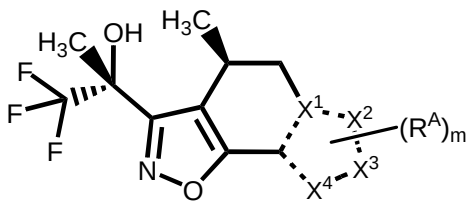
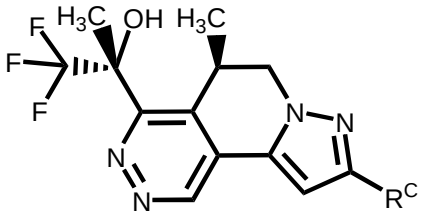
[CLAIMS]

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



[I]



[III]

wherein

-- is a single bond or a double bond,

X^1, X^2, X^3 and X^4 are each independently C or N,

R^A is

(1) C_{1-6} alkyl wherein the C_{1-6} alkyl is optionally substituted by one substituent selected from the group consisting of hydroxy and cyano,

(2) halo C_{1-4} alkyl,

(3) $-OR^a$ wherein R^a is

(i) C_{1-6} alkyl wherein the C_{1-6} alkyl is optionally substituted by one substituent selected from the group consisting of

(a) hydroxy,

(b) cyano,

(c) C_{1-4} alkoxy,

(d) C_{3-6} cycloalkyl optionally substituted by one cyano,

(e) phenyl, and

(f) 4- to 6-membered saturated heterocyclyl having one oxygen atom,

(ii) halo C_{1-4} alkyl,

(iii) 4- to 6-membered saturated heterocyclyl having one oxygen atom, or

(iv) C_{3-6} cycloalkyl wherein the C_{3-6} cycloalkyl is optionally substituted by 1 or 2 substituents independently

selected from the group consisting of C_{1-6} alkyl, hydroxy, and cyano,

(4) phenyl optionally substituted by one halogen,

(5) C_{3-6} cycloalkyl wherein the C_{3-6} cycloalkyl is optionally substituted by 1 or 2 substituents independently selected from the group consisting of

(i) halogen,

(ii) C_{1-4} alkyl,

(iii) halo C_{1-4} alkyl,

(iv) hydroxy, and

(v) cyano,

(6) 4- to 6-membered saturated heterocyclyl having one oxygen atom, or

(7) bridged C_{5-10} cycloalkyl wherein the bridged C_{5-10} cycloalkyl is optionally substituted by one substituent selected from the group consisting of

(i) C_{1-4} alkoxycarbonyl,

(ii) hydroxy C_{1-4} alkyl,

(iii) halo C_{1-4} alkyl, and

(iv) cyano,

m is 0 or 1, and

R^C is

(1) halo C_{1-4} alkyl,

(2) C_{3-6} cycloalkyl optionally substituted by one halogen, or

(3) bridged C_{5-10} cycloalkyl wherein the bridged C_{5-10} cycloalkyl is optionally substituted by one substituent selected from the group consisting of cyano and C_{1-4} alkoxycarbonyl.

2. The compound according to claim 1 or a pharmaceutically acceptable salt thereof, which is a compound of the formula [I] or a pharmaceutically acceptable salt thereof.

3. The compound according to claim 1 or 2, wherein R^A is

(1) halo C_{1-4} alkyl,

(2) -OR^a wherein R^a is

(i) C_{1-6} alkyl wherein the C_{1-6} alkyl is optionally substituted by one substituent selected from the group consisting of

(a) hydroxy,

(b) C_{3-6} cycloalkyl optionally substituted by one cyano, and

(c) 4- to 6-membered saturated heterocyclyl having one oxygen atom,

(ii) halo C_{1-4} alkyl,

(iii) 4- to 6-membered saturated heterocyclyl having one oxygen atom, or

(iv) C_{3-6} cycloalkyl wherein the C_{3-6} cycloalkyl is optionally substituted by 1 or 2 substituents independently selected from the group consisting of C_{1-6} alkyl, hydroxy, and cyano,

(3) C_{3-6} cycloalkyl wherein the C_{3-6} cycloalkyl is optionally substituted by 1 or 2 substituents independently selected from the group consisting of

(i) C_{1-4} alkyl,

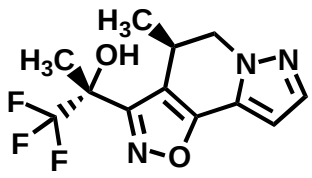
(ii) hydroxy, and

(iii) cyano, or

(4) 4- to 6-membered saturated heterocyclyl having one oxygen atom, or a pharmaceutically acceptable salt thereof.

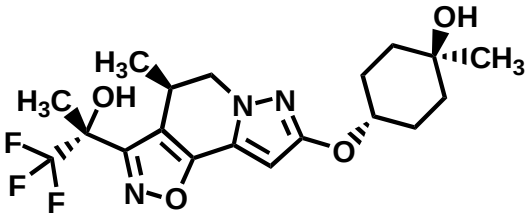
4. The compound according to claim 1 or 2, wherein m is 0, or a pharmaceutically acceptable salt thereof.

5. A compound of the formula:



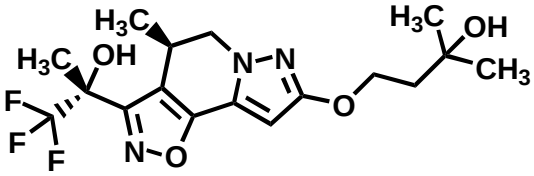
or a pharmaceutically acceptable salt thereof.

6. A compound of the formula:



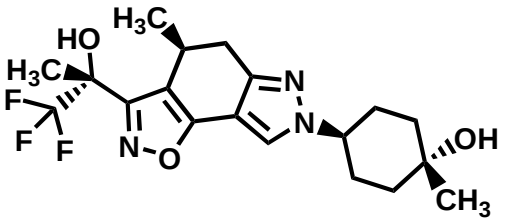
or a pharmaceutically acceptable salt thereof.

7. A compound of the formula:



or a pharmaceutically acceptable salt thereof.

8. A compound of the formula:



or a pharmaceutically acceptable salt thereof.

9. A pharmaceutical composition comprising the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

10. A PDHK inhibitor comprising the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof.

11. A PDHK2 inhibitor comprising the compound according to any

one of claims 1 to 8 or a pharmaceutically acceptable salt thereof.

12. 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, intermittent claudication, chronic obstructive pulmonary disease, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer, pulmonary hypertension, Alzheimer disease, vascular dementia, glaucoma, diabetic retinopathy, retinopathy of prematurity, retinal vein occlusion, ischemic optic neuropathy or chronic kidney disease, the agent comprising the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof.

13. The agent according to claim 12, wherein the diabetes is type 1 diabetes or type 2 diabetes.

14. The agent according to claim 12, wherein the vascular dementia is a large-vessel type of vascular dementia or a small-vessel type of vascular dementia.

15. The agent according to claim 12, wherein the cardiac failure is acute cardiac failure or chronic cardiac failure.

16. The agent according to claim 12, wherein the pulmonary hypertension is pulmonary arterial hypertension.

17. A method for inhibiting PDHK, comprising administering a therapeutically effective amount of the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt

thereof to a mammal.

18. A method for treating or preventing a disease selected from the 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 disease, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer, pulmonary hypertension, Alzheimer disease, vascular dementia, glaucoma, diabetic retinopathy, retinopathy of prematurity, retinal vein occlusion, ischemic optic neuropathy and chronic kidney disease, the method comprising administering a therapeutically effective amount of the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof to a mammal.

19. The method according to claim 18, wherein the diabetes is type 1 diabetes or type 2 diabetes.

20. The method according to claim 18, wherein the vascular dementia is a large-vessel type of vascular dementia or a small-vessel type of vascular dementia.

21. The method according to claim 18, wherein the cardiac failure is acute cardiac failure or chronic cardiac failure.

22. The method according to claim 18, wherein the pulmonary hypertension is pulmonary arterial hypertension.

23. Use of the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof in the

manufacture of a PDHK inhibitor.

24. Use of the compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof in the manufacture of an agent for the treatment or prophylaxis of a disease selected from the 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 disease, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer, pulmonary hypertension, Alzheimer disease, vascular dementia, glaucoma, diabetic retinopathy, retinopathy of prematurity, retinal vein occlusion, ischemic optic neuropathy and chronic kidney disease.

25. The use according to claim 24, wherein the diabetes is type 1 diabetes or type 2 diabetes.

26. The use according to claim 24, wherein the vascular dementia is a large-vessel type of vascular dementia or a small-vessel type of vascular dementia.

27. The use according to claim 24, wherein the cardiac failure is acute cardiac failure or chronic cardiac failure.

28. The use according to claim 24, wherein the pulmonary hypertension is pulmonary arterial hypertension.

29. The compound according to any one of claims 1 to 8 or a pharmaceutically acceptable salt thereof for use in the treatment or prophylaxis of a disease selected from the 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 disease, brain ischemia, cerebral apoplexy, mitochondrial disease, mitochondrial encephalomyopathy, cancer, pulmonary hypertension, Alzheimer disease, vascular dementia, glaucoma, diabetic retinopathy, retinopathy of prematurity, retinal vein occlusion, ischemic optic neuropathy and chronic kidney disease.

30. The compound according to claim 29 or a pharmaceutically acceptable salt thereof, wherein the diabetes is type 1 diabetes or type 2 diabetes.

31. The compound according to claim 29 or a pharmaceutically acceptable salt thereof, wherein the vascular dementia is a large-vessel type of vascular dementia or a small-vessel type of vascular dementia.

32. The compound according to claim 29 or a pharmaceutically acceptable salt thereof, wherein the cardiac failure is acute cardiac failure or chronic cardiac failure.

33. The compound according to claim 29 or a pharmaceutically acceptable salt thereof, wherein the pulmonary hypertension is pulmonary arterial hypertension.