial disease, intermittent claudication, chronic obstructive pulmonary diseases, brain ischemia,
30 cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer and pulmonary hypertension.

38. The use according to claim 37 wherein diabetes is type 1 diabetes or type 2 diabetes.

39. The use according to claim 37 wherein diabetic complication is selected from the group consisting of diabetic neuropathy, diabetic retinopathy, diabetic nephropathy and cataract.

5

40. The use according to claim 37 wherein cardiac failure is acute cardiac failure or chronic cardiac failure.

41. The use according to claim 37 wherein pulmonary hypertension is
10 pulmonary arterial hypertension.

42. The compound according to any one of claims 1 to 25 or a pharmaceutically acceptable salt thereof for use in the treatment or prophylaxis of a disease selected from the group consisting of
15 diabetes, insulin resistance syndrome, metabolic syndrome, hyperglycemia, hyperlactacidemia, diabetic complication, cardiac failure, cardiomyopathy, myocardial ischemia, myocardial infarction, angina pectoris, dyslipidemia, atherosclerosis, peripheral arterial disease, intermittent claudication, chronic obstructive pulmonary
20 diseases, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer and pulmonary hypertension.

43. The compound or a pharmaceutically acceptable salt thereof according to claim 42 wherein diabetes is type 1 diabetes or type 2
25 diabetes.

44. The compound or a pharmaceutically acceptable salt thereof according to claim 42 wherein diabetic complication is selected from the group consisting of diabetic neuropathy, diabetic retinopathy,
30 diabetic nephropathy and cataract.

45. The compound or a pharmaceutically acceptable salt thereof according to claim 42 wherein cardiac failure is acute cardiac failure or chronic cardiac failure.

46. The compound or a pharmaceutically acceptable salt thereof according to claim 42 wherein pulmonary hypertension is pulmonary arterial hypertension.