

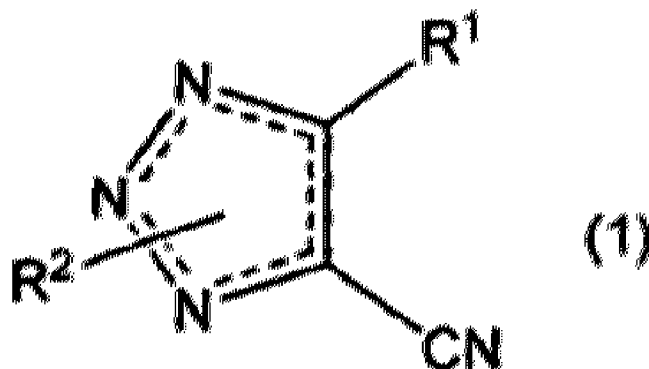


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(54) Titre : COMPOSES CYANOTRIAZOLE
(54) Title: CYANOTRIAZOLE COMPOUNDS



(57) Abrégé/Abstract:

Disclosed is a cyanotriazole compound represented by the formula (1):
(see formula 1)

wherein the moieties are defined herein, or a salt thereof. In selected embodiments the compound or salt thereof stimulates the

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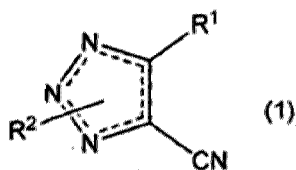
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(57) **Abrégé(suite)/Abstract(continued)**:

citric acid cycle activity and/or improves hyperglycemia with less side effects. Selected compounds are suitable for use to treat, for example, diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit from stimulating energy expenditure.

Abstract

Disclosed is a cyanotriazole compound represented by the formula (1):



5

wherein the moieties are defined herein, or a salt thereof. In selected embodiments the compound or salt thereof stimulates the citric acid cycle activity and/or improves hyperglycemia with less side effects. Selected compounds are
10 suitable for use to treat, for example, diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit from stimulating
15 energy expenditure.

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JUMBO APPLICATIONS/PATENTS

THIS SECTION OF THE APPLICATION/PATENT CONTAINS MORE THAN ONE VOLUME

THIS IS VOLUME 1 OF 2
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DESCRIPTION
CYANOTRIAZOLE COMPOUNDS

Technical Field

5 [0001]

This invention relates to cyanotriazole compounds which stimulate the citric acid cycle activity and/or improve hyperglycemia. The citric acid cycle activators are useful for treating and/or preventing diseases or disorders related to energy imbalance which comes from less energy output than calorie intake. Besides, the hypoglycemic agents are helpful for treating diabetes and impaired glucose tolerance accompanied by postprandial hyperglycemia. The compounds of this invention possessing activities of promoting the citric acid cycle and/or reducing blood glucose are applicable to, for example, diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit from stimulating energy expenditure.

Background Art

[0002]

Overweight, obesity and insulin resistance associated with them are major risk factors for a number of chronic diseases including diabetes and cardiovascular diseases (non-patent documents 1-4), especially, the global pandemic of diabetes is serious problem for public health and puts a huge burden on healthcare system in the world (non-patent document 5). Although various oral and injectable hypoglycemic drugs have been developed and launched, the efforts to stop or to slow down the growth rate of diabetes-related mortality and morbidity are not still going well. Postprandial hyperglycemia (PPH) which is one of phenomenon of blood glucose dysregulation seen in diabetes and impaired glucose tolerance (IGT) is cautioned as an independent risk factor for

cardiovascular disease (non-patent documents 6-7). Close relation between PPH and carotid intima-media thickness suggested that PPH was associated with atherosclerosis (non-patent documents 8-9). Some recent studies imply that PPH
5 causes vascular inflammation and endothelial dysfunction through oxidative stress during PPH (non-patent documents 10-11). Three types of oral anti-diabetics, α -glucosidase inhibitors, glinides and DPP4 inhibitors, were developed aiming to lower PPH. Acarbose, a member of the α -glucosidase
10 inhibitors class, showed a promising result that its treatment reduce both the risk of diabetes progression in patients with IGT and the incidence of cardiovascular disease in its clinical trial "STOP-NIDDM" (non-patent documents 12-13), however, another drug, a member of the glinides class,
15 nateglinide failed to show its benefits in the trial "NAVIGATOR" (non-patent document 14). In addition, two DPP4 inhibitors, saxagliptin and alogliptin, did not have benefits for cardiovascular disease risk reduction in their clinical outcome trials, "SAVOR-TIMI 53" (non-patent document 15) and
20 "EXAMIN" (non-patent document 16), respectively. Considering such a wavering situation, more efficacious and safer anti-diabetic agents having potency to lower PPH should be desirable for suppressing diabetes epidemic and also relieving diabetic vascular complications. Screening for new compounds
25 with lowering PPH resulted in finding newly synthesized cyanotriazol compounds which reduced PPH after meal loading in Zucker Diabetic Fatty rats, one of type 2 diabetes model rats which show severe hyperglycemia and insulin resistance. This result demonstrated that the cyanotriazol compounds would be
30 applicable to treating diabetes and preventing diabetic various complications.

[0003]

When metabolic disorders including diabetes, obesity and so on are considered, they are highly involved in energy
35 imbalance between energy expenditure and calorie intake.

Although proper dietary restriction and exercise are best means for improving the metabolic disorders (non-patent document 17), it has been proved that the efficacy by themselves was insufficient (non-patent document 18) and drug intervention facilitated raising the probability of achieving clinical treatment target. Thus, modulation, particularly augmentation, of cellular energy expenditure is an attractive drug target to correct such energy imbalance-related disorders. The citric acid cycle has pivotal and mandatory roles in the aerobic metabolism, which mainly reduces NAD^+ to NADH and discharges carbon dioxide from metabolizing various energy substrates. We conceived that this cycle activation may lead to promote energy metabolism and expenditure, therefore we has conducted drug discovery screening to find synthetic chemical compounds with promoting citric acid cycle activity. Consequently, we found newly synthesized cyanotriazol compounds with strong efficacy on stimulating cellular citric acid cycle substrate consumption by measuring intracellular radiolabeled content derived from ^{14}C -citrate. For further certification, we employed an extracellular flux analyzer (XF24-3; Seahorse Bioscience) to measure actual carbon dioxide evolution rate (CDER) in cultured cells treated by several screened compounds (non-patent document 19). The analysis proved that the tested compounds accelerated not only CDER and but also oxygen consumption rate (OCR), which indicates energy expenditure is highly stimulated by the compounds.

[0004]

In this invention, we found that newly synthesized cyanotriazole compounds have strong efficacy to improve hyperglycemia and/or to stimulate the citric acid cycle activity. Not limiting the usage as an anti-obesity and/or diabetic drug, expected profits by a cyanotriazol compound are curative or preventive effects on diseases or disorders related to energy imbalance which comes from less energy output than calorie intake, for example, impaired glucose

tolerance, insulin resistance, diabetic complication, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit from stimulating energy expenditure.

5 [0005]

Patent Document 1 discloses a production method of cyanotriazole compounds.

Patent Document 2 and Non-Patent Documents 20-21 disclose a cyanotriazole compound as a human epidermis growth factor
10 receptor 2 tyrosinase inhibitor.

Patent Document 3 discloses a production method of cyanotriazole compounds.

Patent Document 4 discloses a cyanotriazole compound as an inhibitor of fatty acid syhthase.

15 **Document List**

Patent Documents

[0006]

[Patent Document 1] JP-A-51-53529

[Patent Document 2] CN 1651418 A

20 [Patent Document 3] US 4039531

[Patent Document 4] WO 2011/140296

Non-Patent Documents

[0007]

[Non-Patent Document 1] Diabetes Care, 2011, 34, e115-120

25 [Non-Patent Document 2] Diabetes Care, 2011, 34, e126-131

[Non-Patent Document 3] Diabetes Care, 2011, 34, e140-145

[Non-Patent Document 4] Diabetes Care, 2011, 34, e152-157

[Non-Patent Document 5] IDF DIABETES ATLAS Fifth edition, 2011, 5th Ed, International Diabetes Federation

30 [Non-Patent Document 6] Arch Intern Med 164, 2090-2095

[Non-Patent Document 7] J Clin Endocrinol Metab 91, 813-819

[Non-Patent Document 8] Diabetes Care 23, 1830-1834

[Non-Patent Document 9] Atherosclerosis 210, 302-306

[Non-Patent Document 10] Am J Cardiol 100, 899-904

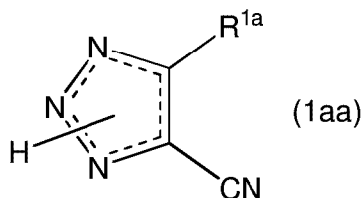
35 [Non-Patent Document 11] Nutr Res 32, 727-740

- [Non-Patent Document 12] Lancet 359, 2072-2077
[Non-Patent Document 13] JAMA 290, 486-494
[Non-Patent Document 14] N Engl J Med 362, .1463-1476
[Non-Patent Document 15] N Engl J Med 369, 1317-1326
5 [Non-Patent Document 16] N Engl J Med 369, 1327-1335
[Non-Patent Document 17] Circulation 122, 406-441
[Non-Patent Document 18] Eat Weight Disord 14, e56-65
[Non-Patent Document 19] Biochimica et Biophysica Acta -
Bioenergetics 1817, S123
10 [Non-Patent Document 20] Bioorganic Medicinal Chemistry,
'vol.15, 2007, 1533-1538
[Non-Patent Document 21] Tetrahedron Letters, 53, 2012, 59-63

Summary

[0007a]

- 15 Certain exemplary embodiments provide a cyanotriazole
compound represented by the formula (1aa):



wherein

R^{1a} is one of the following (1-1) to (1-13):

- 20 (1-1) a phenyl group substituted with one or more members
selected from the group consisting of the following (1-1-1)
to (1-1-36):
(1-1-1) a C₁₋₆ alkyl group optionally substituted with one
or more halogen atoms,
25 (1-1-2) a C₁₋₆ alkoxy group optionally substituted with one
or more halogen atoms,
(1-1-3) a C₁₋₆ alkoxy C₁₋₆ alkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
30 (1-1-6) a cycloalkyl C₁₋₆ alkyl group,
(1-1-7) a cycloalkyl C₁₋₆ alkoxy group,
(1-1-8) a cycloalkyl C₁₋₆ alkoxy C₁₋₆ alkyl group,
(1-1-9) a halogen atom,
(1-1-10) a cyano group,

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,
(1-1-14) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-15) a phenoxy C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkoxy group; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,
(1-1-18) a benzylthio C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-22) a pyridyl C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl C₁₋₆ alkoxy group,
(1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
(1-1-34) an indolinyl C₁₋₆ alkyl group,

(1-1-35) a benzothienylvinyl group, and
(1-1-36) a benzo[1,3]dioxolylvinyl group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
5 (1-2) a thiazolyl group substituted with one or more members
selected from the group consisting of the following (1-2-1)
to (1-2-11):
(1-2-1) a C₁₋₆ alkyl group optionally substituted with one
or more halogen atoms,
10 (1-2-2) a C₁₋₆ alkoxy group,
(1-2-3) a cycloalkyl group,
(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
15 halogen atom; a C₁₋₆ alkyl group optionally substituted
with one or more halogen atoms; and a C₁₋₆ alkoxy group
optionally substituted with one or more halogen atoms,
(1-2-6) a styryl group optionally substituted on the
phenyl ring with one or more C₁₋₆ alkyl groups optionally
20 substituted with one or more halogen atoms,
(1-2-7) a phenoxy group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a C₁₋₆ alkyl group optionally substituted
with one or more halogen atoms; and a C₁₋₆ alkoxy group
25 optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the
phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one
or more members selected from the group consisting of a
30 halogen atom; and a C₁₋₆ alkyl group optionally substituted
with one or more halogen atoms,
(1-2-10) an N-C₁₋₆ alkyl-N-phenyl amino group optionally
substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atom; and
35 a C₁₋₆ alkyl group optionally substituted with one or more
halogen atoms,
(1-2-11) a pyridyl group optionally substituted with one
or more members selected from the group consisting of a

halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the
5 following (1-3-1) to (1-3-3):
 (1-3-1) a C₁₋₆ alkyl group,
 (1-3-2) a cycloalkyl group, and
 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
10 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1)
15 to (1-4-5):
 (1-4-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a
20 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
25 (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
 (1-4-4) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
30 (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following
35 (1-5-1) to (1-5-2):
 (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

5 (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):

(1-6-1) a C₁₋₆ alkyl group,

(1-6-2) a phenyl group optionally substituted with one or

10 more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-6-3) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups

15 optionally substituted with one or more halogen atoms,

(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-3):

(1-7-1) a benzyloxy C₁₋₆ alkyl group optionally substituted

20 on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-7-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

25 (1-7-3) a benzofuryl group,

(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or

30 more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or

35 more members selected from the group consisting of the following (1-9-1) to (1-9-2):

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

(1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

(1-13-3) a piperidyl group;

provided that

5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;

5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

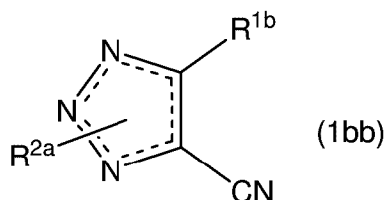
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;

5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5 4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
 4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
 4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 10 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 15 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile;
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 20 4-(2-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dimethoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,6-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(3-bromo-6-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2-chloro-6-fluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 25 4-(4'-methoxy-biphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4-trifluoromethoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-chlorobiphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
 30 4-(3-trifluoromethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4,6-trimethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,6-difluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-(trifluoromethyl)biphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
 35 4-(3,5-di-tert-butyl-2-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-methylbiphenyl-2-yl)-1H-1,2,3-triazole-5-carbonitrile;

4-(4-ethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(4-tert-butylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;
5-(piperidin-1-yl)-1H-1,2,3-triazole-4-carbonitrile; and
5 5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;
are excluded,
or a salt thereof.

[0007b]

Other exemplary embodiments provide a cyanotriazole
10 compound represented by the formula (1bb):



wherein

R^{1b} is one of the following (1-1) to (1-13):

(1-1) a phenyl group optionally substituted with one or more
15 members selected from the group consisting of the following
(1-1-1) to (1-1-34):

- (1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- (1-1-2) a C₁₋₆ alkoxy group optionally substituted with one
20 or more halogen atoms,
- (1-1-3) a C₁₋₆ alkoxy C₁₋₆ alkyl group,
- (1-1-4) a cycloalkyl group,
- (1-1-5) a cycloalkoxy group,
- (1-1-6) a cycloalkyl C₁₋₆ alkyl group,
- 25 (1-1-7) a cycloalkyl C₁₋₆ alkoxy group,
- (1-1-8) a cycloalkyl C₁₋₆ alkoxy C₁₋₆ alkyl group,
- (1-1-9) a halogen atom,
- (1-1-10) a cyano group,
- (1-1-11) a phenyl group optionally substituted with one or
30 more members selected from the group consisting of a
halogen atom; a C₁₋₆ alkyl group optionally substituted
with one or more halogen atoms; and a C₁₋₆ alkoxy group
optionally substituted with one or more halogen atoms,

(1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,

(1-1-14) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-15) a phenoxy C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkoxy group; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-22) a pyridyl C₁₋₆ alkyl group optionally substituted
5 on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more
10 halogen atoms,
(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-25) a pyrimidinyl group optionally substituted with
15 one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
20 (1-1-27) a piperidyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
25 (1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl C₁₋₆ alkoxy group,
(1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted
30 with one or more halogen atoms, and
(1-1-34) an indolinyl C₁₋₆ alkyl group,
(1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):
35 (1-2-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-2-2) a C₁₋₆ alkoxy group,
(1-2-3) a cycloalkyl group,

(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted
5 with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-2-6) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
10 (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
15 (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted
20 with one or more halogen atoms,
(1-2-10) an N-C₁₋₆ alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more
25 halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
30 (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
(1-3-1) a C₁₋₆ alkyl group,
(1-3-2) a cycloalkyl group, and
35 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted

with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms, (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following

5 (1-4-1) to (1-4-5):

(1-4-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a

10 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

15 (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

20 (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following

25 (1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the

30 group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):

35 (1-6-1) a C₁₋₆ alkyl group,

(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-6-3) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups

5 optionally substituted with one or more halogen atoms,

(1-7) a pyridyl group optionally substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-2):

(1-7-1) a benzyloxy C₁₋₆ alkyl group optionally substituted

10 on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-7-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

15 (1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or

20 more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the

25 following (1-9-1) to (1-9-2):

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

30 (1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more

35 halogen atoms,

(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

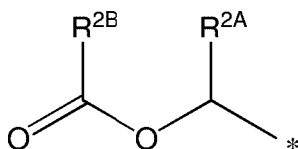
(1-13-3) a piperidyl group; and

R^{2a} is one of the following (2-1) to (2-3):

(2-1) a C₁₋₆ alkyl group optionally substituted with one or more members selected from the group consisting of a hydroxy group; and a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(2-2) a 2-oxo-1,3-dioxolanyl group, and

(2-3) a group represented by the formula:



wherein

* is a bonding site;

R^{2A} is one of the following (2A-1) to (2A-2):

(2A-1) a hydrogen atom, and

(2A-2) a C₁₋₆ alkyl group; and

R^{2B} is one of the following (2B-1) to (2B-6):

(2B-1) a C₁₋₆ alkoxy group optionally substituted with one or more members selected from the group consisting of a C₁₋₆ alkoxy group; a carboxy group; a C₁₋₆ alkoxy-carbonyl group; a hydroxy group; a phenyl C₁₋₆ alkoxy-carbonyl group; a C₂₋₆ alkenyloxy-carbonyl group; a morpholinyl group; a benzyloxycarbonyl group; and a tetrahydropyran-2-yloxy group,

(2B-2) a C₁₋₆ alkyl group;

(2B-3) a C₁₋₆ alkylamino group optionally substituted with one or more C₁₋₆ alkoxy-carbonyl groups;
(2B-4) a cycloalkyl group;
(2B-5) a cycloalkoxy group; and
5 (2B-6) a phenyl group;
provided that
1-methyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;
1-ethyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;
5-phenyl-1-propyl-1H-1,2,3-triazole-4-carbonitrile;
10 1-pentyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;
5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;
5-(piperidin-1-yl)-1H-1,2,3-triazole-4-carbonitrile;
5-(4-methoxyphenyl)-1-methyl-1H-1,2,3-triazole-4-carbonitrile; and
15 5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;
are excluded,
or a salt thereof.

[0008]

An object of the present invention is therefore to provide a
20 compound which stimulates the citric acid cycle activity
and/or improves hyperglycemia with less side effects, and
excellent safety, and is useful for treating and/or
preventing diseases or disorders on which citric acid cycle
activation and/or improvement of hyperglycemia has a
25 prophylactic and/or therapeutic effect, for example,
diabetes, impaired glucose tolerance, insulin resistance,
diabetic complications, obesity, dyslipidemia, hepatic
steatosis, atherosclerosis and/or cardiovascular disease, as
well as diseases or disorders that would benefit from
30 stimulating energy expenditure.

Means of Solving the Problems

[0009]

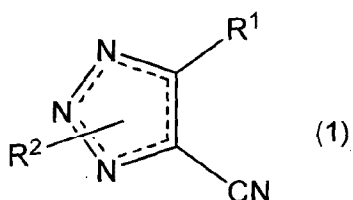
The present inventors intensively conducted studies with
the view to attaining the aforementioned object. As a result,
35 they found that a cyanotriazole compound represented by the
general formula (1) below and a salt thereof stimulates the
citric acid cycle activity and/or improves hyperglycemia with
less side effects, and excellent safety, and is useful for

treating and/or preventing diseases or disorders on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect, for example, diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit from stimulating energy expenditure. The present invention has been achieved based on the finding.

10 [0010]

The present invention provides a cyanotriazole compound represented by the formula (1):

[0011]



15 [0012]

wherein

R^1 is a phenyl group, a thiazolyl group, a thienyl group, a pyridyl group or a quinolyl group, each of which is substituted (provided that the phenyl group is substituted with a lower alkyl group, a lower alkoxy group, a lower alkylthio group, a halogen atom, a phenoxy group or a carboxy group, then the the phenyl group is substituted with additional one or more substituents); or

an oxazolyl group, a furyl group, a pyrrolyl group, a piperidyl group, an indolyl group, a benzofuryl group, a benzothienyl group, a phenyl lower alkyl group, a pyrimidinyl group, a 2,3-dihydroindolyl group, an imidazolyl group, a benzothiazolyl group, an isoxazolyl group, a 2,3-dihydrobenzofuryl group, an isothiazolyl group, a dibenzofuryl group, a benzo[1,3]dioxolyl group, a carbazolyl group, a naphthyl group, a 2-oxo-1,2,3,4-tetrahydroquinolyl group, a 6-

oxo-1,6-dihydropyrimidinyl group, an imidazo[1,2-a]pyridyl group, an oxadiazolyl group, a thiadiazolyl group, a benzoxazolyl group, a styryl group, a benzoyl group, a cycloalkyl group, a higher alkyl group, a 2-oxo-1,2-dihydroquinolyl group, a benzimidazolyl group, a 2,3-dihydro[1,4]benzodioxinyl group, a fluorenyl group, a bicyclo[2,2,1]hept-2-enyl group, a thieno[3,2-b]pyridyl group, an imidazo[1,2-a]benzimidazolyl group, a 3,4-dihydro-2H-[1,4]benzoxazinyl group, a 3,4-dihydro-2H-benzo[b][1,4]dioxepinyl group or an amino group, each of which is optionally substituted.; and

R^2 is

- (1) a hydrogen atom,
- (2) a lower alkyl group optionally substituted with one or more substituents excluding an oxo group, or
- (3) a heterocyclyl group optionally substituted with one or more substituents;

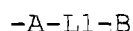
provided that

- 5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
- 5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- methyl 4-[4-(4-cyano-1,2,3-triazol-5-yl)styryl]benzoate;
- 5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 5-{4-[4-(*N,N*-dimethylamino)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[2-(biphenyl-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[4-(2-oxo-2H-chromen-3-yl)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[4-(benzo[d]oxazol-2-yl)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;

5-{4-[2-(2-methoxynaphthalen-1-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(4-methoxynaphthalen-1-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 5-[4-(4-formylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(4'-formylbiphenyl-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
 4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 (5-(5-cyano-1,2,3-triazol-4-yl)furan-2-yl)methyl acetate;
 2-[4-(4'-benzoxazole-2-yl-stilbene-4-yl)-5-cyano-1,2,3-triazole-N-yl]acetic acid methyl ester;
 4-(4-(4-(1H-benzo[d]imidazol-2-yl)styryl)phenyl)-N-trityl-1,2,3-triazole-5-carbonitrile;
 2-(4-(4-(4-(1H-benzo[d]imidazol-2-yl)styryl)phenyl)-5-cyano-1,2,3-triazol-N-yl)acetamide;
 2-(4-(4-(4-(1H-benzo[d]imidazol-2-yl)styryl)phenyl)-5-cyano-1,2,3-triazol-N-yl)acetic acid;
 4-(4-(4-(1H-benzo[d]imidazol-2-yl)styryl)phenyl)-N-(2-oxo-2-phenylethyl)-1,2,3-triazole-5-carbonitrile; and
 4-(4'-benzoxazole-2-yl-stilbene-4-yl)-5-cyano-N-acetamide-1,2,3-triazole;
 are excluded,
 or a salt thereof (hereinafter to be referred to as Compound (1)).

[0013]

In this embodiment, R¹ is preferably a group represented by formula:



5 wherein

A is a divalent group selected from (A1) to (A45):

- (A1) a phenylene group,
- (A2) a thiazolediyl group,
- (A3) an oxazolediyl group,
- 10 (A4) a thiophenediyl group,
- (A5) a furandiyl group,
- (A6) a pyrrolediyl group,
- (A7) a pyridinediyl group,
- (A8) a piperidinediyl group,
- 15 (A9) an indolediyl group,
- (A10) a benzofurandiyl group,
- (A11) a benzothiophenediyl group,
- (A12) -lower alkylene-phenylene-,
- (A13) a pyrimidinediyl group,
- 20 (A14) a quinolinediyl group,
- (A15) a 2,3-dihydroindolediyl group,
- (A16) an imidazolediyl group,
- (A17) a benzothiazolediyl group,
- (A18) an isoxazolediyl group,
- 25 (A19) a 2,3-dihydrobenzofurandiyl group,
- (A20) an isothiazolediyl group,
- (A21) a dibenzofurandiyl group,
- (A22) a benzo[1,3]dioxolediyl group,
- (A23) a carbazolediyl group,
- 30 (A24) a naphthalenediyl group,
- (A25) a 2-oxo-1,2,3,4-tetrahydroquinolinediyl group,
- (A26) a 6-oxo-1,6-dihydropyrimidinediyl group,
- (A27) an imidazo[1,2-a]pyridinediyl group,
- (A28) a [1,3,4]oxadiazolediyl group,
- 35 (A29) a [1,2,4]thiadiazolediyl group,

(A30) a benzoxazolediyl group,
 (A31) a [1,3,4]thiadiazolelediyl group,
 (A32) a styrenediyl group,
 (A33) -CO-phenylene-,
 5 (A34) a cycloalkanediyl group,
 (A35) a higher alkylene group,
 (A36) a 2-oxo-1,2-dihydroquinolinediyl group,
 (A37) a benzimidazolelediyl group,
 (A38) a 2,3-dihydro[1,4]benzodioxinediyl group,
 10 (A39) a fluorenediyl group,
 (A40) a bicyclo[2,2,1]hept-2-enediyl group,
 (A41) a thieno[3,2-b]pyridinediyl group,
 (A42) an imidazo[1,2-a]benzimidazolelediyl group,
 (A43) a 3,4-dihydro-2H-[1,4]benzoxazinediyl group,
 15 (A44) a 3,4-dihydro-2H-benzo[b][1,4]dioxepinediyl group, and
 (A45) -NH-,
 each of (A1) to (A45) is optionally substituted with one or
 more members selected from the group consisting of
 a halogen atom;
 20 a lower alkyl group optionally substituted with one or more
 halogen atoms;
 a lower alkenyl group;
 a hydroxy group;
 a lower alkoxy group optionally substituted with one or more
 25 halogen atoms;
 a lower alkenyloxy group;
 a lower alkynyloxy group;
 a cyano group;
 an amino group optionally mono- or di-substituted with members
 30 selected from the group consisting of a lower alkyl group, a
 lower alkyl-carbonyl group, a lower alkoxy-carbonyl group, and
 a lower alkylsulfonyl group;
 a N,N-di-lower alkylamino lower alkyl group;
 a N,N-di-lower alkylamino lower alkoxy group;
 35 a cycloalkyl group optionally substituted with one or more

halogen atoms;
a cycloalkoxy group optionally substituted with one or more
halogen atoms;
a cycloalkyl lower alkyl group optionally substituted with one
5 or more halogen atoms;
a cycloalkyl lower alkoxy group optionally substituted with
one or more halogen atoms;
a lower alkoxy lower alkyl group optionally substituted with
one or more halogen atoms;
10 a lower alkoxy lower alkoxy group optionally substituted with
one or more halogen atoms;
a lower alkylthio group;
a phenyl group optionally substituted with one or more members
selected from the group consisting of a halogen atom, a lower
15 alkyl group optionally substituted with one or more halogen
atoms, and a lower alkoxy group optionally substituted with
one or more halogen atoms;
a phenoxy group optionally substituted with one or more
members selected from the group consisting of a halogen atom,
20 a lower alkyl group optionally substituted with one or more
halogen atoms, and a lower alkoxy group optionally substituted
with one or more halogen atoms;
a styryl group optionally substituted on the phenyl ring with
one or more members selected from the group consisting of a
25 halogen atom, a lower alkyl group optionally substituted with
one or more halogen atoms, and a lower alkoxy group optionally
substituted with one or more halogen atoms;
a phenyl lower alkyl group optionally substituted on the
phenyl ring with one or more members selected from the group
30 consisting of a halogen atom, a lower alkyl group optionally
substituted with one or more halogen atoms, and a lower alkoxy
group optionally substituted with one or more halogen atoms;
a phenyl lower alkoxy group optionally substituted on the
phenyl ring with one or more members selected from the group
35 consisting of a halogen atom, a lower alkyl group optionally

substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms; a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group

5 consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms; a phenoxy lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group

10 consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms; a thienyl group; an oxetanyl lower alkoxy group optionally substituted with one

15 or more lower alkyl groups; a furyl group; a piperidyl group; a pyrrolidinyl group; and a morpholinyl group;

20 L1 is

a bond,

lower alkylene, lower alkenylene,

-O-, -O-lower alkylene, lower alkylene-O-, -O-lower alkenylene, lower alkenylene-O-,

25 -O-lower alkylene-CO-, -CO-lower alkylene-O-,

-O-lower alkylene-O-, -O-lower alkenylene-O-, lower alkylene-O-lower alkylene, lower alkylene-C(OH)-lower alkylene,

-CO-, -CO-lower alkylene, lower alkylene-CO-,

-NH-, -NH-lower alkylene, lower alkylene-NH-, -N(phenyl)-, -

30 N(lower alkyl)-, -N(lower alkyl)-lower alkylene, lower alkylene-N(lower alkyl)-,

-CONH-, -CONH-lower alkylene, lower alkylene-CONH-, -CO-N(lower alkyl)-, -CO-N(lower alkyl)-lower alkylene, lower alkylene-CO-N(lower alkyl)-,

35 -NHCO-, -N(lower alkyl)-CO-, -NHCO-lower alkylene, lower

alkylene-NHCO-, -N(lower alkyl)-CO-lower alkylene, lower
 alkylene -N(lower alkyl)-CO-,
 -CO₂-, -CO₂-lower alkylene, lower alkylene-CO₂-,
 -OCO-, -OCO-lower alkylene, lower alkylene-OCO-,
 5 -NHCO₂-lower alkylene, lower alkylene-NHCO₂-, -N(lower alkyl)-
 CO₂-lower alkylene, lower alkylene-N(lower alkyl)-CO₂-,
 -OCONH-lower alkylene, lower alkylene-OCONH-, -OCO-N(lower
 alkyl)-lower alkylene, lower alkylene-OCO-N(lower alkyl)-,
 -S-, lower alkylene-S-, -S-lower alkylene, lower alkylene-S-
 10 lower alkylene,
 -SO₂-, lower alkylene-SO₂-, -SO₂-lower alkylene, lower alkylene-
 SO₂-lower alkylene,
 -NH₂SO₂-lower alkylene, lower alkylene-NH₂SO₂-, -N(lower alkyl)-
 SO₂-lower alkylene, lower alkylene-N(lower alkyl)-SO₂-,
 15 -SO₂NH-lower alkylene, lower alkylene-SO₂NH-, -SO₂-N(lower
 alkyl) -lower alkylene, or lower alkylene-SO₂-N(lower alkyl)-;
 and

B is a group or an atom selected from (B1) to (B65):

- (B1) a phenyl group,
- 20 (B2) a naphthyl group,
- (B3) a tetrahydronaphthyl group,
- (B4) an imidazolyl group,
- (B5) a [1,2,3]triazolyl group,
- (B6) a thiazolyl group,
- 25 (B7) a pyrazolyl group,
- (B8) a thienyl group,
- (B9) a furyl group,
- (B10) a tetrahydrofuryl group,
- (B11) a pyrrolyl group,
- 30 (B12) a pyridyl group,
- (B13) an imidazo[1,2-a]pyridyl group,
- (B14) a pyrimidinyl group,
- (B15) a pyridazyl group,
- (B16) a pyrazyl group,
- 35 (B17) a pyrrolo[2,3-b]pyridyl group,

- (B18) a pyrazolo[3,4-b]pyridyl group,
(B19) a piperidyl group,
(B20) a piperazinyl group,
(B21) a morpholinyl group,
5 (B22) a pyrrolidinyl group,
(B23) a quinolyl group,
(B24) an isoquinolyl group,
(B25) a 1,2,3,4-tetrahydroquinolyl group,
(B26) a 1,2,3,4-tetrahydroisoquinolyl group,
10 (B27) a 2-oxo-1,2,3,4-tetrahydroquinolyl group,
(B28) an indolyl group,
(B29) a 2,3-dihydroindolyl group,
(B30) an indanyl group,
(B31) a benzofuryl group,
15 (B32) a 2,3-dihydrobenzofuryl group,
(B33) a benzothienyl group,
(B34) a benzothiazolyl group,
(B35) a benzo[1,3]dioxolyl group,
(B36) a cycloalkyl group,
20 (B37) a cycloalkenyl group,
(B38) a tetrahydropyranyl group,
(B39) an oxetanyl group,
(B40) an oxiranyl group,
(B41) a 2,3-dihydro[1,4]benzodioxinyl group,
25 (B42) a 3,4-dihydro-2H-benzo[1,4]oxazinyl group,
(B43) a dibenzofuryl group,
(B44) a 4H-benzo[1,3]dioxinyl group,
(B45) a 1,2,4-oxadiazolyl group,
(B46) a 1,3,4-oxadiazolyl group,
30 (B47) an indazolyl group,
(B48) an isoxazolyl group,
(B49) a benzoisoxazolyl group,
(B50) a 2-oxo-1,2-dihydro-1H-benzimidazolyl group,
(B51) a 2-oxo-2,3-dihydro-3H-benzothiazolyl group,
35 (B52) a 2,3,4,5-tetrahydrobenzo[1,4]oxazepinyl group,

- (B53) an isoindolinyl group,
(B54) a 2,4-dihydro-1H-benzo[1,3]oxazinyl group,
(B55) a 1,2,3,4-tetrahydrobenzo[1,4]oxazepinyl group,
(B56) a 2,3,4,5-tetrahydro-1H-benzoazepinyl group,
5 (B57) a tetrazolyl group,
(B58) a 2-oxo-1,2-dihydroquinolyl group,
(B59) a 3,4-dihydro-2H-benzodioxepinyl group,
(B60) a 3,6-dihydropyranyl group,
(B61) a 2-oxo-benzoxazolyl group,
10 (B62) an oxazolyl group,
(B63) a benzoxazolyl group,
(B64) a triphenylphosphonium group, and
(B65) a hydrogen atom,
each of (B1) to (B64) is optionally substituted on the ring(s)
15 with one or more members selected from the group consisting of
a halogen atom;
an oxo group;
a lower alkyl group optionally substituted with one or more
members selected from the group consisting of a halogen atom,
20 and a hydroxy group;
a higher alkyl group;
a hydroxy group;
a lower alkoxy group optionally substituted with one or more
halogen atoms;
25 a cyano group;
a nitro group;
an amino group optionally mono- or di-substituted with lower
alkyl groups;
a lower alkylsulfonylamino group;
30 a N,N-di-lower alkylamino-carbonyl group;
a N,N-di-lower alkylamino lower alkoxy group;
an acetylamino lower alkyl group;
a formyl group;
a lower alkyl-carbonyl group;
35 a lower alkylsulfonyl group;

a lower alkoxy-carbonyl group optionally substituted with one or more halogen atoms;

a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, a lower alkoxy group optionally substituted with one or more halogen atoms, and a phenoxy group;

a phenoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;

a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;

a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;

a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;

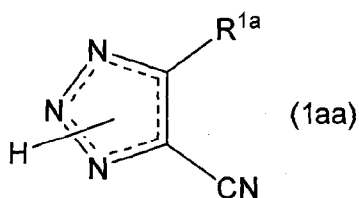
a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;

a phenoxy lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally

substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms;
a benzoyl group;
a lower alkylthio group optionally substituted with one or
5 more halogen atoms;
a morpholinyl group;
a piperazinyl group optionally substituted with one or more lower alkyl groups;
a thienyl group;
10 a pyrrolyl group;
a pyrimidinyl group;
a pyrazolyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms;
15 a thiazolyl group optionally substituted with one or more lower alkyl groups;
a tetrahydropyranyloxy group;
a furyl group;
a pyrazinyl group optionally substituted with one or more
20 lower alkyl groups;
a [1,2,4]oxadiazolyl group optionally substituted with one or more lower alkyl groups;
a [1,3,4]oxadiazolyl group optionally substituted with one or more lower alkyl groups;
25 a pyrrolidinyl group;
a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms;
an isoxazolyl group;
30 an imidazolyl group;
a cycloalkyl group;
a 2-oxo-pyrrolidinyl group; and
a [1,2,3]triazolyl group optionally substituted with one or more cyano groups.
35 [0014]

The present invention also provides a cyanotriazole compound represented by the formula (1aa):

[0015]



5 [0016]

wherein

R^{1a} is one of the following (1-1) to (1-34):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of the following (1-1-1) to

10 (1-1-108):

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

15 (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),

(1-1-3) a lower alkoxy lower alkyl group optionally substituted with one or more members selected from the group consisting of a halogen atoms; and a cycloalkyl group,

25 (1-1-4) a cycloalkyl group,

(1-1-5) a cycloalkoxy group optionally substituted with one or more halogen atoms,

(1-1-6) a cycloalkyl lower alkyl group,

30 (1-1-7) a cycloalkyl lower alkoxy group optionally substituted on the cycloalkyl group with one or more members selected from the group consisting of a halogen

atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl group optionally substituted with one or more halogen atoms,

(1-1-8) a cycloalkyl lower alkoxy lower alkyl group optionally substituted on the cycloalkyl group with one or more members selected from the group consisting of a hydroxy; and a lower alkoxy group,

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-10) a cyano group,

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkoxy-carbonyl group; a lower alkylsulfonyl group; a phenyl group; a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom and a lower alkyl group optionally substituted with one or more halogen atoms; a phenoxy group; and a cyano group,

(1-1-12) a phenyl lower alkyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; a lower alkoxy group optionally substituted with one or more halogen atoms; and a hydroxy group,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen

atoms; a cyano group; a halogen atom; and a 5-cyano-1H-1,2,3-triazol-4-yl group (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),
(1-1-14) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),
(1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; and a cyano group,
(1-1-17) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atoms; and a lower alkyl group,
(1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; and

a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a cyano group,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms

(preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

(1-1-25) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

- (1-1-27) a piperidyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl group,
- 5 (1-1-28) a benzoxazolyl group optionally substituted with one or more halogen atoms,
- (1-1-29) a benzofuryl group optionally substituted with one or more halogen atoms,
- (1-1-30) a benzofuryl lower alkoxy group optionally substituted on the benzofuran ring with one or more phenyl groups optionally substituted with one or more halogen atoms,
- 10 (1-1-31) a thienyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; a lower alkyl-carbonyl group; and a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms,
- 15 (1-1-32) a benzothienyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- 25 (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
- (1-1-34) an indolinyl lower alkyl group,
- (1-1-35) a benzothienylvinyl group,
- 30 (1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
- (1-1-37) a lower alkoxy lower alkoxy group,
- (1-1-38) a cycloalkoxy lower alkyl group optionally substituted on the cycloalkyl group with one or more lower
- 35

alkyl groups,
(1-1-39) a cycloalkyl lower alkenyl group,
(1-1-40) a cycloalkenyloxy group,
(1-1-41) a cycloalkenylvinyl group,
5 (1-1-42) an oxiranyl group optionally substituted with one
or more phenyl groups optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms,
(1-1-43) an oxetanyl lower alkoxy group optionally
10 substituted on the oxetane ring with one or more lower
alkyl groups,
(1-1-44) a tetrahydropyranyl lower alkoxy group,
(1-1-45) a hydroxy group,
(1-1-46) a phenyl lower alkoxy lower alkyl group optionally
15 substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atom; a
lower alkoxy group optionally substituted with one or more
halogen atoms; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkylthio group
20 optionally substituted with one or more halogen atoms,
(1-1-47) a phenyl lower alkenyloxy group optionally
substituted on the phenyl ring with one or more lower alkyl
groups optionally substituted with one or more halogen
atoms,
25 (1-1-48) a benzoyl group optionally substituted with one or
more halogen atoms,
(1-1-49) a phenylthio lower alkyl group optionally
substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atoms; and
30 a lower alkyl group optionally substituted with one or more
halogen atoms,
(1-1-50) a phenylsulfonyl group optionally substituted with
one or more lower alkyl groups,
(1-1-51) a phenylsulfonyl lower alkyl group optionally
35 substituted on the phenyl ring with one or more halogen

atoms,

(1-1-52) a naphthyl group optionally substituted with one or more halogen atoms,

5 (1-1-53) a naphthylvinyl group optionally substituted on the naphthyl ring with one or more halogen atoms,

(1-1-54) a tetrahydronaphthyloxy group,

(1-1-55) an indanyloxy group,

(1-1-56) an amino group optionally mono- or di-substituted with members selected from the group consisting of a lower
10 alkyl group; a lower alkyl-carbonyl group; a lower alkoxy-carbonyl group; and a lower alkylsulfonyl group;

(1-1-57) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen
15 atoms,

(1-1-58) an aminocarbonyl group optionally substituted with one or more members selected from the group consisting of a lower alkyl group; a cycloalkyl group; a cycloalkyl lower alkyl group; and a phenyl group optionally substituted with
20 one or more halogen atoms,

(1-1-59) a pyridyl lower alkoxy group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

25 (1-1-60) a pyridyloxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-61) a pyrrolo[2,3-b]pyridyl group optionally substituted with one or more lower alkyl groups,

30 (1-1-62) a pyrazolo[3,4-b]pyridyl group optionally substituted with one or more lower alkyl groups,

(1-1-63) an imidazo[1,2-a]pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group
35 optionally substituted with one or more halogen atoms,

- (1-1-64) a pyrimidinyl lower alkyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 5 (1-1-65) a pyrimidinyl lower alkoxy group optionally substituted on the pyrimidine ring with one or more members selected from the group consisting of a lower alkoxy group; a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl group,
- 10 (1-1-66) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-67) a pyrimidinyl lower alkyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more
- 15 halogen atoms,
- (1-1-68) a pyrazinyl group optionally substituted with one or more lower alkyl groups,
- (1-1-69) a pyridazinyl group optionally substituted with
- 20 one or more members selected from the group consisting of a lower alkyl group; and a lower alkoxy group,
- (1-1-70) a piperidyl lower alkyl group,
- (1-1-71) a piperidylcarbonyl group,
- (1-1-72) a piperazinyl group optionally substituted with
- 25 one or more phenyl groups optionally substituted with one or more halogen atoms,
- (1-1-73) an imidazolyl group,
- (1-1-74) a pyrazolyl group optionally substituted with one or more lower alkyl groups,
- 30 (1-1-75) a pyrrolyl lower alkyl group,
- (1-1-76) a thiazolyl group,
- (1-1-77) a thiazolyl lower alkoxy group optionally substituted on the thiazole ring with one or more lower alkyl groups,
- 35 (1-1-78) a benzothiazolyl group optionally substituted with

- one or more halogen atoms,
(1-1-79) a furyl group,
(1-1-80) a furylvinyl group optionally substituted on the
furan ring with one or more lower alkyl groups,
5 (1-1-81) a benzofurylvinyl group (preferably the
benzofurylvinyl group is bonded to the o- or m-position on
the phenyl ring of (1-1)),
(1-1-82) a 2,3-dihydrobenzofuryl group,
(1-1-83) a thienyl lower alkoxy group,
10 (1-1-84) a thienylvinyl group optionally substituted on the
thiophene ring with one or more halogen atoms (preferably
the thienylvinyl group is bonded to the o- or m-position on
the phenyl ring of (1-1)),
(1-1-85) a benzothienyl lower alkyl group optionally
15 substituted on the benzothiophene ring with one or more
halogen atoms,
(1-1-86) a benzothienyl lower alkoxy group optionally
substituted on the benzothiophene ring with one or more
members selected from the group consisting of a halogen
20 atom; and a lower alkyl group optionally substituted with
one or more halogen atoms,
(1-1-87) a benzo[1,3]dioxolyl lower alkyl group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
25 (1-1-88) a benzo[1,3]dioxolyl lower alkoxy group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
(1-1-89) a 4H-benzo[1,3]dioxinyl group optionally
substituted with one or more halogen atoms,
30 (1-1-90) a 4H-benzo[1,3]dioxinylvinyl group optionally
substituted on the benzo[1,3]dioxine ring with one or more
halogen atoms,
(1-1-91) a quinolyl group,
(1-1-92) a quinolyl lower alkoxy group,
35 (1-1-93) a quinolylvinyl group,

- (1-1-94) a 3,4-dihydro-2H-quinolyl group,
(1-1-95) a 3,4-dihydro-2H-quinolyl lower alkyl group,
(1-1-96) a 2-oxo-1,2,3,4-tetrahydroquinolyl group,
(1-1-97) a 2-oxo-1,2,3,4-tetrahydroquinolyl lower alkoxy
5 group,
(1-1-98) a 2-oxo-1,2,3,4-tetrahydroquinolyloxy group
optionally substituted with one or more lower alkyl groups,
(1-1-99) an isoquinolyl group,
(1-1-100) a 3,4-dihydro-1H-isoquinolyl group,
10 (1-1-101) a 3,4-dihydro-1H-isoquinolyl lower alkyl group,
(1-1-102) an indolyl group optionally substituted with one
or more members selected from the group consisting of a
halogen atom; a lower alkyl group; and a lower alkoxy-
carbonyl group,
15 (1-1-103) an indolyl lower alkyl group,
(1-1-104) an indolylvinyl group optionally substituted on
the indole ring with one or more lower alkyl groups,
(1-1-105) an indolinyll group,
(1-1-106) an indolinyllcarbonyl group,
20 (1-1-107) a 1H-1,2,3-triazolyl group optionally substituted
with one or more cyano groups, and
(1-1-108) a triphenylphosphonium lower alkyl group,
(1-2) a thiazolyl group substituted with one or more members
selected from the group consisting of the following (1-2-1) to
25 (1-2-26):
(1-2-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-2-2) a lower alkoxy group,
(1-2-3) a cycloalkyl group,
30 (1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; a lower alkoxy group
35 optionally substituted with one or more halogen atoms; a

hydroxy group; and a cyano group,
(1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
5 (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
10 (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
15 (1-2-10) an amino group optionally mono- or di-substituted with members selected from the group consisting of a lower alkyl group; a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms; a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms; and a benzoyl group optionally substituted with one or more halogen atoms,
20 (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
30 (1-2-12) a lower alkenyl group,
(1-2-13) a cycloalkyl lower alkyl group,
(1-2-14) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from
35

the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a hydroxy group,

(1-2-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-2-16) a phenyl lower alkoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group optionally substituted with one or more halogen atoms; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-17) a phenyl lower alkylsulfonyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-18) a mono- or di-N-lower alkyl amino lower alkyl group;

(1-2-19) a piperidyl group optionally substituted with one or more members selected from the group consisting of a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-20) a piperazinyl group optionally substituted with one or more phenyl groups optionally substituted with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally

- substituted with one or more halogen atoms,
(1-2-21) an indolyl group,
(1-2-22) a morpholinyl group,
(1-2-23) a thienyl group,
5 (1-2-24) a benzothienyl group optionally substituted with
one or more lower alkyl groups optionally substituted with
one or more halogen atoms,
(1-2-25) a furyl group, and
(1-2-26) a cyano group,
10 (1-3) an oxazolyl group optionally substituted with one or
more members selected from the group consisting of the
following (1-3-1) to (1-3-12):
(1-3-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
15 (1-3-2) a cycloalkyl group,
(1-3-3) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
20 optionally substituted with one or more halogen atoms,
(1-3-4) a lower alkoxy lower alkyl group,
(1-3-5) a phenoxy lower alkyl group optionally substituted
on the phenyl ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms,
25 (1-3-6) a naphthyl group,
(1-3-7) a pyridyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms,
(1-3-8) a furyl group,
30 (1-3-9) a dihydrobenzofuryl group,
(1-3-10) a thienyl group,
(1-3-11) a benzothienyl group optionally substituted with
one or more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
35 with one or more halogen atoms; and a lower alkoxy group

optionally substituted with one or more halogen atoms, and
(1-3-12) a benzo[1,3]dioxolyl group optionally substituted
with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members
5 selected from the group consisting of the following (1-4-1) to
(1-4-14):
(1-4-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-4-2) a phenyl group optionally substituted with one or
10 more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more members selected from the group consisting
of a halogen atom and a hydroxy group; a lower alkoxy group
optionally substituted with one or more halogen atoms; a
15 lower alkyl-carbonyl group; a lower alkoxy-carbonyl group;
and a benzyloxy group optionally substituted on the phenyl
ring with one or more members selected from the group
consisting of a lower alkyl group optionally substituted
with one or more halogen atoms, and a halogen atom,
20 (1-4-3) a benzyl group optionally substituted on the phenyl
ring with one or more halogen atoms,
(1-4-4) a phenoxy group optionally substituted with one or
more members selected from the group consisting of a lower
alkyl group optionally substituted with one or more halogen
25 atoms; and a halogen atom,
(1-4-5) a styryl group optionally substituted on the phenyl
ring with one or more members selected from the group
consisting of a halogen atom; and a lower alkyl groups
optionally substituted with one or more halogen atoms,
30 (1-4-6) a cycloalkyl lower alkenyl group,
(1-4-7) a halogen atom,
(1-4-8) a pyridyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
35 substituted with one or more halogen atoms,

- (1-4-9) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-4-10) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-4-11) a thienyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a phenyl group optionally substituted with one or more halogen atoms,
- (1-4-12) a thienylvinyl group,
- (1-4-13) a benzothienyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-4-14) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
- (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-8):
- (1-5-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl group,
- (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group,
- (1-5-3) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-5-4) a naphthyl group,
- (1-5-5) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

- (1-5-6) a quinolyl group,
(1-5-7) a benzothienyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
5 (1-5-8) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following
10 (1-6-1) to (1-6-5):
(1-6-1) a lower alkyl group,
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted
15 with one or more halogen atoms; a lower alkoxy group optionally substituted with one or more halogen atoms; a phenoxy group; a benzyl group; and a benzoyl group,
(1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from
20 the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; a lower alkoxy group optionally substituted with one or more halogen atoms; a phenyl group; and a phenyl lower alkoxy group,
(1-6-4) an indanyl group, and
25 (1-6-5) a benzo[1,3]dioxolyl lower alkyl group,
(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-9):
30 (1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
35 (1-7-2) a phenyl group optionally substituted with one or

- more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-7-3) a benzofuryl group,
- 5 (1-7-4) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-7-5) a naphthyl group,
- (1-7-6) a halogen atom,
- 10 (1-7-7) a pyridyl group,
- (1-7-8) a benzothienyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- 15 (1-7-9) a [1,2,3]triazolyl group optionally substituted with one or more cyano groups,
- (1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-8):
- 20 (1-8-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-8-2) a benzyl group optionally substituted on the phenyl
- 25 ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-8-3) a lower alkoxy-carbonyl group,
- (1-8-4) a benzoyl group optionally substituted on the
- 30 phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-8-5) a phenyl lower alkyl-carbonyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- 35 (1-8-6) a phenyl lower alkoxy-carbonyl group,

- (1-8-7) a phenoxy carbonyl group, and
(1-8-8) a phenylsulfonyl group optionally substituted with one or more lower alkyl groups,
(1-9) an indolyl group optionally substituted with one or more
5 members selected from the group consisting of the following
(1-9-1) to (1-9-8):
(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
(1-9-2) a phenyl group optionally substituted with one or
10 more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group,
(1-9-3) a cycloalkyl lower alkyl group,
(1-9-4) a halogen atom,
15 (1-9-5) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-9-6) a thienyl lower alkyl group,
20 (1-9-7) a tetrahydrofuryl lower alkyl group, and
(1-9-8) a benzo[1,3]dioxolyl group,
(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-10-1) to (1-10-7):
25 (1-10-1) a halogen atom,
(1-10-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group
30 optionally substituted with one or more halogen atoms,
(1-10-3) a lower alkyl group,
(1-10-4) a benzyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
35 (1-10-5) a styryl group optionally substituted on the

- phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-10-6) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms, and
- 5 (1-10-7) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-11) a benzothienyl group optionally substituted with one or more members selected from the group consisting of the
- 10 following (1-11-1) to (1-11-7):
- (1-11-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 15 (1-11-2) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-11-3) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 20 (1-11-4) a halogen atom,
- (1-11-5) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-11-6) a pyrimidinyl group optionally substituted with
- 25 one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-11-7) a thienyl group,
- (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the
- 30 group consisting of the following (1-12-1) to (1-12-4):
- (1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-12-2) a benzyloxy group optionally substituted on the
- 35 phenyl ring with one or more lower alkyl groups optionally

substituted with one or more halogen atoms,

(1-12-3) a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-12-4) a phenoxy group,

5 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-7):

(1-13-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or
10 more halogen atoms,

(1-13-2) a pyrrolidyl group,

(1-13-3) a piperidyl group,

(1-13-4) a lower alkyl group optionally substituted with one or more halogen atoms,

15 (1-13-5) a lower alkoxy group,

(1-13-6) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

20 (1-13-7) a morpholinyl group,

(1-14) a quinolyl group substituted with one or more members selected from the group consisting of the following (1-14-1) to (1-14-5):

(1-14-1) a lower alkoxy group,

25 (1-14-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-14-3) a phenyl lower alkoxy group optionally substituted
30 on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-14-4) a pyrrolidyl group, and

(1-14-5) a thienyl group,

(1-15) a 2,3-dihydro-1H-indolyl group optionally substituted
35 with one or more members selected from the group consisting of

the following (1-15-1) to (1-15-2):

(1-15-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally

5 substituted with one or more halogen atoms, and

(1-15-2) a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

10 (1-16) an imidazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-16-1) to (1-16-4):

(1-16-1) a lower alkyl group,

(1-16-2) a halogen atom,

15 (1-16-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-16-4) a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

20 (1-17) a benzothiazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-17-1) to (1-17-6):

(1-17-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-17-2) a lower alkoxy group,

(1-17-3) a halogen atom,

30 (1-17-4) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-17-5) a phenoxy group optionally substituted with one or more members selected from the group consisting of a

35

- halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-17-6) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-18) an isoxazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,
- (1-19) a 2,3-dihydrobenzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-19-1) to (1-19-3):
- (1-19-1) a halogen atom,
- (1-19-2) a phenyl group optionally substituted with one or more halogen atoms, and
- (1-19-3) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-20) an isothiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-21) a dibenzofuryl group,
- (1-22) a benzo[1,3]dioxolyl group optionally substituted with one or more members selected from the group consisting of the following (1-22-1) to (1-22-2):
- (1-22-1) a halogen atom, and
- (1-22-2) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-23) a carbazolyl group optionally substituted with one or more lower alkyl groups,
- (1-24) a naphthyl group optionally substituted with one or more benzyloxy groups optionally substituted on the phenyl

- ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-25) a 2-oxo-1,2,3,4-tetrahydroquinolyl group optionally substituted with one or more benzyl groups optionally
- 5 substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-26) a 6-oxo-1,6-dihydropyrimidinyl group optionally substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally
- 10 substituted with one or more halogen atoms,
- (1-27) an imidazo[1,2-a]pyridyl group optionally substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 15 (1-28) a [1,3,4]oxadiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-29) a [1,2,4]thiadiazolyl group optionally substituted with
- 20 one or more phenyl groups optionally substituted with one or more halogen atoms,
- (1-30) a benzoxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-30-1) to (1-30-4):
- 25 (1-30-1) a lower alkyl group,
- (1-30-2) a lower alkoxy group,
- (1-30-3) a halogen atom, and
- (1-30-4) a phenyl group,
- (1-31) a [1,3,4]thiadiazolyl group optionally substituted with
- 30 one or more phenyl groups optionally substituted with one or more halogen atoms;
- (1-32) a styryl group optionally substituted on the phenyl ring with one or more benzyloxy groups optionally substituted on the phenyl ring with one or more lower alkyl groups
- 35 optionally substituted with one or more halogen atoms,

(1-33) a benzoyl group optionally substituted with one or more benzyloxy groups optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

5 and

(1-34) a cycloalkyl group optionally substituted with one or more members selected from the group consisting of a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and a benzyloxy groups optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms;

15 provided that

5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-
20 carbonitrile;
5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-
25 carbonitrile;
5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
30 4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
35 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;

4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 5 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole; and
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile; and
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 10 are excluded,
 or a salt thereof (hereinafter to be referred to as Compound
 (1aa)).

[0017]

As preferable embodiment, R^{1a} is one of the following (1-
 15 1) to (1-13):

(1-1) a phenyl group substituted with one or more members
 selected from the group consisting of the following (1-1-1) to
 (1-1-36):

(1-1-1) a lower alkyl group optionally substituted with one
 20 or more halogen atoms (preferably provided that the phenyl
 group of (1-1) is substituted with one or more lower alkyl
 groups, then the phenyl group of (1-1) is substituted with
 additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with
 25 one or more halogen atoms (preferably provided that the
 phenyl group of (1-1) is substituted with one or more lower
 alkoxy groups, then the phenyl group of (1-1) is
 substituted with additional one or more substituents
 excluding a lower alkoxy group and a halogen atom);

30 (1-1-3) a lower alkoxy lower alkyl group,

(1-1-4) a cycloalkyl group,

(1-1-5) a cycloalkoxy group,

(1-1-6) a cycloalkyl lower alkyl group,

(1-1-7) a cycloalkyl lower alkoxy group,

35 (1-1-8) a cycloalkyl lower alkoxy lower alkyl group,

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-10) a cyano group,

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

(1-1-14) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

- (1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,
- (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,
- (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the

- pyridine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms
(preferably a pyridylvinyl group substituted on the
pyridine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms),
(1-1-25) a pyrimidinyl group optionally substituted with
one or more lower alkyl groups optionally substituted with
one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on
the pyrimidine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one
or more lower alkyl groups optionally substituted with one
or more halogen atoms,
(1-1-28) a benzoxazolyl group optionally substituted on the
phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl lower alkoxy group,
(1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted
with one or more halogen atoms,
(1-1-34) an indolinyl lower alkyl group,
(1-1-35) a benzothienylvinyl group, and
(1-1-36) a benzo[1,3]dioxolylvinyl group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
(1-2) a thiazolyl group substituted with one or more members
selected from the group consisting of the following (1-2-1) to
(1-2-11):
(1-2-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-2-2) a lower alkoxy group,
(1-2-3) a cycloalkyl group,
(1-2-4) a halogen atom,

- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
- (1-3-1) a lower alkyl group,
- (1-3-2) a cycloalkyl group, and
- (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members
5 selected from the group consisting of the following (1-4-1) to (1-4-5):

(1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-4-2) a phenyl group optionally substituted with one or
10 more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more
15 halogen atoms,

(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or
20 more halogen atoms, and

(1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-5) a furyl group optionally substituted with one or more
25 members selected from the group consisting of the following

(1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl
30 ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following

35 (1-6-1) to (1-6-3):

- (1-6-1) a lower alkyl group,
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-3):
(1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-7-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-7-3) a benzofuryl group,
(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):
(1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-2):
(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,
(1-10) a benzofuryl group optionally substituted with one or

more members selected from the group consisting of the following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

(1-10-2) a phenyl group optionally substituted with one or
5 more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on
10 the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and

15 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the
20 following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidinyl group, and

(1-13-3) a piperidyl group.

[0018]

25 As another preferable embodiment, R^{1a} is the following (1-1):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of the following (1-1-1) to (1-1-36):

30 (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

35 (1-1-2) a lower alkoxy group optionally substituted with

one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents

5 excluding a lower alkoxy group and a halogen atom),
(1-1-3) a lower alkoxy lower alkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl lower alkyl group,
10 (1-1-7) a cycloalkyl lower alkoxy group,
(1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with

15 additional one or more substituents excluding a phenoxy group),
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a

20 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from

25 the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally

30 substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group

35 is substituted on the phenyl ring with one or more members

selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

5 (1-1-14) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with
10 additional one or more substituents excluding a halogen atom),

(1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally
15 substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from
20 the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

25 (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group
30 optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen
35 atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more

halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms

(preferably a pyridylvinyl group substituted on the

pyridine ring with one or more lower alkyl groups

optionally substituted with one or more halogen atoms),

(1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-29) a benzofuryl group,

(1-1-30) a benzofuryl lower alkoxy group,

(1-1-31) a thienyl group,

(1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,

(1-1-34) an indolinyl lower alkyl group,

(1-1-35) a benzothienylvinyl group, and

(1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms.

[0019]

5 As another preferable embodiment, R^{1a} is one of the following (1-2) to (1-13):

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):

10 (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-2) a lower alkoxy group,

(1-2-3) a cycloalkyl group,

(1-2-4) a halogen atom,

15 (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

20 (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

25 (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,

30 (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members

selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):

(1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):

(1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-4-5) a styryl group optionally substituted on the phenyl

- ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following
- 5 (1-5-1) to (1-5-2):
- (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
- (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group
- 10 consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following
- (1-6-1) to (1-6-3):
- 15 (1-6-1) a lower alkyl group,
- (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- 20 (1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to
- 25 (1-7-3):
- (1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 30 (1-7-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-7-3) a benzofuryl group,
- (1-8) a piperidyl group optionally substituted with one or
- 35 more members selected from the group consisting of the

following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

5 (1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following

(1-9-1) to (1-9-2):

10 (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

(1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

20 (1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and

30 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

35 (1-13-1) a phenyl group,

- (1-13-2) a pyrrolidinyl group, and
(1-13-3) a piperidyl group.

[0020]

As another preferable embodiment, R^{1a} is the following

5 (1-2):

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):

(1-2-1) a lower alkyl group optionally substituted with one
10 or more halogen atoms,

(1-2-2) a lower alkoxy group,

(1-2-3) a cycloalkyl group,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or
15 more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-2-6) a styryl group optionally substituted on the phenyl
20 ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted
25 with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-2-9) a phenylthio group optionally substituted with one
30 or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members
35 selected from the group consisting of a halogen atom; and a

lower alkyl group optionally substituted with one or more halogen atoms, and

- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

[0021]

As another preferable embodiment, R^{1a} is the following

(1-3):

- (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):

(1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

- (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms.

[0022]

As another preferable embodiment, R^{1a} is the following

(1-5):

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following

- (1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

- (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

[0023]

As another preferable embodiment, R^{1a} is the following

(1-13):

- (1-13) a pyrimidinyl group optionally substituted with one or

more members selected from the group consisting of the following (1-13-1) to (1-13-3):

- (1-13-1) a phenyl group,
- (1-13-2) a pyrrolidinyl group, and
- 5 (1-13-3) a piperidyl group.

[0024]

As another preferable embodiment, R^{1a} is one of the following (1-1) to (1-7), (1-9), (1-10), (1-12) and (1-13):

- (1-1) a phenyl group substituted with one or more (preferably
10 1 to 3) members selected from the group consisting of
 - (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with
15 additional one or more substituents),
 - (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is
20 substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),
 - (1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with
25 additional one or more substituents excluding a phenoxy group),
 - (1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted
30 with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
 - (1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl
35 group optionally substituted with one or more halogen atoms,

- (1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),
- (1-1-14) a phenoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),
- (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

- (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),
- (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-31) a thienyl group,
- (1-1-32) a benzothienyl group,
- (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
- (1-1-35) a benzothienylvinyl group, and
- (1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
- (1-2) a thiazolyl group substituted with one or more members selected from the group consisting of
- (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and
- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

5 (1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally

10 substituted with one or more halogen atoms,

(1-4) a thienyl group substituted with one or more members selected from the group consisting of

(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or

15 more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

20 (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more

25 members selected from the group consisting of

(1-6-1) a lower alkyl group, and

(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally

30 substituted with one or more halogen atoms,

(1-7) a pyridyl group substituted with one or more members selected from the group consisting of

(1-7-3) a benzofuryl group,

(1-9) an indolyl group optionally substituted with one or more

35 members selected from the group consisting of

- (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of
- 5 (1-10-2) a phenyl group optionally substituted with one or more halogen atoms,
- (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of
- 10 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of
- 15 (1-13-1) a phenyl group,
- (1-13-2) a pyrrolidyl group, and
- (1-13-3) a piperidyl group.

[0025]

As another preferable embodiment, R^{1a} is the following

- 20 (1-1):
- (1-1) a phenyl group substituted with one or more (preferably 1 to 3) members selected from the group consisting of
- (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl
- 25 group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),
- (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the
- 30 phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),
- (1-1-9) a halogen atom (preferably provided that the phenyl
- 35 group of (1-1) is substituted with one or more halogen

atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

5 (1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

10 (1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

15 (1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-
20 position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a
25 fluoro atom),

(1-1-14) a phenoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents
30 excluding a halogen atom),

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

35 (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more

halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen

5 atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms

(preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

(1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-31) a thienyl group,

(1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,

(1-1-35) a benzothienylvinyl group, and

(1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms.

[0026]

As another preferable embodiment, R^{1a} is one of the following (1-2) to (1-7), (1-9), (1-10), (1-12) and (1-13):

(1-2) a thiazolyl group substituted with one or more members
5 selected from the group consisting of

(1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or
10 more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or
15 more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

20 (1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally
25 substituted with one or more halogen atoms,

(1-4) a thienyl group substituted with one or more members selected from the group consisting of

(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or
30 more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

35 (1-5-2) a styryl group optionally substituted on the phenyl

ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-6) a pyrrolyl group optionally substituted with one or more
5 members selected from the group consisting of
(1-6-1) a lower alkyl group, and
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally
10 substituted with one or more halogen atoms,
(1-7) a pyridyl group substituted with one or more members selected from the group consisting of
(1-7-3) a benzofuryl group,
(1-9) an indolyl group optionally substituted with one or more
15 members selected from the group consisting of
(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of
20 (1-10-2) a phenyl group optionally substituted with one or more halogen atoms,
(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of
25 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of
30 (1-13-1) a phenyl group,
(1-13-2) a pyrrolidyl group, and
(1-13-3) a piperidyl group.

[0027]

As another preferable embodiment, R^{1a} is the following
35 (1-2):

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of

(1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

5 (1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group

10 optionally substituted with one or more halogen atoms, and

(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

15 [0028]

As another preferable embodiment, R^{1a} is the following

(1-3):

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

20 (1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally

25 substituted with one or more halogen atoms.

[0029]

As another preferable embodiment, R^{1a} is the following

(1-5):

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group

35

optionally substituted with one or more halogen atoms.

[0030]

As another preferable embodiment, R^{1a} is the following (1-13):

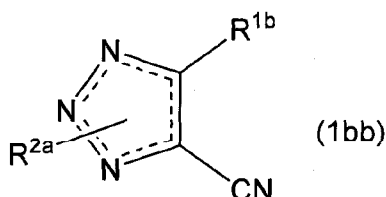
5 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of

- (1-13-1) a phenyl group,
- (1-13-2) a pyrrolidyl group, and
- (1-13-3) a piperidyl group.

10 [0031]

The present invention also provides a cyanotriazole compound represented by the formula (1bb):

[0032]



15 [0033]

wherein

R^{1b} is one of the following (1-1) to (1-13):

(1-1) a phenyl group optionally substituted with one or more members selected from the group consisting of the following

20 (1-1-1) to (1-1-34):

- (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms,
- 25 (1-1-3) a lower alkoxy lower alkyl group,
- (1-1-4) a cycloalkyl group,
- (1-1-5) a cycloalkoxy group,
- (1-1-6) a cycloalkyl lower alkyl group,
- (1-1-7) a cycloalkyl lower alkoxy group,
- 30 (1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
- (1-1-9) a halogen atom,

- (1-1-10) a cyano group,
- (1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,
- (1-1-14) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,
- (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

5 (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

10 (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

15 (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

20 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

25 (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

30 (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-29) a benzofuryl group,

(1-1-30) a benzofuryl lower alkoxy group,

(1-1-31) a thienyl group,

35 (1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms, and

(1-1-34) an indolinyl lower alkyl group,

(1-2) a thiazolyl group optionally substituted with one or
5 more members selected from the group consisting of the
following (1-2-1) to (1-2-11):

(1-2-1) a lower alkyl group optionally substituted with one
or more halogen atoms,

(1-2-2) a lower alkoxy group,

10 (1-2-3) a cycloalkyl group,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
15 with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,

(1-2-6) a styryl group optionally substituted on the phenyl
ring with one or more lower alkyl groups optionally
substituted with one or more halogen atoms,

20 (1-2-7) a phenoxy group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,

25 (1-2-8) a benzyloxy group optionally substituted on the
phenyl ring with one or more halogen atoms,

(1-2-9) a phenylthio group optionally substituted with one
or more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
30 substituted with one or more halogen atoms,

(1-2-10) an N-lower alkyl-N-phenyl amino group optionally
substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atom; and a
lower alkyl group optionally substituted with one or more
35 halogen atoms, and

- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 5 (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
- (1-3-1) a lower alkyl group,
- (1-3-2) a cycloalkyl group, and
- 10 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- 15 (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):
- (1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- 20 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more
- 25 lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- 30 (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 35 (1-5) a furyl group optionally substituted with one or more

members selected from the group consisting of the following
(1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or
more halogen atoms, and

5 (1-5-2) a styryl group optionally substituted on the phenyl
ring with one or more members selected from the group
consisting of a halogen atom; and a lower alkyl group
optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more
10 members selected from the group consisting of the following
(1-6-1) to (1-6-3):

(1-6-1) a lower alkyl group,

(1-6-2) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
15 halogen atom; and a lower alkyl group optionally
substituted with one or more halogen atoms, and

(1-6-3) a phenyl lower alkyl group optionally substituted
on the phenyl ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms,

20 (1-7) a pyridyl group optionally substituted with one or more
members selected from the group consisting of the following
(1-7-1) to (1-7-2):

(1-7-1) a benzyloxy lower alkyl group optionally
substituted on the phenyl ring with one or more lower alkyl
25 groups optionally substituted with one or more halogen
atoms, and

(1-7-2) a phenyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms,

30 (1-8) a piperidyl group optionally substituted with one or
more members selected from the group consisting of the
following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
35 more halogen atoms, and

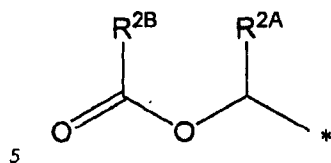
- (1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following
- 5 (1-9-1) to (1-9-2):
- (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-9-2) a phenyl group optionally substituted with one or more halogen atoms,
- 10 (1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,
- (1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more
- 15 halogen atoms,
- (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):
- (1-12-1) a phenyl group optionally substituted with one or
- 20 more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- 25 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):
- (1-13-1) a phenyl group,
- (1-13-2) a pyrrolidyl group, and
- 30 (1-13-3) a piperidyl group; and
- R^{2a} is one of the following (2-1) to (2-3):
- (2-1) a lower alkyl group optionally substituted with one or more members selected from the group consisting of a hydroxy group; and a phenyl group optionally substituted with one or
- 35 more lower alkyl groups optionally substituted with one or

more halogen atoms,

(2-2) a 2-oxo-1,3-dioxolanyl group, and

(2-3) a group represented by the formula:

[0034]



[0035]

wherein

* is a bonding site;

R^{2A} is one of the following (2A-1) to (2A-2):

10 (2A-1) a hydrogen atom, and

(2A-2) a lower alkyl group; and

R^{2B} is one of the following (2B-1) to (2B-6):

15 (2B-1) a lower alkoxy group optionally substituted with one or more members selected from the group consisting of a lower alkoxy group; a carboxy group; a lower alkoxy-carbonyl group; a hydroxy group; a phenyl lower alkoxy-carbonyl group; a lower alkenyloxy-carbonyl group; a morpholinyl group; a benzyloxycarbonyl group; and a tetrahydropyran-2-yloxy group,

20 (2B-2) a lower alkyl group;

(2B-3) a lower alkylamino group optionally substituted with one or more lower alkoxy-carbonyl groups;

(2B-4) a cycloalkyl group;

(2B-5) a cycloalkoxy group; and

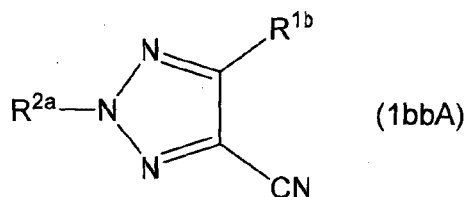
25 (2B-6) a phenyl group;

or a salt thereof (hereinafter to be referred to as Compound (1bb)).

[0036]

30 As preferable embodiment, the cyanotriazole compound or salt is a compound represented by the formula (1bbA):

[0037]



[0038]

wherein each symbol is as defined in Compound (1bb),
or a salt thereof (hereinafter to be referred to as Compound
5 (1bbA)).

[0039]

As another preferable embodiment, R^{1b} is one of the
following (1-1) to (1-5):

(1-1) a phenyl group optionally substituted with one or more
10 members selected from:

(1-1-1) a lower alkyl group optionally substituted with one
or more halogen atoms,

(1-1-2) a lower alkoxy group optionally substituted with
one or more halogen atoms,

15 (1-1-9) a halogen atom,

(1-1-11) a phenyl group optionally substituted with one or
more lower alkoxy groups optionally substituted with one or
more halogen atoms,

(1-1-12) a phenyl lower alkyl group optionally substituted
20 on the phenyl ring with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the
phenyl ring with one or more lower alkyl groups optionally
substituted with one or more halogen atoms,

(1-1-16) a phenyl lower alkoxy group optionally substituted
25 on the phenyl ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms,

30 (1-1-23) a pyridyloxy lower alkyl group optionally
substituted on the pyridine ring with one or more lower

- alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups
- 5 optionally substituted with one or more halogen atoms,
- (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on
- 10 the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-31) a thienyl group, and
- (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
- 15 (1-2) a thiazolyl group optionally substituted with one or more members selected from:
- (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-4) a halogen atom,
- 20 (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and
- 25 (1-2-11) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-3) an oxazolyl group optionally substituted with one or more members selected from:
- 30 (1-3-1) a lower alkyl group,
- (1-3-2) a cycloalkyl group, and
- (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally
- 35 substituted with one or more halogen atoms,

(1-4) a thienyl group optionally substituted with one or more members selected from:

(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-5) a furyl group optionally substituted with one or more members selected from:

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms; and

10 R^{2a} is one of the following groups:

a 1-(((2-carboxy-2,2-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-carboxy-1,1-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-hydroxyethoxy)carbonyl)oxy)ethyl group;

a 1-(butyryloxy)ethyl group;

15 a 1-(isobutyryloxy)ethyl group;

an acetoxymethyl group; and

a butyryloxymethyl group.

[0040]

The present invention also provides a cyanotriazole compound selected from the group consisting of following compounds:

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 11),

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,

5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 14),

30 5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,

5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,

35 5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 15),

- 5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5 5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 21),
5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
10 [1,2,3]triazole-4-carbonitrile,
5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 22),
5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
15 5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 23),
5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
20 [1,2,3]triazole-4-carbonitrile,
5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-3H-[1,2,3]triazole-4-carbonitrile (Example 29),
25 5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-2H-[1,2,3]triazole-4-carbonitrile,
5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-1H-[1,2,3]triazole-4-carbonitrile,
5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 41),
30 5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
35 5-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-

phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 47),
 5-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 5 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile (Example 49),
 5-{3-[(E)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 10 5-{3-[(E)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile (Example 50),
 5-{3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 15 2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-
 yl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example
 20 51),
 5-{3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-
 yl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-
 yl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 25 5-{3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile (Example 52),
 5-{3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-phenyl}-
 30 1H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile (Example 55),
 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-1H-

[1,2,3]triazole-4-carbonitrile,
5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-3H-
[1,2,3]triazole-4-carbonitrile (Example 60),
5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-2H-
5 [1,2,3]triazole-4-carbonitrile,
5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-1H-
[1,2,3]triazole-4-carbonitrile,
5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
[1,2,3]triazole-4-carbonitrile (Example 70),
10 5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
[1,2,3]triazole-4-carbonitrile,
5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
[1,2,3]triazole-4-carbonitrile,
5-[2-(4-chloro-phenyl)-thiazol-4-yl]-3H-[1,2,3]triazole-4-
15 carbonitrile (Example 75),
5-[2-(4-chloro-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazole-4-
carbonitrile,
5-[2-(4-chloro-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-
carbonitrile,
20 5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-3H-[1,2,3]triazole-4-
carbonitrile (Example 77),
5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazole-4-
carbonitrile,
5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-
25 carbonitrile,
5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-
[1,2,3]triazole-4-carbonitrile (Example 78),
5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-
[1,2,3]triazole-4-carbonitrile,
30 5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-
[1,2,3]triazole-4-carbonitrile,
5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-3H-
[1,2,3]triazole-4-carbonitrile (Example 79),
5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-2H-
35 [1,2,3]triazole-4-carbonitrile,

- 5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-3H-[1,2,3]triazole-4-carbonitrile (Example 90),
5 5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-
10 [1,2,3]triazole-4-carbonitrile (Example 92),
5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-carbonitrile,
15 5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-3H-[1,2,3]triazole-4-carbonitrile (Example 98),
5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-1H-
20 [1,2,3]triazole-4-carbonitrile,
5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-3H-[1,2,3]triazole-4-carbonitrile (Example 100),
5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-2H-[1,2,3]triazole-4-carbonitrile,
25 5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-[1,2,3]triazole-4-carbonitrile (Example 108),
5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-
30 [1,2,3]triazole-4-carbonitrile,
5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-3H-[1,2,3]triazole-4-carbonitrile (Example 120),
35 5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-2H-

- [1,2,3]triazole-4-carbonitrile,
5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-1H-
[1,2,3]triazole-4-carbonitrile,
5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-3H-
5 [1,2,3]triazole-4-carbonitrile (Example 122),
5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-2H-
[1,2,3]triazole-4-carbonitrile,
5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-1H-
[1,2,3]triazole-4-carbonitrile,
10 5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-3H-
[1,2,3]triazole-4-carbonitrile (Example 137),
5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-2H-
[1,2,3]triazole-4-carbonitrile,
5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-1H-
15 [1,2,3]triazole-4-carbonitrile,
5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-3H-
[1,2,3]triazole-4-carbonitrile (Example 146),
5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-2H-
[1,2,3]triazole-4-carbonitrile,
20 5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-1H-
[1,2,3]triazole-4-carbonitrile,
5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-3H-[1,2,3]triazole-4-
carbonitrile (Example 147),
5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-2H-[1,2,3]triazole-4-
25 carbonitrile,
5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-1H-[1,2,3]triazole-4-
carbonitrile,
5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-3H-
[1,2,3]triazole-4-carbonitrile (Example 220),
30 5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-2H-
[1,2,3]triazole-4-carbonitrile,
5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-1H-
[1,2,3]triazole-4-carbonitrile,
5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-3H-
35 [1,2,3]triazole-4-carbonitrile (Example 275),

- 5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-2H-[1,2,3]triazole-4-carbonitrile,
- 5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-1H-[1,2,3]triazole-4-carbonitrile,
- 5 5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-3H-[1,2,3]triazole-4-carbonitrile (Example 276),
- 5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-2H-[1,2,3]triazole-4-carbonitrile,
- 5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-1H-
- 10 [1,2,3]triazole-4-carbonitrile,
- 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-3H-[1,2,3]triazole-4-carbonitrile (Example 298),
- 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-2H-[1,2,3]triazole-4-carbonitrile,
- 15 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-1H-[1,2,3]triazole-4-carbonitrile,
- 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 423),
- 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-2H-
- 20 [1,2,3]triazole-4-carbonitrile,
- 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
- 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 504),
- 25 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
- 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 600),
- 30 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 35 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-3H-

[1,2,3]triazole-4-carbonitrile (Example 607),
 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 610),
 5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 613),
 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 617),
 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 620),
 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 623),
 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,

- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 627),
- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 5 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 639),
- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 10 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 640),
- 15 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 644),
- 20 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 25 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 645),
- 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
- 30 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 646),
- 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
- 35 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-1H-

[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 649),
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 657),
 5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 659),
 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 663),
 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-3H-[1,2,3]triazole-4-carbonitrile (Example 718),
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-2H-[1,2,3]triazole-4-carbonitrile,
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-1H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 790),
 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,

- 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 807),
5 5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 931),
10 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
15 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 934),
5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
20 5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 944),
5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
25 5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 989),
5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
30 5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (Example 1004),
35 5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-2H-

[1,2,3]triazole-4-carbonitrile,
 5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 5 phenyl}-3H-[1,2,3]triazole-4-carbonitrile (Example 1017),
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 10 5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile (Example 1018),
 5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 15 1H-[1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile (Example 1248),
 5-[2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 20 5-[2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-3H-
 [1,2,3]triazole-4-carbonitrile (Example 1505),
 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-2H-
 25 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-3H-[1,2,3]triazole-4-
 carbonitrile (Example 1573),
 30 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-2H-[1,2,3]triazole-4-
 carbonitrile,
 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-1H-[1,2,3]triazole-4-
 carbonitrile,
 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-3H-
 35 [1,2,3]triazole-4-carbonitrile (Example 1672),

- 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-2H-[1,2,3]triazole-4-carbonitrile,
- 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-1H-[1,2,3]triazole-4-carbonitrile,
- 5 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-3H-[1,2,3]triazole-4-carbonitrile (Example 1676),
- 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-2H-[1,2,3]triazole-4-carbonitrile,
- 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-1H-[1,2,3]triazole-4-carbonitrile,
- 10 3-(1-{4-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1806),
- 3-(1-{4-[3-chloro-5-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1808),
- 15 3-(1-{4-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1810),
- 20 3-[1-(4-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-5-cyano-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-2,2-dimethyl-propionic acid (Example 1811),
- 3-(1-{4-cyano-5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1812),
- 25 3-[1-(4-cyano-5-{3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-2,2-dimethyl-propionic acid (Example 1813),
- 30 3-(1-{4-[2-(4-chloro-phenyl)-thiazol-4-yl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1814),
- 3-(1-(4-cyano-5-{3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1815),
- 35

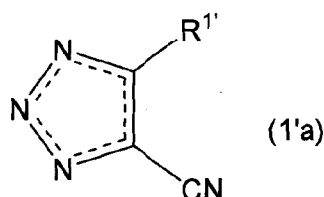
- 3-[1-(4-cyano-5-{3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-phenyl}-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-2,2-dimethyl-propionic acid (Example 1816),
- 3-(1-{4-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1817),
- 3-(1-{4-cyano-5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1818),
- 3-(1-{4-cyano-5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1819),
- 3-(1-{4-cyano-5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1820),
- 3-(1-{4-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1822),
- 3-(1-{4-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1823),
- 3-(1-{4-cyano-5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1824),
- 3-(1-{4-cyano-5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1825),
- 3-(1-{4-cyano-5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-propionic acid (Example 1826),
- 3-(1-{4-[3-(2,5-bis-trifluoromethylbenzyloxy)phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}ethoxycarbonyloxy)-3-methylbutyric acid (Example 1827),
- carbonic acid 1-{4-[3-(2,5-bis-trifluoromethylbenzyloxy)phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}ethyl ester -2-

hydroxyethyl ester (Example 1828),
 acetic acid 4-cyano-5-[3-methyl-5- (4-
 trifluoromethylpyrimidin-2-yl)phenyl]-2H-[1,2,3]triazol-2-
 ylmethyl ester (Example 1829),
 5 acetic acid 4-{3-chloro-5-[(E)-2-(3-trifluoromethylphenyl)
 vinyl]phenyl}-5-cyano-2H-[1,2,3]triazol-2-ylmethyl ester
 (Example 1830), and
 butyric acid 4-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-
 vinyl]-phenyl}-5-cyano-2H-[1,2,3]triazol-2-ylmethyl ester
 10 (Example 1831),
 or a salt thereof.

[0041]

The present invention also provides a cyanotriazole
 compound represented by the formula (1'a):

15 [0042]



[0043]

wherein

R^{1'} is one of the following (1-1) to (1-12):

20 (1-1) a phenyl group optionally substituted with one or more
 (preferably 1 to 3) members selected from the group consisting
 of the following (1-1-1) to (1-1-34):

(1-1-1) a lower alkyl group optionally substituted with one
 or more halogen atoms (preferably provided that the phenyl
 25 group of (1-1) is substituted with one or more lower alkyl
 groups, then the phenyl group of (1-1) is substituted with
 additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with
 one or more halogen atoms (preferably provided that the
 30 phenyl group of (1-1) is substituted with one or more lower
 alkoxy groups, then the phenyl group of (1-1) is

substituted with additional one or more substituents
excluding a lower alkoxy group and a halogen atom),
(1-1-3) a lower alkoxy lower alkyl group,
(1-1-4) a cycloalkyl group,
5 (1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl lower alkyl group,
(1-1-7) a cycloalkyl lower alkoxy group,
(1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
(1-1-9) a halogen atom (preferably provided that the phenyl
10 group of (1-1) is substituted with one or more halogen
atoms, then the phenyl group of (1-1) is substituted with
additional one or more substituents excluding a phenoxy
group),
(1-1-10) a cyano group,
15 (1-1-11) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,
20 (1-1-12) a phenyl lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a halogen atom; and a lower alkyl
group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the
25 phenyl ring with one or more members selected from the
group consisting of a lower alkoxy group; a lower alkyl
group optionally substituted with one or more halogen
atoms; a cyano group; and halogen atoms (preferably
provided that when the styryl group is bonded to the p-
30 position on the phenyl ring of (1-1), then the styryl group
is substituted on the phenyl ring with one or more members
selected from the group consisting of a lower alkyl group
substituted with one or more halogen atoms; and a fluoro
atom),
35 (1-1-14) a phenoxy group optionally substituted with one or

more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

(1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups

- optionally substituted with one or more halogen atoms,
(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
5 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),
10 (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
15 (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
20 (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl lower alkoxy group,
25 (1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a 2,2-difluorobenzo[1,3]dioxolyl group, and
(1-1-34) an indolinyl lower alkyl group,
(1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):
30 (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
(1-2-2) a lower alkoxy group,
35 (1-2-3) a cycloalkyl group,

- (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
- (1-3-1) a lower alkyl group,
- (1-3-2) a cycloalkyl group, and
- (1-3-3) a phenyl group optionally substituted with one or

- more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- 5 (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):
- (1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- 10 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more
- 15 lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-4-4) a phenoxy group optionally substituted with one or
- 20 more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 25 (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-2):
- (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
- 30 (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following
- 35 (1-6-1) to (1-6-3):

- (1-6-1) a lower alkyl group,
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-6-3) a benzyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-7) a pyridyl group optionally substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-2):
(1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-7-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):
(1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-2):
(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,
(1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more

halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms, and

5 (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or
10 more halogen atoms; and

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms;

provided that

15 5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

20 5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;

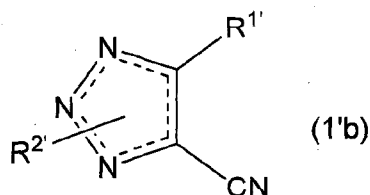
25 4-phenyl-5-cyano-1,2,3-triazole;
4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
30 4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
35 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;

4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole; and
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile; and
 5 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 are excluded,
 or a salt thereof (hereinafter to be referred to as Compound
 (1'a)).

[0044]

10. The present invention also provides a cyanotriazole
 compound represented by the formula (1'b):

[0045]



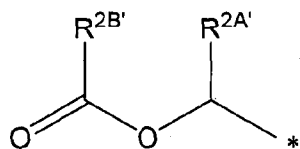
[0046]

15 wherein

$R^{1'}$ is as defined in Compound (1'a); and

$R^{2'}$ is a group represented by the formula:

[0047]



20 [0048]

wherein

* is a bonding site;

$R^{2A'}$ is

(2A-1) a hydrogen atom, or

25 (2A-2) a lower alkyl group; and

$R^{2B'}$ is

(2B-1) a lower alkoxy group optionally substituted with one
 or more members selected from the group consisting of a

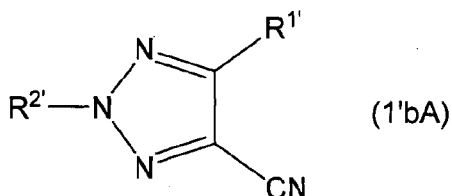
carboxy group; a lower alkoxy-carbonyl group; a hydroxy group; a phenyl lower alkoxy-carbonyl group; a lower alkenyloxy-carbonyl group; and a tetrahydropyran-2-yloxy group, or

- 5 (2B-2) a lower alkyl group;
or a salt thereof (hereinafter to be referred to as Compound (1'b)).

[0049]

- The present invention also provides a cyanotriazole
10 compound represented by the formula (1'bA):

[0050]



[0051]

wherein

- 15 R^{1'} is as defined in Compound (1'a); and
R^{2'} is as defined in Compound (1'b),
or a salt thereof (hereinafter to be referred to as Compound (1'bA)).

[0052]

- 20 Compound (1) encompasses Compound (1a) (mentioned below),
Compound (1b) (mentioned below), Compound (1aa), Compound (1bb),
Compound (1bbA), Compound (1'a), Compound (1'b),
Compound (1'bA) and Compounds (1A)-(1C) (mentioned below).

[0053]

- 25 In one embodiment, Compound (1) is used as a prophylactic
and/or therapeutic agent for a disease or a disorder on which
citric acid cycle activation and/or improvement of
hyperglycemia has a prophylactic and/or therapeutic effect.

[0054]

- 30 The present invention also provides a citric acid cycle
activator comprising, as an active ingredient, Compound (1).

[0055]

The present invention also provides a hypoglycemic agent comprising, as an active ingredient, Compound (1).

[0056]

5 The present invention also provides a prophylactic and/or therapeutic agent for a disease or a disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect, comprising Compound (1) as an active ingredient. In one embodiment, the disease or
10 disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect is selected from the group consisting of diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic
15 steatosis, atherosclerosis and cardiovascular disease.

[0057]

The present invention also provides use of Compound (1) for manufacturing a prophylactic and/or therapeutic agent for a disease or a disorder on which citric acid cycle activation
20 and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect.

[0058]

The present invention also provides a method for preventing and/or treating a disease or a disorder on which
25 citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect, comprising administering an effective amount of Compound (1) to a patient.

Effect of the Invention

30 [0059]

Since Compound (1) stimulates the citric acid cycle activity and/or improves hyperglycemia, it is useful for treating and/or preventing diseases or disorders on which citric acid cycle activation and/or improvement of
35 hyperglycemia has a prophylactic and/or therapeutic effect,

for example, diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, atherosclerosis and/or cardiovascular disease, as well as diseases or disorders that would benefit
5 from stimulating energy expenditure.

Brief Description of the Drawings

[0060]

Figure 1 shows carbon dioxide evolution rate (CDER) of the compound of Example 60.

10 Figure 2 shows oxygen consumption rate (OCR) of the compound of Example 60.

Description of Embodiments

[0061]

Suitable examples and illustrations of the various
15 definitions which the present invention includes within the scope thereof and which appear in the above and following description in the present specification are explained in detail as follows.

[0062]

20 The term "lower" is intended to mean 1 to 6 carbon atom(s) unless otherwise indicated.

The term "higher" is intended to mean 7 to 20 carbon atom(s) unless otherwise indicated.

Examples of the "lower alkyl" include straight or
25 branched ones such as methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, *tert*-butyl, *sec*-butyl, n-pentyl, neopentyl, n-hexyl, isohexyl, 3-methylpentyl and the like.

Examples of the "higher alkyl" include straight or branched ones such as n-heptyl, n-octyl, n-nonyl, n-decyl and
30 the like.

Examples of the "lower alkyl group optionally substituted with one or more halogen atoms" include trifluoromethyl, 2,2,2-trifluoroethyl, 3,3,3-trifluoropropyl, 2,2-difluoropropyl, 2,2-dichloropropyl, 4,4,4-trifluorobutyl, 2,3-difluorobutyl, 2-chloro-3-fluorobutyl and the like, in which
35

preferred is trifluoromethyl or 4,4,4-trifluorobutyl.

[0063]

Examples of the "lower alkoxy" include straight or branched ones such as methoxy, ethoxy, n-propoxy, isopropoxy, 5 n-butoxy, isobutoxy, tert-butoxy, sec-butoxy, n-pentyloxy, neopentyloxy, n-hexyloxy, isohexyloxy, 3-methylpentyloxy and the like, in which preferred is methoxy, ethoxy or isopropoxy.

Examples of the "lower alkoxy group optionally substituted with one or more halogen atoms" include 10 difluoromethoxy, trifluoromethoxy, 2,2,2-trifluoroethoxy, 1,1,2,2-tetrafluoroethoxy, 3,3,3-trifluoropropoxy, 2,2-difluoropropoxy, 2,2-dichloropropoxy, 4,4,4-trifluorobutoxy, 2,3-difluorobutoxy, 2-chloro-3-fluorobutoxy and the like, in which preferred is trifluoromethoxy or 4,4,4-trifluorobutoxy.

15 [0064]

Examples of the "lower alkoxy lower alkyl" include methoxymethyl, ethoxymethyl, propoxymethyl, methoxyethyl, ethoxyethyl, methoxypropyl and the like, in which preferred is ethoxymethyl.

20 Examples of the "lower alkoxy lower alkoxy" include methoxymethoxy, ethoxymethoxy, propoxymethoxy, methoxyethoxy, ethoxyethoxy, methoxypropoxy and the like, in which preferred is methoxymethoxy or ethoxymethoxy.

[0065]

25 Examples of the "lower alkenyl" include linear or branched ones that have 1 to 3 double bonds such as vinyl (ethenyl), 1-methylethyl, 1-propenyl, 2-propenyl, 2-methyl-1-propenyl, 1-butenyl, 2-butenyl, 3-butenyl, 3-methyl-2-butenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 4-methyl-3- 30 pentenyl, 1-hexenyl, 3-hexenyl, 5-hexenyl and the like, in which preferred is vinyl or 1-methylethyl.

Examples of the "lower alkenyloxy" include linear or branched ones that have 1 to 3 double bonds such as vinyloxy (ethenyloxy), 1-propenyloxy, 2-propenyloxy, 2-methyl-1- 35 propenyloxy, 1-butenyloxy, 2-butenyloxy, 3-butenyloxy, 3-

methyl-2-butenyloxyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 4-methyl-3-pentenyl, 1-hexenyl, 3-hexenyl, 5-hexenyl and the like, in which preferred is vinyl, 3-butenyl or 3-methyl-2-butenyl.

5 [0066]

Examples of the "lower alkynyl" include linear or branched ones that have 1 to 3 triple bonds such as ethynyl, 1-propynyl, 2-propynyl, 1-butylnyl, 2-butylnyl, 3-butylnyl, 1-pentylnyl, 2-pentylnyl, 3-pentylnyl, 4-pentylnyl, 1,1-dimethylprop-2-yn-1-yl, 1-hexynyl, 2-hexynyl, 3-hexynyl, 4-hexynyl, 5-hexynyl and the like, in which preferred is 2-butylnyl.

Examples of the "lower alkylthio" include straight or branched ones such as methylthio, ethylthio, n-propylthio, 15 isopropylthio, n-butylthio, isobutylthio, tert-butylthio, sec-butylthio, n-pentylthio, neopentylthio, n-hexylthio, isohexylthio, 3-methylpentylthio and the like in which preferred is methylthio or ethylthio.

[0067]

20 Examples of the "lower alkyl-carbonyl" include straight or branched ones such as acetyl, ethylcarbonyl, propylcarbonyl, isopropylcarbonyl, butylcarbonyl, tert-butylcarbonyl, pentylcarbonyl, hexylcarbonyl and the like, in which preferred is acetyl or ethylcarbonyl.

25 Examples of the "lower alkoxy-carbonyl" include straight or branched ones such as methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl, isopropoxycarbonyl, butoxycarbonyl, tert-butoxycarbonyl, pentyloxycarbonyl, hexyloxycarbonyl and the like, in which preferred is methoxycarbonyl or ethoxycarbonyl.

30 [0068]

Examples of the "lower alkenyl-carbonyl" include linear or branched ones that have 1 to 3 double bonds such as vinylcarbonyl (ethenylcarbonyl), 1-propenylcarbonyl, 2-propenylcarbonyl, 2-methyl-1-propenylcarbonyl, 1-butenylcarbonyl, 2-butenylcarbonyl, 3-butenylcarbonyl,

3-methyl-2-butenyloxycarbonyl, 1-pentenylloxycarbonyl, 2-pentenylloxycarbonyl, 3-pentenylloxycarbonyl, 4-pentenylloxycarbonyl, 4-methyl-3-pentenylloxycarbonyl, 1-hexenylloxycarbonyl, 3-hexenylloxycarbonyl, 5-hexenylloxycarbonyl
5 and the like, in which preferred is vinyloxycarbonyl, 2-propenylloxycarbonyl or 3-methyl-2-butenyloxycarbonyl.

Examples of the "lower alkylsulfonyl" include straight or branched ones such as methylsulfonyl, ethylsulfonyl, propylsulfonyl, isopropylsulfonyl, butylsulfonyl, tert-
10 butylsulfonyl, pentylsulfonyl, hexylsulfonyl and the like, in which preferred is methylsulfonyl.

[0069]

Examples of the "cycloalkyl" include cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, adamantyl,
15 bicyclo[2.2.1]heptanyl and the like, in which preferred is cyclopropyl, adamantyl or bicyclo[2.2.1]heptanyl.

Examples of the "cycloalkoxy" include cyclopropoxy, cyclobutoxy, cyclopentyloxy, cyclohexyloxy, adamantyloxy, bicyclo[2.2.1]heptanyloxy and the like, in which preferred is
20 cyclobutoxy.

[0070]

Examples of the "cycloalkyl lower alkyl" include cyclopropylmethyl, cyclopropylethyl, cyclopentylmethyl, cyclohexylmethyl, cyclohexylethyl, adamantylmethyl,
25 bicyclo[2.2.1]heptanylmethyl and the like, in which preferred is cyclopropylmethyl.

Examples of the "cycloalkyl lower alkoxy" include cyclopropylmethoxy, 1-cyclopropylethoxy, 2-cyclopropylethoxy, cyclopentylmethoxy, cyclohexylmethoxy, cycloheptylmethoxy,
30 cyclooctylmethoxy, 2-cyclohexylethoxy, adamantylmethoxy, bicyclo[2.2.1]heptanylmethoxy and the like, in which preferred is cyclopropylmethoxy.

Examples of the "cycloalkyl lower alkoxy lower alkyl" include cyclopropylmethoxymethyl, cyclopropylmethoxyethyl,
35 cyclopentylmethoxymethyl, cyclohexylmethoxymethyl,

cycloheptylmethoxymethyl, cyclooctylmethoxymethyl, cyclohexylmethoxyethyl, cyclohexylethoxymethyl, adamantylmethoxymethyl, bicyclo[2.2.1]heptanylmethoxymethyl and the like, in which preferred is cyclohexylmethoxymethyl.

5 [0071]

Examples of the "cycloalkoxy lower alkyl" include cyclopropoxymethyl, cyclopropoxyethyl, cyclopentoxymethyl, cyclohexyloxymethyl, cycloheptoxymethyl, cyclooctoxymethyl, cyclohexyloxyethyl, adamantyloxymethyl, bicyclo[2.2.1]heptanyloxymethyl and the like, in which preferred is cyclopropoxymethyl or cyclopentoxymethyl.

Examples of the "cycloalkoxy lower alkoxy" include cyclopropoxymethoxy, cyclopropoxyethoxy, cyclopentoxymethoxy, cyclohexyloxymethoxy, adamantyloxymethoxy, bicyclo[2.2.1]heptanyloxymethoxy and the like, in which preferred is cyclopropoxymethoxy.

[0072]

Examples of the "cycloalkyl lower alkenyl" include 2-cyclopropylvinyl, 3-cyclopropyl-1-propen-1-yl, 3-cyclopropyl-2-propen-1-yl, 3-cyclopropyl-2-methyl-1-propen-1-yl, 3-cyclopropyl-2-methyl-2-propen-1-yl, 4-cyclopropyl-1-buten-1-yl, 4-cyclopropyl-2-buten-1-yl, 4-cyclopropyl-3-buten-1-yl, 2-cyclobutylvinyl, 2-cyclopentylvinyl, 2-cyclohexylvinyl and the like, in which preferred is 2-cyclopropylvinyl.

Examples of the "cycloalkylvinyl" include 2-cyclopropylvinyl, 2-cyclobutylvinyl, 2-cyclopentylvinyl, 2-cyclohexylvinyl and the like, in which preferred is 2-cyclopropylvinyl.

[0073]

Examples of the "cycloalkenyl" include 1-cyclopropenyl, 1-cyclobutenyl, 1-cyclopentenyl, 1-cyclohexenyl, bicyclo[2,2,1]hept-2-enyl and the like, in which preferred is 1-cyclopropenyl or bicyclo[2,2,1]hept-2-enyl.

Examples of the "cycloalkenyloxy" include 1-cyclopropenyloxy, 1-cyclobutenyloxy, 1-cyclopentenyoxy, 1-

cyclohexenyloxy, bicyclo[2,2,1]hept-2-enyloxy and the like, in which preferred is 1-cyclopropenyloxy or 1-cyclohexenyloxy.

[0074]

Examples of the "halogen" include fluoro, chloro, bromo
5 and iodo, in which preferred is fluoro or chloro.

Examples of the "phenyl lower alkyl" include benzyl, 1-phenylethyl, phenethyl (2-phenylethyl), 3-phenylpropyl, 4-phenylbutyl, 5-phenylpentyl, 6-phenylhexyl and the like, in which preferred is benzyl or phenethyl.

10 Examples of the "phenoxy lower alkyl" include phenoxymethyl, 1-phenoxyethyl, 2-phenoxyethyl, 3-phenoxypropyl, 4-phenoxybutyl, 5-phenoxyethyl, 6-phenoxyhexyl and the like, in which preferred is phenoxymethyl.

[0075]

15 Examples of the "phenyl lower alkoxy" include benzyloxy, 1-phenylethoxy, 2-phenylethoxy, 1-methyl-2-phenylethoxy, 3-phenylpropyloxy, 1-phenylbutyloxy, 4-phenylbutyloxy, 5-phenylpentyloxy, 6-phenylhexyloxy and the like, in which preferred is benzyloxy, 1-phenylethoxy or 1-methyl-2-
20 phenylethoxy.

Examples of the "phenoxy lower alkoxy" include phenoxymethoxy, 1-phenoxyethoxy, 2-phenoxyethoxy, 3-phenoxypropoxy, 4-phenoxybutoxy, 5-phenoxypentoxy, 6-phenoxyhexoxy and the like, in which preferred is
25 phenoxymethoxy or 2-phenoxyethoxy.

[0076]

Examples of the "phenyl lower alkoxy lower alkyl" include benzyloxymethyl, 1-phenylethoxymethyl, 2-phenylethoxymethyl, 3-phenylpropoxymethyl, 4-phenylbutoxymethyl, 5-
30 phenylpentoxyethyl, 6-phenylhexoxymethyl and the like, in which preferred is benzyloxymethyl.

Examples of the "phenyl lower alkenyl" include styryl, 3-phenyl-1-propen-1-yl, 3-phenyl-2-propen-1-yl, 3-phenyl-2-methyl-1-propen-1-yl, 3-phenyl-2-methyl-2-propen-1-yl, 4-
35 phenyl-1-buten-1-yl, 4-phenyl-2-buten-1-yl, 4-phenyl-3-buten-

1-yl and the like, in which preferred is styryl.

[0077]

Examples of the "phenyl lower alkenyloxy" include styryloxy, 3-phenyl-1-propen-1-yloxy, 3-phenyl-2-propen-1-yloxy, 3-phenyl-2-methyl-1-propen-1-yloxy, 3-phenyl-2-methyl-2-propen-1-yloxy, 4-phenyl-1-buten-1-yloxy, 4-phenyl-2-buten-1-yloxy, 4-phenyl-3-buten-1-yloxy and the like, in which preferred is styryloxy.

Examples of the "phenylthio lower alkyl" include phenylthiomethyl, 1-phenylthioethyl, 2-phenylthioethyl, 3-phenylthiopropyl, 4-phenylthiobutyl, 5-phenylthiopentyl, 6-phenylthiohexyl and the like, in which preferred is phenylthiomethyl or 2-phenylthioethyl.

[0078]

Examples of the "phenylsulfonyl lower alkyl" include phenylsulfonylmethyl, 1-phenylsulfonylethyl, 2-phenylsulfonylethyl, 3-phenylsulfonylpropyl, 4-phenylsulfonylbutyl, 5-phenylsulfonylpentyl, 6-phenylsulfonylhexyl and the like, in which preferred is phenylsulfonylmethyl or 2-phenylsulfonylethyl.

Examples of the "phenyl lower alkylsulfonyl lower alkyl" include benzylsulfonylmethyl, (1-phenylethylsulfonyl)methyl, (2-phenylethylsulfonyl)methyl, (3-phenylpropylsulfonyl)methyl and the like, in which preferred is benzylsulfonylmethyl.

[0079]

Examples of the "phenyl lower alkyl-carbonyl" include benzylcarbonyl, 1-phenylethylcarbonyl, 2-phenylethylcarbonyl, 3-phenylpropylcarbonyl, 4-phenylbutylcarbonyl, 5-phenylpentylcarbonyl, 6-phenylhexylcarbonyl and the like, in which preferred is benzylcarbonyl or 2-phenylethylcarbonyl.

Examples of the "phenyl lower alkoxy-carbonyl" include benzyloxycarbonyl, 1-phenylethoxycarbonyl, 2-phenylethoxycarbonyl, 1-methyl-2-phenylethoxycarbonyl, 3-phenylpropyloxycarbonyl, 4-phenylbutyloxycarbonyl, 5-phenylpentyloxycarbonyl, 6-phenylhexyloxycarbonyl and the like,

in which preferred is benzyloxycarbonyl, 1-phenylethoxycarbonyl or 1-methyl-2-phenylethoxycarbonyl.

[0080]

Examples of the "benzyloxy lower alkyl" include
5 benzyloxymethyl, 1-benzyloxyethyl, 2-benzyloxyethyl, 1-benzyloxypropyl, 3-benzyloxypropyl and the like, in which preferred is 1-benzyloxypropyl.

Examples of the "benzylthio lower alkyl" include
benzylthiomethyl, 1-benzylthioethyl, 2-benzylthioethyl, 3-
10 benzylthiopropyl and the like, in which preferred is benzylthiomethyl.

[0081]

Examples of the "lower alkylamino" include straight or branched ones such as methylamino, ethylamino, n-propylamino,
15 isopropylamino, n-butylamino, isobutylamino, tert-butylamino, sec-butylamino, n-pentylamino, neopentylamino, n-hexylamino, isohexylamino, 3-methylpentylamino and the like, in which preferred is methylamino or ethylamino.

Examples of the "N-lower alkyl-N-phenyl amino" include N-
20 methyl-N-phenyl amino, N-ethyl-N-phenyl amino, N-propyl-N-phenyl amino, N-isopropyl-N-phenyl amino and the like, in which preferred is N-methyl-N-phenyl amino or N-ethyl-N-phenyl amino.

Examples of the "N-lower alkyl-N-phenyl amino lower
25 alkyl" include N-methyl-N-phenyl amino methyl, N-ethyl-N-phenyl amino methyl, N-methyl-N-phenyl amino ethyl, N-methyl-N-phenyl amino propyl and the like, in which preferred is N-methyl-N-phenyl amino methyl.

Examples of the "N-benzyl-N-lower alkyl amino" include N-
30 benzyl-N-methylamino, N-benzyl-N-ethylamino, N-benzyl-N-propylamino and the like, in which preferred is N-benzyl-N-methylamino.

[0082]

Examples of the "mono- or di-N-lower alkyl amino lower
35 alkyl" include mono- or di-N-methylaminomethyl, mono- or di-N-

ethylaminomethyl, mono- or di-N-propylaminomethyl, mono- or di-N-methylaminoethyl, mono- or di-N-methylaminopropyl and the like, in which preferred is mono- or di-N-methylaminomethyl.

Examples of the "N,N-di-lower alkylamino lower alkyl"
5 include N,N-di-methylaminomethyl, N,N-di-ethylaminomethyl, N,N-di-propylaminomethyl, N,N-di-methylaminoethyl, N,N-di-methylaminopropyl, N-ethyl-N-methylaminomethyl, N-ethyl-N-methylaminoethyl and the like, in which preferred is N,N-di-methylaminomethyl or N,N-di-ethylaminomethyl.

10 Examples of the "N,N-di-lower alkylamino lower alkoxy" include N,N-di-methylaminomethoxy, N,N-di-ethylaminomethoxy, N,N-di-propylaminomethoxy, N,N-di-methylaminoethoxy, N,N-di-methylaminopropoxy, N-ethyl-N-methylaminomethoxy, N-ethyl-N-methylaminoethoxy and the like, in which preferred is N,N-di-
15 methylaminomethoxy, N,N-dimethylaminopropoxy or N,N-di-ethylaminomethoxy.

[0083]

Examples of the "N,N-di-lower alkylamino-carbonyl" include N,N-di-methylaminocarbonyl, N,N-di-ethylaminocarbonyl,
20 N,N-di-propylaminocarbonyl, N,N-di-butylaminocarbonyl, N,N-di-methylaminocarbonyl, N-ethyl-N-methylaminocarbonyl, N-ethyl-N-methylaminocarbonyl and the like, in which preferred is N,N-di-methylaminocarbonyl or N,N-di-ethylaminocarbonyl.

Examples of the "lower alkylsulfonylamino" include
25 methylsulfonylamino, ethylsulfonylamino, propylsulfonylamino, isopropylsulfonylamino, butylsulfonylamino, isobutylsulfonylamino and the like, in which preferred is methylsulfonylamino or ethylsulfonylamino.

Examples of the "acetylamino lower alkyl" include
30 acetylaminoethyl, 2-acetylaminoethyl, 3-acetylaminoethyl, 2-acetylamino-1-methylethyl, 4-acetylaminoethyl, 5-acetylaminoethyl, 6-acetylaminoethyl and the like, in which preferred is acetylaminoethyl or 2-acetylaminoethyl.

[0084]

35 Examples of the "pyridyl lower alkyl" include (pyridin-2-

yl)methyl, (pyridin-3-yl)methyl, 1-(pyridin-2-yl)ethyl, 2-(pyridin-2-yl)ethyl, 2-(pyridin-3-yl)ethyl, 3-(pyridin-2-yl)propyl and the like, in which preferred is 2-(pyridin-2-yl)ethyl.

5 Examples of the "pyridyl lower alkoxy" include (pyridin-2-yl)methoxy, (pyridin-3-yl)methoxy, 1-(pyridin-2-yl)ethoxy, 2-(pyridin-2-yl)ethoxy, 2-(pyridin-3-yl)ethoxy, 3-(pyridin-2-yl)propoxy and the like, in which preferred is (pyridin-2-yl)methoxy or 2-(pyridin-2-yl)ethoxy.

10 Examples of the "pyridyloxy lower alkyl" include (pyridin-2-yloxy)methyl, 1-(pyridin-2-yloxy)ethyl, 2-(pyridin-2-yloxy)ethyl, 3-(pyridin-2-yloxy)propyl and the like, in which preferred is (pyridin-2-yloxy)methyl or 2-(pyridin-2-yloxy)ethyl.

15 [0085]

 Examples of the "pyrimidinyl lower alkyl" include (pyrimidin-2-yl)methyl, (pyrimidin-4-yl)methyl, (pyrimidin-5-yl)methyl, 1-(pyrimidin-2-yl)ethyl, 2-(pyrimidin-2-yl)ethyl, 2-(pyrimidin-4-yl)ethyl, 3-(pyrimidin-2-yl)propyl and the like,
20 in which preferred is (pyrimidin-2-yl)methyl or 2-(pyrimidin-2-yl)ethyl.

 Examples of the "pyrimidinyl lower alkoxy" include (pyrimidin-2-yl)methoxy, (pyrimidin-4-yl)methoxy, (pyrimidin-5-yl)methoxy, 1-(pyrimidin-2-yl)ethoxy, 2-(pyrimidin-2-yl)ethoxy, 2-(pyrimidin-4-yl)ethoxy, 3-(pyrimidin-2-yl)propoxy
25 and the like, in which preferred is (pyrimidin-2-yl)methoxy.

 Examples of the "pyrimidyloxy lower alkyl" include (pyrimidin-2-yloxy)methyl, (pyrimidin-4-yloxy)methyl, (pyrimidin-5-yloxy)methyl, 1-(pyrimidin-2-yloxy)ethyl, 2-(pyrimidin-2-yloxy)ethyl, 2-(pyrimidin-4-yloxy)ethyl, 3-(pyrimidin-2-yloxy)propyl and the like, in which preferred is
30 (pyrimidin-2-yloxy)methyl.

[0086]

 Examples of the "benzofuryl lower alkoxy" include
35 (benzofuran-2-yl)methoxy, (benzofuran-3-yl)methoxy, 1-

(benzofuran-2-yl)ethoxy, 2-(benzofuran-2-yl)ethoxy, 3-(benzofuran-2-yl)propoxy and the like, in which preferred is (benzofuran-2-yl)methoxy.

Examples of the "indolinyl lower alkyl" include (indolin-1-yl)methyl, (indolin-2-yl)methyl, (indolin-3-yl)methyl, 1-(indolin-1-yl)ethyl, 2-(indolin-1-yl)ethyl, 3-(indolin-2-yl)propyl and the like, in which preferred is (indolin-1-yl)methyl.

[0087]

10 Examples of the "oxetanyl lower alkoxy" include (oxetan-2-yl)methoxy, (oxetan-3-yl)methoxy, 1-(oxetan-2-yl)ethoxy, 2-(oxetan-2-yl)ethoxy, 1-(oxetan-3-yl)ethoxy, 2-(oxetan-3-yl)ethoxy, 3-(oxetan-2-yl)propoxy, 3-(oxetan-3-yl)propoxy and the like, in which preferred is (oxetan-2-yl)methoxy or
15 (oxetan-3-yl)methoxy.

Examples of the "tetrahydrofuryl lower alkyl" include (tetrahydrofuran-2-yl)methyl, (tetrahydrofuran-3-yl)methyl, 1-(tetrahydrofuran-2-yl)ethyl, 2-(tetrahydrofuran-2-yl)ethyl, 3-(tetrahydrofuran-2-yl)propyl and the like, in which preferred
20 is (tetrahydrofuran-2-yl)methyl.

Examples of the "tetrahydropyranyl lower alkoxy" include (tetrahydropyran-2-yl)methoxy, 1-(tetrahydropyran-2-yl)ethoxy, 2-(tetrahydropyran-2-yl)ethoxy, 3-(tetrahydropyran-2-yl)propyloxy and the like, in which preferred is
25 (tetrahydropyran-2-yl)methoxy.

[0088]

Examples of the "piperidyl lower alkyl" include (piperidin-1-yl)methyl, (piperidin-2-yl)methyl, (piperidin-3-yl)methyl, (piperidin-4-yl)methyl, 1-(piperidin-1-yl)ethyl, 2-(piperidin-1-yl)ethyl, 3-(piperidin-1-yl)propyl and the like,
30 in which preferred is (piperidin-1-yl)methyl.

Examples of the "pyrrolyl lower alkyl" include (pyrrol-1-yl)methyl, (pyrrol-2-yl)methyl, (pyrrol-3-yl)methyl, 1-(pyrrol-1-yl)ethyl, 2-(pyrrol-1-yl)ethyl, 1-(pyrrol-2-yl)ethyl, 2-(pyrrol-2-yl)ethyl, 3-(pyrrol-1-yl)propyl and the like, in
35

which preferred is (pyrrol-1-yl)methyl or (pyrrol-2-yl)methyl.

Examples of the "thiazolyl lower alkoxy" include (thiazol-2-yl)methoxy, (thiazol-4-yl)methoxy, (thiazol-5-yl)methoxy, 1-(thiazol-2-yl)ethoxy, 2-(thiazol-2-yl)ethoxy, 3-
5 (thiazol-2-yl)propoxy and the like, in which preferred is (thiazol-2-yl)methoxy.

[0089]

Examples of the "thienyl lower alkyl" include (thiophen-2-yl)methyl, (thiophen-3-yl)methyl, 1-(thiophen-2-yl)ethyl, 2-
10 (thiophen-2-yl)ethyl, 3-(thiophen-2-yl)propyl and the like, in which preferred is (thiophen-2-yl)methyl or (thiophen-3-yl)methyl.

Examples of the "thienyl lower alkoxy" include (thiophen-2-yl)methoxy, (thiophen-3-yl)methoxy, 1-(thiophen-2-yl)ethoxy,
15 2-(thiophen-2-yl)ethoxy, 3-(thiophen-2-yl)propoxy and the like, in which preferred is (thiophen-2-yl)methoxy or (thiophen-3-yl)methoxy.

Examples of the "benzothienyl lower alkyl" include (benzothiophen-2-yl)methyl, (benzothiophen-3-yl)methyl, 1-
20 (benzothiophen-2-yl)ethyl, 2-(benzothiophen-2-yl)ethyl, 3-(benzothiophen-2-yl)propyl and the like, in which preferred is (benzothiophen-2-yl)methyl or (benzothiophen-3-yl)methyl.

Examples of the "benzothienyl lower alkoxy" include (benzothiophen-2-yl)methoxy, (benzothiophen-3-yl)methoxy, 1-
25 (benzothiophen-2-yl)ethoxy, 2-(benzothiophen-2-yl)ethoxy, 3-(benzothiophen-2-yl)propoxy and the like, in which preferred is (benzothiophen-2-yl)methoxy or (benzothiophen-3-yl)methoxy.
[0090]

Examples of the "benzo[1,3]dioxolyl lower alkyl" include
30 (benzo[1,3]dioxol-2-yl)methyl, (benzo[1,3]dioxol-4-yl)methyl, (benzo[1,3]dioxol-5-yl)methyl, 1-(benzo[1,3]dioxol-4-yl)ethyl, 2-(benzo[1,3]dioxol-4-yl)ethyl, 1-(benzo[1,3]dioxol-5-yl)ethyl, 2-(benzo[1,3]dioxol-5-yl)ethyl, 3-(benzo[1,3]dioxol-4-yl)propyl and the like, in which preferred is
35 (benzo[1,3]dioxol-4-yl)methyl or (benzo[1,3]dioxol-5-yl)methyl.

Examples of the "benzo[1,3]dioxolyl lower alkoxy" include (benzo[1,3]dioxol-2-yl)methoxy, (benzo[1,3]dioxol-4-yl)methoxy, (benzo[1,3]dioxol-5-yl)methoxy, 1-(benzo[1,3]dioxol-4-yl)ethoxy, 2-(benzo[1,3]dioxol-4-yl)ethoxy, 1-
 5 (benzo[1,3]dioxol-5-yl)ethoxy, 2-(benzo[1,3]dioxol-5-yl)ethoxy, 3-(benzo[1,3]dioxol-4-yl)propoxy and the like, in which preferred is (benzo[1,3]dioxol-4-yl)methoxy or (benzo[1,3]dioxol-5-yl)methoxy.

[0091]

10 Examples of the "quinolyl lower alkoxy" include (quinolin-2-yl)methoxy, (quinolin-3-yl)methoxy, (quinolin-4-yl)methoxy, (quinolin-5-yl)methoxy, (quinolin-6-yl)methoxy, (quinolin-7-yl)methoxy, (quinolin-8-yl)methoxy, 1-(quinolin-2-yl)ethoxy, 2-(quinolin-2-yl)ethoxy, 3-(quinolin-2-yl)propoxy
 15 and the like, in which preferred is (quinolin-2-yl)methoxy or 2-(quinolin-2-yl)ethoxy.

Examples of the "3,4-dihydro-2H-quinolyl lower alkyl" include (3,4-dihydro-2H-quinolin-1-yl)methyl, (3,4-dihydro-2H-quinolin-2-yl)methyl, (3,4-dihydro-2H-quinolin-3-yl)methyl,
 20 (3,4-dihydro-2H-quinolin-4-yl)methyl, (3,4-dihydro-2H-quinolin-5-yl)methyl, (3,4-dihydro-2H-quinolin-6-yl)methyl, (3,4-dihydro-2H-quinolin-7-yl)methyl, (3,4-dihydro-2H-quinolin-8-yl)methyl, 1-(3,4-dihydro-2H-quinolin-2-yl)ethyl, 2-(3,4-dihydro-2H-quinolin-2-yl)ethyl, 3-(3,4-dihydro-2H-
 25 quinolin-2-yl)propyl and the like, in which preferred is (3,4-dihydro-2H-quinolin-1-yl)methyl, (3,4-dihydro-2H-quinolin-2-yl)methyl or 2-(3,4-dihydro-2H-quinolin-2-yl)ethyl.

Examples of the "2-oxo-1,2,3,4-tetrahydroquinolyl lower alkoxy" include (2-oxo-1,2,3,4-tetrahydroquinolin-1-yl)methoxy,
 30 (2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)methoxy, (2-oxo-1,2,3,4-tetrahydroquinolin-3-yl)methoxy, (2-oxo-1,2,3,4-tetrahydroquinolin-4-yl)methoxy, (2-oxo-1,2,3,4-tetrahydroquinolin-5-yl)methoxy, (2-oxo-1,2,3,4-tetrahydroquinolin-6-yl)methoxy, (2-oxo-1,2,3,4-tetrahydroquinolin-7-yl)methoxy,
 35 (2-oxo-1,2,3,4-

tetrahydroquinolin-8-yl)methoxy, 1-(2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)ethoxy, 2-(2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)ethoxy, 3-(2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)propoxy, 3-(2-oxo-1,2,3,4-tetrahydroquinolin-6-yl)propoxy and the like, in which preferred is (2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)methoxy, 2-(2-oxo-1,2,3,4-tetrahydroquinolin-2-yl)ethoxy or 3-(2-oxo-1,2,3,4-tetrahydroquinolin-6-yl)propoxy.

[0092]

10 Examples of the "3,4-dihydro-1H-isoquinolyl lower alkyl" include (3,4-dihydro-1H-isoquinolin-1-yl)methyl, (3,4-dihydro-1H-isoquinolin-2-yl)methyl, (3,4-dihydro-1H-isoquinolin-3-yl)methyl, (3,4-dihydro-1H-isoquinolin-4-yl)methyl, (3,4-dihydro-1H-isoquinolin-5-yl)methyl, (3,4-dihydro-1H-isoquinolin-6-yl)methyl, (3,4-dihydro-1H-isoquinolin-7-yl)methyl, (3,4-dihydro-1H-isoquinolin-8-yl)methyl, 1-(3,4-dihydro-1H-isoquinolin-1-yl)ethyl, 2-(3,4-dihydro-1H-isoquinolin-1-yl)ethyl, 3-(3,4-dihydro-1H-isoquinolin-1-yl)propyl and the like, in which preferred is (3,4-dihydro-1H-isoquinolin-1-yl)methyl, (3,4-dihydro-1H-isoquinolin-2-yl)methyl or 2-(3,4-dihydro-1H-isoquinolin-1-yl)ethyl.

[0093]

Examples of the "indolyl lower alkyl" include (indol-1-yl)methyl, (indol-2-yl)methyl, (indol-3-yl)methyl, 1-(indol-1-yl)ethyl, 2-(indol-1-yl)ethyl, 3-(indol-2-yl)propyl and the like, in which preferred is (indol-1-yl)methyl.

Examples of the "triphenylphosphonium lower alkyl" include triphenylphosphonium methyl, 1-(triphenylphosphonium)ethyl, 2-(triphenylphosphonium)ethyl, 3-(triphenylphosphonium)propyl and the like, in which preferred is triphenylphosphonium methyl.

[0094]

Examples of the "alkyl" include straight or branched ones having 1 to 10 carbon atoms, such as methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, sec-butyl, n-pentyl,

neopentyl, n-hexyl, isohexyl, 3-methylpentyl and the like.

[0095]

Examples of the "aryl" include phenyl, 1-naphthyl, 2-naphthyl and the like.

5 Examples of the "aryl lower alkyl" include benzyl, 1-phenylethyl, phenethyl (2-phenylethyl), 3-phenylpropyl, 4-phenylbutyl, 5-phenylpentyl, 6-phenylhexyl, 1-naphthylmethyl, 2-naphthylmethyl, 1-(1-naphthyl)ethyl, 1-(2-naphthyl)ethyl, 2-(1-naphthyl)ethyl, 2-(2-naphthyl)ethyl, 3-(1-naphthyl)propyl,
10 3-(2-naphthyl)propyl, 4-(1-naphthyl)butyl, 4-(2-naphthyl)butyl and the like, in which preferred is benzyl or phenethyl.

Examples of the "aryl lower alkenyl" include styryl, 3-phenyl-1-propen-1-yl, 3-phenyl-2-propen-1-yl, 3-phenyl-2-methyl-1-propen-1-yl, 3-phenyl-2-methyl-2-propen-1-yl, 4-phenyl-1-buten-1-yl, 4-phenyl-2-buten-1-yl, 4-phenyl-3-buten-1-yl and the like, in which preferred is styryl.

[0096]

Examples of the "acyl" include straight or branched alkylcarbonyl having 1 to 10 carbon atoms, preferably 1 to 6
20 carbon atoms, such as formyl, acetyl, ethylcarbonyl, propylcarbonyl, isopropylcarbonyl, butylcarbonyl, isobutylcarbonyl, sec-butylcarbonyl, tert-butylcarbonyl, pentylcarbonyl, hexylcarbonyl and the like.

Examples of the "aroyl" include benzoyl, 1-naphthoyl, 2-naphthoyl and the like, in which preferred is benzoyl.

[0097]

Examples of the "lower alkylene" include linear or branched ones such as methylene, ethylene, 1-methylethylene, 2-methylethylene, trimethylene, 2-methyltrimethylene, 2,2
30 dimethyltrimethylene, 1-methyltrimethylene, methylmethylene, ethylmethylene, dimethylmethylene, tetramethylene, pentamethylene, hexamethylene and the like.

Examples of the "higher alkylene" include linear or branched ones such as heptamethylene, octamethylene,
35 nonamethylene, decamethylene, dodecamethylene,

tetradecamethylene, hexadecamethylene, octadecamethylene and the like.

[0098]

Examples of the "lower alkenylene" include linear or
5 branched ones that have 1 to 3 double bonds such as vinylene,
1-methylvinylene, 2-methylvinylene, 1,2-dimethylvinylene, 1-
propenylene, 1-methyl-1-propenylene, 2-methyl-1-propenylene,
2-propenylene, 2-butenylene, 1-butenylene, 3-butenylene, 2-
pentenylene, 1-pentenylene, 3-pentenylene, 4-pentenylene, 1,3-
10 butadienylene, 1,3-pentadienylene, 2-penten-4-ynylene, 2-
hexenylene, 1-hexenylene, 5-hexenylene, 3-hexenylene, 4-
hexenylene, 3,3-dimethyl-1-propenylene, 2-ethyl-1-propenylene,
1,3,5-hexatrienylene, 1,3-hexadienylene, 1,4-hexadienylene and
the like.

15 Examples of the "phenylene" include 1,2-phenylene, 1,3-
phenylene and 1,4-phenylene.

[0099]

Examples of "heterocyclyl" include saturated or
unsaturated monocyclic or polycyclic heterocyclyl containing
20 at least one hetero atom selected from the group consisting of
oxygen, sulfur and nitrogen. Examples of preferable
heterocyclyl include the following (a) to (n):

(a) unsaturated 3 to 8-membered, preferably 5 or 6-
membered heteromonocyclyl containing 1 to 4 nitrogen atoms,
25 for example, pyrrolyl, pyrrolinyl, imidazolyl, pyrazolyl,
pyridyl, and its N-oxide, tetrahydropyridyl (e.g., 1,2,3,6-
tetrahydropyridyl), pyrimidinyl, pyrazinyl, pyridazinyl,
triazolyl (e.g., 4H-1,2,4-triazolyl, 1H-1,2,3-triazolyl, 2H-
1,2,3-triazolyl, etc.), tetrazolyl (e.g., 1H-tetrazolyl, 2H-
30 tetrazolyl, etc.), dihydrotriazinyl (e.g., 4,5-dihydro-1,2,4-
triazinyl, 2,5-dihydro-1,2,4-triazinyl, etc.),
dihydropyrimidinyl (e.g., 1,6-dihydrodihydropyrimidinyl);
tetrahydropyrimidinyl (e.g., 1,2,3,6-tetrahydropyrimidinyl)
etc.;

35 (b) saturated 3 to 8-membered, preferably 5 to 7-

membered heteromonocyclyl containing 1 to 4 nitrogen atoms, for example, azetidiny, pyrrolidinyl, imidazolidinyl, piperidyl, pyrazolidinyl, piperazinyl, azepanyl, 1,4-diazepanyl, etc.;

5 (c) saturated or unsaturated condensed 7 to 12-membered heterocyclyl containing 1 to 5 nitrogen atoms, for example, decahydroquinolyl, indolyl, dihydroindolyl (e.g., 2,3-dihydroindolyl, etc.), isoindolyl, indolizinyl, benzimidazolyl, dihydrobenzimidazolyl (e.g., 2,3-dihydro-1H-benzo[d]imidazolyl, 10 etc.), quinolyl, dihydroquinolyl (e.g. 1,4-dihydroquinolyl, 1,2-dihydroquinolyl, etc.), tetrahydroquinolyl (1,2,3,4-tetrahydroquinolyl, etc.), isoquinolyl, dihydroisoquinolyl (e.g., 3,4-dihydro-1H-isoquinolyl, 1,2-dihydroisoquinolyl, etc.), tetrahydroisoquinolyl (e.g., 1,2,3,4-tetrahydro-1H- 15 isoquinolyl, 5,6,7,8-tetrahydroisoquinolyl, etc.), carbostyryl, dihydrocarbostyryl (e.g., 3,4-dihydrocarbostyryl, etc.), indazolyl, benzotriazolyl (e.g. benzo[d][1,2,3]triazolyl, etc.), tetrazolopyridyl, tetrazolopyridazinyl (e.g., tetrazolo[1,5-b]pyridazinyl, etc.), dihydrotriazolopyridazinyl, 20 imidazopyridyl (e.g., imidazo[1,2-a]pyridyl, imidazo[4,5-c]pyridyl, imidazo[1,5-a]pyridyl, etc.), imidazobenzimidazolyl (e.g., imidazo[1,2-a]benzimidazolyl), naphthyridinyl, cinnolinyl, quinoxalinyl, quinazolinyl, pyrazolopyridyl (e.g., pyrazolo[2,3-a]pyridyl, etc.), tetrahydropyridoindolyl (e.g., 25 2,3,4,9-tetrahydro-1H-pyrido[3,4-b]indolyl, etc.), azabicyclooctanyl (e.g., (1R,5S)-8-azabicyclo[3.2.1]octanyl), carbazolyl etc.;

(d) saturated or unsaturated 3 to 8-membered, preferably 5 or 6-membered heteromonocyclyl containing 1 to 2 oxygen 30 atoms, for example, furyl, tetrahydropyranyl (e.g., tetrahydro-2H-pyranyl, etc.), tetrahydrofuryl, etc.;

(e) unsaturated condensed 7 to 12-membered heterocyclyl containing 1 to 3 oxygen atoms, for example, benzofuryl, dihydrobenzofuryl (e.g. 2,3-dihydrobenzo[b]furyl, etc.), 35 chromanyl, benzodioxanyl (e.g., 1,4-benzodioxanyl, etc.),

benzodioxolyl (benzo[1,3]dioxolyl, etc.), dibenzofuryl,
 dihydrobenzodioxanyl (e.g., 2,3-dihydro[1,4]benzodioxanyl),
 dihydrobenzodioxinyl (e.g., 2,3-dihydro[1,4]benzodioxinyl),
 dihydrobenzodioxepinyl (e.g., 3,4-dihydro-
 5 benzo[b][1,4]dioxepinyl) etc.;

(f) unsaturated 3 to 8-membered, preferably 5 or 6-
 membered heteromonocyclyl containing 1 to 2 oxygen atoms and 1
 to 3 nitrogen atoms, for example, oxazolyl, isoxazolyl,
 oxadiazolyl (e.g., 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl,
 10 1,2,5-oxadiazolyl, etc.), etc.;

(g) saturated 3 to 8-membered, preferably 5 or 6-
 membered heteromonocyclyl containing 1 to 2 oxygen atoms and 1
 to 3 nitrogen atoms, for example, morpholinyl, etc.;

(h) unsaturated condensed 7 to 12-membered heterocyclyl
 15 containing 1 to 2 oxygen atoms and 1 to 3 nitrogen atoms, for
 example, benzoxazolyl, benzoxadiazolyl, benzisoxazolyl,
 dihydrobenzoxazinyl (e.g., 2,3-dihydrobenz-1,4-oxazinyl, etc.),
 furopyridyl (e.g., furo[2,3-c]pyridyl, 6,7-dihydrofuro[2,3-
 c]pyridyl, furo[3,2-c]pyridyl, 4,5-dihydrofuro[3,2-c]pyridyl,
 20 furo[2,3-b]pyridyl, 6,7-dihydrofuro[2,3-b]pyridyl, etc.),
 furopyrrolyl (e.g., furo[3,2-b]pyrrolyl etc.), etc.;

(i) unsaturated 3 to 8-membered, preferably 5 or 6-
 membered heteromonocyclyl containing 1 to 2 sulfur atoms and 1
 to 3 nitrogen atoms, for example, thiazolyl, thiazolinyl,
 25 thiadiazolyl (e.g., 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl,
 1,2,5- thiadiazolyl, 1,2,3-thiadiazolyl, etc.), isothiazolyl ,
 etc.;

(j) saturated 3 to 8-membered, preferably 5 or 6-
 membered heteromonocyclyl containing 1 to 2 sulfur atoms and 1
 30 to 3 nitrogen atoms, for example, thiazolidinyl, etc.;

(k) unsaturated 3 to 8-membered, preferably 5 or 6-
 membered heteromonocyclyl containing a sulfur atom, for
 example, thienyl, etc.;

(l) unsaturated condensed 7 to 12-membered heterocyclyl
 35 containing 1 to 3 sulfur atoms, for example, benzothienyl (e.g.

benzo[b]thienyl, etc.);

(m) unsaturated condensed 7 to 12-membered heterocyclyl containing 1 to 2 sulfur atoms and 1 to 3 nitrogen atoms, for example, benzothiazolyl, benzothiadiazolyl, thienopyridyl
 5 (e.g., thieno[2,3-c]pyridyl, 6,7-dihydrothieno[2,3-c]pyridyl, thieno[3,2-c]pyridyl, 4,5-dihydrothieno[3,2-c]pyridyl, thieno[2,3-b]pyridyl, 6,7-dihydrothieno[2,3-b]pyridyl, thieno[3,2-b]pyridyl, 4,5,6,7-tetrahydrothieno[2,3-c]pyridyl, etc.), imidazothiazolyl (e.g., imidazo[2,1-b]thiazolyl, etc.),
 10 dihydroimidazothiazolyl (e.g., 2,3-dihydroimidazo[2,1-b]thiazolyl, etc.), thienopyrazinyl (e.g., thieno[2,3-b]pyrazinyl, etc.), etc.; and

(n) saturated or unsaturated 7-to 12-membered heterocyclic spiro groups containing 1 to 2 nitrogen atoms,
 15 for example, azaspiro[5.5]undecanyl (e.g., 3-azaspiro[5.5]undecanyl), etc.

[0100]

R¹ is preferably a group represented by formula:

-A-L1-B

20 wherein each symbol is as defined above.

[0101]

R¹ is more preferably one of the following (1-1) to (1-34):

(1-1) a phenyl group substituted with one or more members
 25 selected from the group consisting of the following (1-1-1) to (1-1-108):

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl
 30 groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower
 35 alkoxy groups, then the phenyl group of (1-1) is

substituted with additional one or more substituents
excluding a lower alkoxy group and a halogen atom),
(1-1-3) a lower alkoxy lower alkyl group optionally
substituted with one or more members selected from the
5 group consisting of a halogen atoms; and a cycloalkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group optionally substituted with one
or more halogen atoms,
(1-1-6) a cycloalkyl lower alkyl group,
10 (1-1-7) a cycloalkyl lower alkoxy group optionally
substituted on the cycloalkyl group with one or more
members selected from the group consisting of a halogen
atom; a lower alkyl group optionally substituted with one
or more halogen atoms; and a phenyl group optionally
15 substituted with one or more halogen atoms,
(1-1-8) a cycloalkyl lower alkoxy lower alkyl group
optionally substituted on the cycloalkyl group with one or
more members selected from the group consisting of a
hydroxy; and a lower alkoxy group,
20 (1-1-9) a halogen atom (preferably provided that the phenyl
group of (1-1) is substituted with one or more halogen
atoms, then the phenyl group of (1-1) is substituted with
additional one or more substituents excluding a phenoxy
group),
25 (1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; a lower alkoxy group
30 optionally substituted with one or more halogen atoms; a
lower alkoxy-carbonyl group; a lower alkylsulfonyl group; a
phenyl group; a phenyl lower alkoxy group optionally
substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atom and a
35 lower alkyl group optionally substituted with one or more

halogen atoms; a phenoxy group; and a cyano group,
(1-1-12) a phenyl lower alkyl group optionally substituted
with one or more members selected from the group consisting
of a halogen atom; a lower alkyl group optionally
5 substituted with one or more halogen atoms; a lower alkoxy
group optionally substituted with one or more halogen
atoms; and a hydroxy group,
(1-1-13) a styryl group optionally substituted on the
phenyl ring with one or more members selected from the
10 group consisting of a lower alkoxy group optionally
substituted with one or more halogen atoms; a lower alkyl
group optionally substituted with one or more halogen
atoms; a cyano group; a halogen atom; and a 5-cyano-1H-
1,2,3-triazol-4-yl group (preferably provided that when the
15 styryl group is bonded to the p-position on the phenyl ring
of (1-1), then the styryl group is substituted on the
phenyl ring with one or more members selected from the
group consisting of a lower alkoxy group substituted with
one or more halogen atoms; a lower alkyl group substituted
20 with one or more halogen atoms; and a fluoro atom),
(1-1-14) a phenoxy group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
25 (preferably provided that the phenyl group of (1-1) is
substituted with one or more phenoxy groups, then the
phenyl group of (1-1) is substituted with additional one or
more substituents excluding a halogen atom),
(1-1-15) a phenoxy lower alkyl group optionally substituted
30 on the phenyl ring with one or more members selected from
the group consisting of a halogen atom; a lower alkyl group
optionally substituted with one or more halogen atoms; and
a lower alkoxy group optionally substituted with one or
more halogen atoms,
35 (1-1-16) a phenyl lower alkoxy group optionally substituted

- on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; and a cyano group,
- (1-1-17) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atoms; and a lower alkyl group,
- (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-21) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a cyano group,
- (1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the

pyridine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms
(preferably a pyridylvinyl group substituted on the
pyridine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms),
5 (1-1-25) a pyrimidinyl group optionally substituted with
one or more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group,
10 (1-1-26) a pyrimidinylvinyl group optionally substituted on
the pyrimidine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one
or more members selected from the group consisting of a
15 halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a phenyl group,
(1-1-28) a benzoxazolyl group optionally substituted with
one or more halogen atoms,
(1-1-29) a benzofuryl group optionally substituted with one
20 or more halogen atoms,
(1-1-30) a benzofuryl lower alkoxy group optionally
substituted on the benzofuran ring with one or more phenyl
groups optionally substituted with one or more halogen
atoms,
25 (1-1-31) a thienyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; a lower alkyl-carbonyl
group; and a phenyl group optionally substituted with one
30 or more members selected from the group consisting of a
halogen atom, and a lower alkyl group optionally
substituted with one or more halogen atoms,
(1-1-32) a benzothienyl group optionally substituted with
one or more members selected from the group consisting of a
35 halogen atom; a lower alkyl group optionally substituted

with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
5 (1-1-34) an indolinyl lower alkyl group,
(1-1-35) a benzothienylvinyl group,
(1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
10 (1-1-37) a lower alkoxy lower alkoxy group,
(1-1-38) a cycloalkoxy lower alkyl group optionally substituted on the cycloalkyl group with one or more lower alkyl groups,
(1-1-39) a cycloalkyl lower alkenyl group,
15 (1-1-40) a cycloalkenyloxy group,
(1-1-41) a cycloalkenylvinyl group,
(1-1-42) an oxiranyl group optionally substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally substituted with one or
20 more halogen atoms,
(1-1-43) an oxetanyl lower alkoxy group optionally substituted on the oxetane ring with one or more lower alkyl groups,
(1-1-44) a tetrahydropyranyl lower alkoxy group,
25 (1-1-45) a hydroxy group,
(1-1-46) a phenyl lower alkoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group optionally substituted with one or more
30 halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkylthio group optionally substituted with one or more halogen atoms,
(1-1-47) a phenyl lower alkenyloxy group optionally substituted on the phenyl ring with one or more lower alkyl
35 groups optionally substituted with one or more halogen

atoms,

(1-1-48) a benzoyl group optionally substituted with one or more halogen atoms,

(1-1-49) a phenylthio lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atoms; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-50) a phenylsulfonyl group optionally substituted with one or more lower alkyl groups,

(1-1-51) a phenylsulfonyl lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-52) a naphthyl group optionally substituted with one or more halogen atoms,

(1-1-53) a naphthylvinyl group optionally substituted on the naphthyl ring with one or more halogen atoms,

(1-1-54) a tetrahydronaphthyloxy group,

(1-1-55) an indanyloxy group,

(1-1-56) an amino group optionally mono- or di-substituted with members selected from the group consisting of a lower alkyl group; a lower alkyl-carbonyl group; a lower alkoxy-carbonyl group; and a lower alkylsulfonyl group;

(1-1-57) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-58) an aminocarbonyl group optionally substituted with one or more members selected from the group consisting of a lower alkyl group; a cycloalkyl group; a cycloalkyl lower alkyl group; and a phenyl group optionally substituted with one or more halogen atoms,

(1-1-59) a pyridyl lower alkoxy group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more

- halogen atoms,
- (1-1-60) a pyridyloxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 5 (1-1-61) a pyrrolo[2,3-b]pyridyl group optionally substituted with one or more lower alkyl groups,
- (1-1-62) a pyrazolo[3,4-b]pyridyl group optionally substituted with one or more lower alkyl groups,
- (1-1-63) an imidazo[1,2-a]pyridyl group optionally substituted with one or more members selected from the
- 10 group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-64) a pyrimidinyl lower alkyl group optionally substituted on the pyrimidine ring with one or more lower
- 15 alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-65) a pyrimidinyl lower alkoxy group optionally substituted on the pyrimidine ring with one or more members selected from the group consisting of a lower alkoxy group;
- 20 a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl group,
- (1-1-66) a pyrimidinyloxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 25 (1-1-67) a pyrimidinyloxy lower alkyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-68) a pyrazinyl group optionally substituted with one or more lower alkyl groups,
- 30 (1-1-69) a pyridazinyl group optionally substituted with one or more members selected from the group consisting of a lower alkyl group; and a lower alkoxy group,
- (1-1-70) a piperidyl lower alkyl group,
- 35 (1-1-71) a piperidylcarbonyl group,

- (1-1-72) a piperazinyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,
- (1-1-73) an imidazolyl group,
- 5 (1-1-74) a pyrazolyl group optionally substituted with one or more lower alkyl groups,
- (1-1-75) a pyrrolyl lower alkyl group,
- (1-1-76) a thiazolyl group,
- (1-1-77) a thiazolyl lower alkoxy group optionally substituted on the thiazole ring with one or more lower
- 10 alkyl groups,
- (1-1-78) a benzothiazolyl group optionally substituted with one or more halogen atoms,
- (1-1-79) a furyl group,
- 15 (1-1-80) a furylvinyl group optionally substituted on the furan ring with one or more lower alkyl groups,
- (1-1-81) a benzofurylvinyl group (preferably the benzofurylvinyl group is bonded to the o- or m-position on the phenyl ring of (1-1)),
- 20 (1-1-82) a 2,3-dihydrobenzofuryl group,
- (1-1-83) a thienyl lower alkoxy group,
- (1-1-84) a thienylvinyl group optionally substituted on the thiophene ring with one or more halogen atoms (preferably the thienylvinyl group is bonded to the o- or m-position on the phenyl ring of (1-1)),
- 25 (1-1-85) a benzothienyl lower alkyl group optionally substituted on the benzothiophene ring with one or more halogen atoms,
- (1-1-86) a benzothienyl lower alkoxy group optionally substituted on the benzothiophene ring with one or more
- 30 members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-87) a benzo[1,3]dioxolyl lower alkyl group optionally substituted on the benzo[1,3]dioxole ring with one or more
- 35

- halogen atoms,
(1-1-88) a benzo[1,3]dioxolyl lower alkoxy group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
5 (1-1-89) a 4H-benzo[1,3]dioxinyl group optionally substituted with one or more halogen atoms,
(1-1-90) a 4H-benzo[1,3]dioxinylvinyl group optionally substituted on the benzo[1,3]dioxine ring with one or more halogen atoms,
10 (1-1-91) a quinolyl group,
(1-1-92) a quinolyl lower alkoxy group,
(1-1-93) a quinolylvinyl group,
(1-1-94) a 3,4-dihydro-2H-quinolyl group,
(1-1-95) a 3,4-dihydro-2H-quinolyl lower alkyl group,
15 (1-1-96) a 2-oxo-1,2,3,4-tetrahydroquinolyl group,
(1-1-97) a 2-oxo-1,2,3,4-tetrahydroquinolyl lower alkoxy group,
(1-1-98) a 2-oxo-1,2,3,4-tetrahydroquinolyloxy group optionally substituted with one or more lower alkyl groups,
20 (1-1-99) an isoquinolyl group,
(1-1-100) a 3,4-dihydro-1H-isoquinolyl group,
(1-1-101) a 3,4-dihydro-1H-isoquinolyl lower alkyl group,
(1-1-102) an indolyl group optionally substituted with one or more members selected from the group consisting of a
25 halogen atom; a lower alkyl group; and a lower alkoxy-carbonyl group,
(1-1-103) an indolyl lower alkyl group,
(1-1-104) an indolylvinyl group optionally substituted on the indole ring with one or more lower alkyl groups,
30 (1-1-105) an indolinyl group,
(1-1-106) an indolinylcarbonyl group,
(1-1-107) a 1H-1,2,3-triazolyl group optionally substituted with one or more cyano groups, and
(1-1-108) a triphenylphosphonium lower alkyl group,
35 (1-2) a thiazolyl group substituted with one or more members

selected from the group consisting of the following (1-2-1) to (1-2-26):

- (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- 5 (1-2-2) a lower alkoxy group,
- (1-2-3) a cycloalkyl group,
- (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a
10 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; a lower alkoxy group optionally substituted with one or more halogen atoms; a hydroxy group; and a cyano group,
- (1-2-6) a styryl group optionally substituted on the phenyl
15 ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted
20 with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-2-9) a phenylthio group optionally substituted with one
25 or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-10) an amino group optionally mono- or di-substituted with members selected from the group consisting of a lower
30 alkyl group; a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted with one or more halogen atoms; a
35 benzyl group optionally substituted on the phenyl ring with

one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms; and a benzoyl group optionally substituted with one or more halogen atoms,

5 (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-12) a lower alkenyl group,

10 (1-2-13) a cycloalkyl lower alkyl group,

(1-2-14) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and

15 a hydroxy group,

(1-2-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and

20 a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-2-16) a phenyl lower alkoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a

25 lower alkoxy group optionally substituted with one or more halogen atoms; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-17) a phenyl lower alkylsulfonyl lower alkyl group optionally substituted on the phenyl ring with one or more

30 lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-18) a mono- or di-N-lower alkyl amino lower alkyl group;

(1-2-19) a piperidyl group optionally substituted with one

35 or more members selected from the group consisting of a

phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms; and a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-20) a piperazinyl group optionally substituted with one or more phenyl groups optionally substituted with one or more members selected from the group consisting of a halogen atom, and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-21) an indolyl group,

(1-2-22) a morpholinyl group,

(1-2-23) a thienyl group,

(1-2-24) a benzothienyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-25) a furyl group, and

(1-2-26) a cyano group,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-12):

(1-3-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3-2) a cycloalkyl group,

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-3-4) a lower alkoxy lower alkyl group,

(1-3-5) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups

optionally substituted with one or more halogen atoms,
(1-3-6) a naphthyl group,
(1-3-7) a pyridyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
5 more halogen atoms,
(1-3-8) a furyl group,
(1-3-9) a dihydrobenzofuryl group,
(1-3-10) a thienyl group,
(1-3-11) a benzothienyl group optionally substituted with
10 one or more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms, and
(1-3-12) a benzo[1,3]dioxolyl group optionally substituted
15 with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members
selected from the group consisting of the following (1-4-1) to
(1-4-14):
(1-4-1) a lower alkyl group optionally substituted with one
20 or more halogen atoms,
(1-4-2) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more members selected from the group consisting
25 of a halogen atom and a hydroxy group; a lower alkoxy group
optionally substituted with one or more halogen atoms; a
lower alkyl-carbonyl group; a lower alkoxy-carbonyl group;
and a benzyloxy group optionally substituted on the phenyl
ring with one or more members selected from the group
30 consisting of a lower alkyl group optionally substituted
with one or more halogen atoms, and a halogen atom,
(1-4-3) a benzyl group optionally substituted on the phenyl
ring with one or more halogen atoms,
(1-4-4) a phenoxy group optionally substituted with one or
35 more members selected from the group consisting of a lower

alkyl group optionally substituted with one or more halogen atoms; and a halogen atom,
(1-4-5) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group
5 consisting of a halogen atom; and a lower alkyl groups optionally substituted with one or more halogen atoms,
(1-4-6) a cycloalkyl lower alkenyl group,
(1-4-7) a halogen atom,
(1-4-8) a pyridyl group optionally substituted with one or
10 more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-4-9) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups
15 optionally substituted with one or more halogen atoms,
(1-4-10) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-4-11) a thienyl group optionally substituted with one or
20 more members selected from the group consisting of a halogen atom; and a phenyl group optionally substituted with one or more halogen atoms,
(1-4-12) a thienylvinyl group,
(1-4-13) a benzothienyl group optionally substituted with
25 one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-4-14) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
30 (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-8):
(1-5-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a
35 halogen atom; a lower alkyl group optionally substituted

- with one or more halogen atoms; and a phenyl group,
(1-5-2) a styryl group optionally substituted on the phenyl
ring with one or more members selected from the group
consisting of a halogen atom; a lower alkyl group
5 optionally substituted with one or more halogen atoms; and
a lower alkoxy group,
(1-5-3) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-5-4) a naphthyl group,
10 (1-5-5) a pyridyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms,
(1-5-6) a quinolyl group,
(1-5-7) a benzothienyl group optionally substituted with
15 one or more lower alkyl groups optionally substituted with
one or more halogen atoms, and
(1-5-8) a benzo[1,3]dioxolylvinyl group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
20 (1-6) a pyrrolyl group optionally substituted with one or more
members selected from the group consisting of the following
(1-6-1) to (1-6-5):
(1-6-1) a lower alkyl group,
(1-6-2) a phenyl group optionally substituted with one or
25 more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; a lower alkoxy group
optionally substituted with one or more halogen atoms; a
phenoxy group; a benzyl group; and a benzoyl group,
30 (1-6-3) a phenyl lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a halogen atom; a lower alkyl group
optionally substituted with one or more halogen atoms; a
lower alkoxy group optionally substituted with one or more
35 halogen atoms; a phenyl group; and a phenyl lower alkoxy

group,

(1-6-4) an indanyl group, and

(1-6-5) a benzo[1,3]dioxolyl lower alkyl group,

(1-7) a pyridyl group substituted with one or more members

5 selected from the group consisting of the following (1-7-1) to
(1-7-9):

(1-7-1) a benzyloxy lower alkyl group optionally
substituted on the phenyl ring with one or more members
selected from the group consisting of a halogen atom; and a
10 lower alkyl group optionally substituted with one or more
halogen atoms,

(1-7-2) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
15 substituted with one or more halogen atoms,

(1-7-3) a benzofuryl group,

(1-7-4) a styryl group optionally substituted on the phenyl
ring with one or more lower alkyl groups optionally
substituted with one or more halogen atoms,

20 (1-7-5) a naphthyl group,

(1-7-6) a halogen atom,

(1-7-7) a pyridyl group,

(1-7-8) a benzothienyl group optionally substituted with
one or more members selected from the group consisting of a
25 halogen atom; and a lower alkyl group optionally
substituted with one or more halogen atoms, and

(1-7-9) a [1,2,3]triazolyl group optionally substituted
with one or more cyano groups,

(1-8) a piperidyl group optionally substituted with one or
30 more members selected from the group consisting of the
following (1-8-1) to (1-8-8):

(1-8-1) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
35 substituted with one or more halogen atoms,

- (1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 5 (1-8-3) a lower alkoxy-carbonyl group,
- (1-8-4) a benzoyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-8-5) a phenyl lower alkyl-carbonyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- 10 (1-8-6) a phenyl lower alkoxy-carbonyl group,
- (1-8-7) a phenoxycarbonyl group, and
- (1-8-8) a phenylsulfonyl group optionally substituted with one or more lower alkyl groups,
- 15 (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-8):
- (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- 20 (1-9-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group,
- (1-9-3) a cycloalkyl lower alkyl group,
- 25 (1-9-4) a halogen atom,
- (1-9-5) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 30 (1-9-6) a thienyl lower alkyl group,
- (1-9-7) a tetrahydrofuryl lower alkyl group, and
- (1-9-8) a benzo[1,3]dioxolyl group,
- (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the
- 35

following (1-10-1) to (1-10-7):

- (1-10-1) a halogen atom,
 - (1-10-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
 - (1-10-3) a lower alkyl group,
 - (1-10-4) a benzyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
 - (1-10-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
 - (1-10-6) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms, and
 - (1-10-7) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-11) a benzothienyl group optionally substituted with one or more members selected from the group consisting of the following (1-11-1) to (1-11-7):

- (1-11-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-11-2) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-11-3) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-11-4) a halogen atom,
- (1-11-5) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-11-6) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-11-7) a thienyl group,

5 (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-4):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or
10 more halogen atoms,

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-12-3) a lower alkyl group optionally substituted with
15 one or more halogen atoms, and

(1-12-4) a phenoxy group,

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-7):

20 (1-13-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-13-2) a pyrrolidyl group,

(1-13-3) a piperidyl group,

25 (1-13-4) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-13-5) a lower alkoxy group,

(1-13-6) a styryl group optionally substituted on the phenyl ring with one or more members selected from the
30 group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-13-7) a morpholinyl group,

(1-14) a quinolyl group substituted with one or more members selected from the group consisting of the following (1-14-1)
35 to (1-14-5):

- (1-14-1) a lower alkoxy group,
(1-14-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-14-3) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-14-4) a pyrrolidyl group, and
(1-14-5) a thienyl group,
(1-15) a 2,3-dihydro-1H-indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-15-1) to (1-15-2):
(1-15-1) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-15-2) a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-16) an imidazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-16-1) to (1-16-4):
(1-16-1) a lower alkyl group,
(1-16-2) a halogen atom,
(1-16-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-16-4) a benzyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-17) a benzothiazolyl group optionally substituted with one

or more members selected from the group consisting of the following (1-17-1) to (1-17-6):

(1-17-1) a lower alkyl group optionally substituted with one or more halogen atoms,

5 (1-17-2) a lower alkoxy group,

(1-17-3) a halogen atom,

(1-17-4) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally

10 substituted with one or more halogen atoms,

(1-17-5) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

15 (1-17-6) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-18) an isoxazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more
20 halogen atoms,

(1-19) a 2,3-dihydrobenzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-19-1) to (1-19-3):

(1-19-1) a halogen atom,

25 (1-19-2) a phenyl group optionally substituted with one or more halogen atoms, and

(1-19-3) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

30 (1-20) an isothiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more members selected from the group consisting of a halogen atom, a lower alkyl group optionally substituted with one or more halogen atoms, and a lower alkoxy group optionally substituted
35 with one or more halogen atoms,

(1-21) a dibenzofuryl group,

(1-22) a benzo[1,3]dioxolyl group optionally substituted with one or more members selected from the group consisting of the following (1-22-1) to (1-22-2):

5 (1-22-1) a halogen atom, and

(1-22-2) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-23) a carbazolyl group optionally substituted with one or
10 more lower alkyl groups,

(1-24) a naphthyl group optionally substituted with one or more benzyloxy groups optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

15 (1-25) a 2-oxo-1,2,3,4-tetrahydroquinolyl group optionally substituted with one or more benzyl groups optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-26) a 6-oxo-1,6-dihydropyrimidinyl group optionally
20 substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-27) an imidazo[1,2-a]pyridyl group optionally substituted with one or more phenyl groups optionally substituted with one
25 or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-28) a [1,3,4]oxadiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more lower alkyl groups optionally substituted with one or
30 more halogen atoms,

(1-29) a [1,2,4]thiadiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-30) a benzoxazolyl group optionally substituted with one or
35 more members selected from the group consisting of the

following (1-30-1) to (1-30-4):

(1-30-1) a lower alkyl group,

(1-30-2) a lower alkoxy group,

(1-30-3) a halogen atom, and

5 (1-30-4) a phenyl group,

(1-31) a [1,3,4]thiadiazolyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms;

(1-32) a styryl group optionally substituted on the phenyl
10 ring with one or more benzyloxy groups optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-33) a benzoyl group optionally substituted with one or more benzyloxy groups optionally substituted on the phenyl ring
15 with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

and

(1-34) a cycloalkyl group optionally substituted with one or more members selected from the group consisting of a phenyl
20 group optionally substituted with one or more members selected from the group consisting of a halogen atom and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and a benzyloxy groups optionally
25 substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms.

[0102]

R¹ is further more preferably one of the following (1-1) to (1-13):

30 (1-1) a phenyl group substituted with one or more members selected from the group consisting of the following (1-1-1) to (1-1-36):

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl
35 group of (1-1) is substituted with one or more lower alkyl

groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),
(1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),
(1-1-3) a lower alkoxy lower alkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl lower alkyl group,
(1-1-7) a cycloalkyl lower alkoxy group,
(1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably

provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

(1-1-14) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

(1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally

substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

(1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-29) a benzofuryl group,

(1-1-30) a benzofuryl lower alkoxy group,

(1-1-31) a thienyl group,

(1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted

- with one or more halogen atoms,
(1-1-34) an indolinyl lower alkyl group,
(1-1-35) a benzothienylvinyl group, and
(1-1-36) a benzo[1,3]dioxolylvinyl group optionally
5 substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms,
(1-2) a thiazolyl group substituted with one or more members
selected from the group consisting of the following (1-2-1) to
(1-2-11):
10 (1-2-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-2-2) a lower alkoxy group,
(1-2-3) a cycloalkyl group,
(1-2-4) a halogen atom,
15 (1-2-5) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,
20 (1-2-6) a styryl group optionally substituted on the phenyl
ring with one or more lower alkyl groups optionally
substituted with one or more halogen atoms,
(1-2-7) a phenoxy group optionally substituted with one or
more members selected from the group consisting of a
25 halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the
phenyl ring with one or more halogen atoms,
30 (1-2-9) a phenylthio group optionally substituted with one
or more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
substituted with one or more halogen atoms,
(1-2-10) an N-lower alkyl-N-phenyl amino group optionally
35 substituted on the phenyl ring with one or more members

selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-2-11) a pyridyl group optionally substituted with one or
5 more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the
10 following (1-3-1) to (1-3-3):

(1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
15 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1) to
20 (1-4-5):

(1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a
25 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

35 (1-4-5) a styryl group optionally substituted on the phenyl

ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following
5 (1-5-1) to (1-5-2):
 (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
 (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group
10 consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following
(1-6-1) to (1-6-3):
15 (1-6-1) a lower alkyl group,
 (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
20 (1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to
25 (1-7-3):
 (1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
30 (1-7-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
 (1-7-3) a benzofuryl group,
(1-8) a piperidyl group optionally substituted with one or
35 more members selected from the group consisting of the

following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

5 (1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following

(1-9-1) to (1-9-2):

10 (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the

15 following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

(1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

20 (1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and

30 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

35 (1-13-1) a phenyl group,

- (1-13-2) a pyrrolidinyl group, and
(1-13-3) a piperidyl group.

[0103]

In another embodiment, R¹ is further more preferably the
5 following (1-1):

(1-1) a phenyl group substituted with one or more members
selected from the group consisting of the following (1-1-1) to
(1-1-36):

- (1-1-1) a lower alkyl group optionally substituted with one
10 or more halogen atoms (preferably provided that the phenyl
group of (1-1) is substituted with one or more lower alkyl
groups, then the phenyl group of (1-1) is substituted with
additional one or more substituents),
(1-1-2) a lower alkoxy group optionally substituted with
15 one or more halogen atoms (preferably provided that the
phenyl group of (1-1) is substituted with one or more lower
alkoxy groups, then the phenyl group of (1-1) is
substituted with additional one or more substituents
excluding a lower alkoxy group and a halogen atom),
20 (1-1-3) a lower alkoxy lower alkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl lower alkyl group,
(1-1-7) a cycloalkyl lower alkoxy group,
25 (1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
(1-1-9) a halogen atom (preferably provided that the phenyl
group of (1-1) is substituted with one or more halogen
atoms, then the phenyl group of (1-1) is substituted with
additional one or more substituents excluding a phenoxy
30 group),
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
35 with one or more halogen atoms; and a lower alkoxy group

optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a halogen atom; and a lower alkyl
5 group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the
phenyl ring with one or more members selected from the
group consisting of a lower alkoxy group optionally
substituted with one or more halogen atoms; a lower alkyl
10 group optionally substituted with one or more halogen
atoms; a cyano group; and a halogen atom (preferably
provided that when the styryl group is bonded to the p-
position on the phenyl ring of (1-1), then the styryl group
is substituted on the phenyl ring with one or more members
15 selected from the group consisting of a lower alkoxy group
substituted with one or more halogen atoms; a lower alkyl
group substituted with one or more halogen atoms; and a
fluoro atom),
(1-1-14) a phenoxy group optionally substituted with one or
20 more lower alkyl groups optionally substituted with one or
more halogen atoms (preferably provided that the phenyl
group of (1-1) is substituted with one or more phenoxy
groups, then the phenyl group of (1-1) is substituted with
additional one or more substituents excluding a halogen
25 atom),
(1-1-15) a phenoxy lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a lower alkyl group optionally
substituted with one or more halogen atoms; and a lower
30 alkoxy group optionally substituted with one or more
halogen atoms,
(1-1-16) a phenyl lower alkoxy group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a halogen atom; a lower alkoxy
35 group; and a lower alkyl group optionally substituted with

one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

5 (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

10 (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

15 (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

20 (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

25 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms

(preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

30 (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

35 (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups

- optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one
or more lower alkyl groups optionally substituted with one
or more halogen atoms,
5 (1-1-28) a benzoxazolyl group optionally substituted on the
phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl lower alkoxy group,
(1-1-31) a thienyl group,
10 (1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted
with one or more halogen atoms,
(1-1-34) an indolinyl lower alkyl group,
(1-1-35) a benzothienylvinyl group, and
15 (1-1-36) a benzo[1,3]dioxolylvinyl group optionally
substituted on the benzo[1,3]dioxole ring with one or more
halogen atoms.

[0104]

In another embodiment, R^1 is further more preferably one
20 of the following (1-2) to (1-13):

(1-2) a thiazolyl group substituted with one or more members
selected from the group consisting of the following (1-2-1) to
(1-2-11):

- (1-2-1) a lower alkyl group optionally substituted with one
25 or more halogen atoms,
(1-2-2) a lower alkoxy group,
(1-2-3) a cycloalkyl group,
(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or
30 more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,
(1-2-6) a styryl group optionally substituted on the phenyl
35 ring with one or more lower alkyl groups optionally

- substituted with one or more halogen atoms,
(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
(1-3-1) a lower alkyl group,
(1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):
(1-4-1) a lower alkyl group optionally substituted with one

- or more halogen atoms,
- (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-2):
- (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
- (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):
- (1-6-1) a lower alkyl group,
- (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups

optionally substituted with one or more halogen atoms,
(1-7) a pyridyl group substituted with one or more members
selected from the group consisting of the following (1-7-1) to
(1-7-3):

5 (1-7-1) a benzyloxy lower alkyl group optionally
substituted on the phenyl ring with one or more lower alkyl
groups optionally substituted with one or more halogen
atoms,

(1-7-2) a phenyl group optionally substituted with one or
10 more lower alkyl groups optionally substituted with one or
more halogen atoms, and

(1-7-3) a benzofuryl group,
(1-8) a piperidyl group optionally substituted with one or
more members selected from the group consisting of the
15 following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl
20 ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or more
members selected from the group consisting of the following
(1-9-1) to (1-9-2):

(1-9-1) a lower alkyl group optionally substituted with one
25 or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or
more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or
more members selected from the group consisting of the
30 following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

(1-10-2) a phenyl group optionally substituted with one or
more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or
35 more phenyl groups optionally substituted with one or more

halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

5 (1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

10 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

15 (1-13-2) a pyrrolidinyl group, and

(1-13-3) a piperidyl group.

[0105]

In another embodiment, R¹ is further more preferably the following (1-2):

20 (1-2) a thiazolyl group substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):

(1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

25 (1-2-2) a lower alkoxy group,

(1-2-3) a cycloalkyl group,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

30 (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

[0106]

In another embodiment, R^1 is further more preferably the following (1-3):

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):

(1-3-1) a lower alkyl group,
(1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms.

[0107]

In another embodiment, R^1 is further more preferably the

following (1-5):

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-2):

- 5 (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group
10 optionally substituted with one or more halogen atoms.
[0108]

In another embodiment, R^1 is further more preferably the following (1-13):

(1-13) a pyrimidinyl group optionally substituted with one or
15 more members selected from the group consisting of the following (1-13-1) to (1-13-3):

- (1-13-1) a phenyl group,
(1-13-2) a pyrrolidinyl group, and
(1-13-3) a piperidyl group.

20 [0109]

R^1 is still more preferably one of the following (1-1) to (1-7), (1-9), (1-10), (1-12) and (1-13):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of

- 25 (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),
30 (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents
35 excluding a lower alkoxy group and a halogen atom),

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

(1-1-14) a phenoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

5 (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

10 (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

15 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

20 (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

25 (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

30 (1-1-31) a thienyl group,

(1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,

(1-1-35) a benzothienylvinyl group, and

35 (1-1-36) a benzo[1,3]dioxolylvinyl group optionally

substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of

5 (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a
10 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and

(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a
15 halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

(1-3-1) a lower alkyl group,

20 (1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

25 (1-4) a thienyl group substituted with one or more members selected from the group consisting of

(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

30 (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl
35 ring with one or more members selected from the group

- consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of
- 5 (1-6-1) a lower alkyl group, and
- (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 10 (1-7) a pyridyl group substituted with one or more members selected from the group consisting of
- (1-7-3) a benzofuryl group,
- (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of
- 15 (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of
- (1-10-2) a phenyl group optionally substituted with one or
- 20 more halogen atoms,
- (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of
- (1-12-2) a benzyloxy group optionally substituted on the
- 25 phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of
- (1-13-1) a phenyl group,
- 30 (1-13-2) a pyrrolidyl group, and
- (1-13-3) a piperidyl group.

[0110]

In another embodiment, R¹ is still more preferably the following (1-1):

- 35 (1-1) a phenyl group substituted with one or more members

selected from the group consisting of

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group optionally substituted with one or more halogen atoms; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members

selected from the group consisting of a lower alkoxy group substituted with one or more halogen atoms; a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

5 (1-1-14) a phenoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

10 (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more
15 halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

20 (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower
25 alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms

30 (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

(1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with
35 one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one
5 or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted
10 with one or more halogen atoms,
(1-1-35) a benzothienylvinyl group, and
(1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms.

15 [0111]

In another embodiment, R¹ is still more preferably one of the following (1-2) to (1-7), (1-9), (1-10), (1-12) and (1-13):

(1-2) a thiazolyl group substituted with one or more members
20 selected from the group consisting of
(1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or
25 more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or
30 more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of
35 (1-3-1) a lower alkyl group,

- (1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-4) a thienyl group substituted with one or more members selected from the group consisting of
(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of
(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of
(1-6-1) a lower alkyl group, and
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-7) a pyridyl group substituted with one or more members selected from the group consisting of
(1-7-3) a benzofuryl group,
- (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of
(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of
(1-10-2) a phenyl group optionally substituted with one or

more halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of

5 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of

10 (1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

(1-13-3) a piperidyl group.

[0112]

In another embodiment, R¹ is still more preferably the following (1-2):

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of

(1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,

20 (1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms, and
25 (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

30 [0113]

In another embodiment, R¹ is still more preferably the following (1-3):

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

35 (1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
5 substituted with one or more halogen atoms.

[0114]

In another embodiment, R^1 is still more preferably the
following (1-5):

(1-5) a furyl group optionally substituted with one or more
10 members selected from the group consisting of
(1-5-1) a phenyl group optionally substituted with one or
more halogen atoms, and
(1-5-2) a styryl group optionally substituted on the phenyl
ring with one or more members selected from the group
15 consisting of a halogen atom; and a lower alkyl group
optionally substituted with one or more halogen atoms.

[0115]

In another embodiment, R^1 is still more preferably the
following (1-13):

20 (1-13) a pyrimidinyl group optionally substituted with one or
more members selected from the group consisting of
(1-13-1) a phenyl group,
(1-13-2) a pyrrolidyl group, and
(1-13-3) a piperidyl group.

25 [0116]

In another embodiment, R^1 is preferably is one of the
following (1-1) to (1-13):

(1-1) a phenyl group optionally substituted with one or more
members selected from the group consisting of the following
30 (1-1-1) to (1-1-34):
(1-1-1) a lower alkyl group optionally substituted with one
or more halogen atoms (preferably provided that the phenyl
group of (1-1) is substituted with one or more lower alkyl
groups, then the phenyl group of (1-1) is substituted with
35 additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),
(1-1-3) a lower alkoxy lower alkyl group,
(1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl lower alkyl group,
(1-1-7) a cycloalkyl lower alkoxy group,
(1-1-8) a cycloalkyl lower alkoxy lower alkyl group,
(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkoxy group; a lower alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more members

selected from the group consisting of a lower alkyl group substituted with one or more halogen atoms; and a fluoro atom),

(1-1-14) a phenoxy group optionally substituted with one or
5 more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen
10 atom),

(1-1-15) a phenoxy lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally substituted with one or more halogen atoms; and a lower
15 alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy
20 group; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio lower alkyl group optionally
25 substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more
30 halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen
atoms,

35 (1-1-21) a pyridyl group optionally substituted with one or

- more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),
- (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-29) a benzofuryl group,
- (1-1-30) a benzofuryl lower alkoxy group,
- (1-1-31) a thienyl group,
- (1-1-32) a benzothienyl group,
- (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms, and
- (1-1-34) an indolinyl lower alkyl group,
- (1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of the

following (1-2-1) to (1-2-11):

- (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-2) a lower alkoxy group,
- 5 (1-2-3) a cycloalkyl group,
- (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted
- 10 with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 15 (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- 20 (1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally
- 25 substituted with one or more halogen atoms,
- (1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more
- 30 halogen atoms, and
- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 35 (1-3) an oxazolyl group optionally substituted with one or

more members selected from the group consisting of the following (1-3-1) to (1-3-3):

(1-3-1) a lower alkyl group,

(1-3-2) a cycloalkyl group, and

5 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

10 (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):

(1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,

15 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

25 (1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

30 (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

35 (1-5-2) a styryl group optionally substituted on the phenyl

ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):

- (1-6-1) a lower alkyl group,
 - (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
 - (1-6-3) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-7) a pyridyl group optionally substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-2):

- (1-7-1) a benzyloxy lower alkyl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-7-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

- (1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

- (1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
- (1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

- (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-2):

(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

5 (1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more

10 halogen atoms,

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or
15 more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

20 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

25 (1-13-3) a piperidyl group.

[0117]

In the above-mentioned embodiment, R¹ is more preferably one of the following (1-1) to (1-5):

(1-1) a phenyl group optionally substituted with one or more
30 members selected from:

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with
35 additional one or more substituents),

- (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),
- (1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),
- (1-1-11) a phenyl group optionally substituted with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,
- (1-1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-13) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more lower alkyl groups substituted with one or more halogen atoms),
- (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups

- optionally substituted with one or more halogen atoms
(preferably a pyridylvinyl group substituted on the
pyridine ring with one or more lower alkyl groups
optionally substituted with one or more halogen atoms),
5 (1-1-25) a pyrimidinyl group optionally substituted with
one or more lower alkyl groups optionally substituted with
one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on
the pyrimidine ring with one or more lower alkyl groups
10 optionally substituted with one or more halogen atoms,
(1-1-31) a thienyl group, and
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted
with one or more halogen atoms,
(1-2) a thiazolyl group optionally substituted with one or
15 more members selected from:
(1-2-1) a lower alkyl group optionally substituted with one
or more halogen atoms,
(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or
20 more members selected from the group consisting of a
halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or
25 more lower alkyl groups optionally substituted with one or
more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or
more members selected from:
(1-3-1) a lower alkyl group,
30 (1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
halogen atom; and a lower alkyl group optionally
substituted with one or more halogen atoms,
35 (1-4) a thienyl group optionally substituted with one or more

members selected from:

(1-4-2) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

5 (1-5) a furyl group optionally substituted with one or more members selected from:

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms.

[0118]

10 In another embodiment, R^1 is preferably one of the following (1-1) to (1-12):

(1-1) a phenyl group optionally substituted with one or more members selected from the group consisting of the following (1-1-1) to (1-1-34):

15 (1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

20 (1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents
25 excluding a lower alkoxy group and a halogen atom),

(1-1-3) a lower alkoxy lower alkyl group,

(1-1-4) a cycloalkyl group,

(1-1-5) a cycloalkoxy group,

(1-1-6) a cycloalkyl lower alkyl group,

30 (1-1-7) a cycloalkyl lower alkoxy group,

(1-1-8) a cycloalkyl lower alkoxy lower alkyl group,

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with
35 additional one or more substituents excluding a phenoxy

group),
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or
more members selected from the group consisting of a
5 halogen atom; a lower alkyl group optionally substituted
with one or more halogen atoms; and a lower alkoxy group
optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
10 the group consisting of a halogen atom; and a lower alkyl
group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the
phenyl ring with one or more members selected from the
group consisting of a lower alkoxy group; a lower alkyl
15 group optionally substituted with one or more halogen
atoms; a cyano group; and halogen atoms (preferably
provided that when the styryl group is bonded to the p-
position on the phenyl ring of (1-1), then the styryl group
is substituted on the phenyl ring with one or more members
20 selected from the group consisting of a lower alkyl group
substituted with one or more halogen atoms; and a fluoro
atom),
(1-1-14) a phenoxy group optionally substituted with one or
more lower alkyl groups optionally substituted with one or
25 more halogen atoms (preferably provided that the phenyl
group of (1-1) is substituted with one or more phenoxy
groups, then the phenyl group of (1-1) is substituted with
additional one or more substituents excluding a halogen
atom),
30 (1-1-15) a phenoxy lower alkyl group optionally substituted
on the phenyl ring with one or more members selected from
the group consisting of a lower alkyl group optionally
substituted with one or more halogen atoms; and a lower
alkoxy group optionally substituted with one or more
35 halogen atoms,

- (1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a lower alkoxy group; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,
- (1-1-18) a benzylthio lower alkyl group optionally substituted on the phenyl ring with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,
- (1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-22) a pyridyl lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),
- (1-1-25) a pyrimidinyl group optionally substituted with

- one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-29) a benzofuryl group,
- (1-1-30) a benzofuryl lower alkoxy group,
- (1-1-31) a thienyl group,
- (1-1-32) a benzothienyl group,
- (1-1-33) a 2,2-difluorobenzo[1,3]dioxolyl group, and
- (1-1-34) an indolinyl lower alkyl group,
- (1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):
- (1-2-1) a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-2-2) a lower alkoxy group,
- (1-2-3) a cycloalkyl group,
- (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
- (1-2-6) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted

with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
5 (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-2-10) an N-lower alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members
10 selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or
15 more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the
20 following (1-3-1) to (1-3-3):
 (1-3-1) a lower alkyl group,
 (1-3-2) a cycloalkyl group, and
 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
25 halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,
(1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following
30 (1-4-1) to (1-4-5):
 (1-4-1) a lower alkyl group optionally substituted with one or more halogen atoms,
 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a
35 halogen atom; a lower alkyl group optionally substituted

with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

5 (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

10 (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following

15 (1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally

20 substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following

(1-6-1) to (1-6-3):

(1-6-1) a lower alkyl group,

25 (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms, and

(1-6-3) a benzyl group optionally substituted on the phenyl
30 ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-7) a pyridyl group optionally substituted with one or more members selected from the group consisting of the following

(1-7-1) to (1-7-2):

35 (1-7-1) a benzyloxy lower alkyl group optionally

substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-7-2) a phenyl group optionally substituted with one or
5 more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

10 (1-8-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

15 (1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-2):

(1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and

20 (1-9-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

25 (1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms, and

(1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the
30 group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms; and

35 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally

substituted with one or more halogen atoms.

[0119]

In another embodiment, R¹ is preferably one of the following (1-1) to (1-6), (1-9) and (1-12):

5 (1-1) a phenyl group optionally substituted with one or more members selected from the group consisting of

(1-1-1) a lower alkyl group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),

(1-1-2) a lower alkoxy group optionally substituted with one or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom),

(1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group optionally substituted with one or more halogen atoms,

(1-1-12) a phenyl lower alkyl group (preferably benzyl, 2-phenylethyl) optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a lower alkyl group optionally

substituted with one or more halogen atoms; and a cyano group (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more lower alkyl groups substituted with one or more halogen atoms),

(1-1-14) a phenoxy group (preferably provided that the phenyl group of (1-1) is substituted with one or more phenoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a halogen atom),

(1-1-16) a phenyl lower alkoxy group (preferably benzyloxy) optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-lower alkyl-N-phenyl amino lower alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-lower alkyl amino group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

- (1-1-25) a pyrimidinyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on
5 the pyrimidine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-27) a piperidyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
- 10 (1-1-31) a thienyl group, and
- (1-1-33) a 2,2-difluorobenzo[1,3]dioxolyl group,
- (1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of
- (1-2-1) a lower alkyl group,
- 15 (1-2-4) a halogen atom,
- (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group
- 20 optionally substituted with one or more halogen atoms, and
- (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- 25 (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of
- (1-3-1) a lower alkyl group,
- (1-3-2) a cycloalkyl group, and
- (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
- 30 halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of
- 35 (1-4-2) a phenyl group optionally substituted with one or

- more lower alkyl groups optionally substituted with one or more halogen atoms,
- (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of
- 5 (1-5-1) a phenyl group optionally substituted with one or more halogen atoms,
- (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of
- (1-6-1) a lower alkyl group, and
- 10 (1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms,
- (1-9) an indolyl group optionally substituted with one or more
- 15 members selected from the group consisting of
- (1-9-1) a lower alkyl group optionally substituted with one or more halogen atoms, and
- (1-12) a phenyl lower alkyl group optionally substituted on the phenyl ring with one or more members selected from the
- 20 group consisting of
- (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms.

[0120]

- 25 In another embodiment, R¹ is preferably one of the following (1-1) to (1-3):
- (1-1) a phenyl group optionally substituted with one or more members selected from the group consisting of
- (1-1-1) a lower alkyl group optionally substituted with one
- 30 or more halogen atoms (preferably provided that the phenyl group of (1-1) is substituted with one or more lower alkyl groups, then the phenyl group of (1-1) is substituted with additional one or more substituents),
- (1-1-2) a lower alkoxy group (preferably provided that the
- 35 phenyl group of (1-1) is substituted with one or more lower

alkoxy groups, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a lower alkoxy group and a halogen atom), (1-1-9) a halogen atom (preferably provided that the phenyl group of (1-1) is substituted with one or more halogen atoms, then the phenyl group of (1-1) is substituted with additional one or more substituents excluding a phenoxy group),

(1-1-11) a phenyl group optionally substituted with one or more lower alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably provided that when the styryl group is bonded to the p-position on the phenyl ring of (1-1), then the styryl group is substituted on the phenyl ring with one or more lower alkyl groups substituted with one or more halogen atoms),

(1-1-16) a phenyl lower alkoxy group optionally substituted on the phenyl ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy lower alkyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms (preferably a pyridylvinyl group substituted on the pyridine ring with one or more lower alkyl groups optionally substituted with one or more halogen atoms),

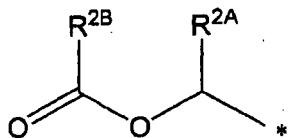
(1-1-25) a pyrimidinyl group optionally substituted with

one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more lower alkyl groups
5 optionally substituted with one or more halogen atoms, and
(1-1-33) a 2,2-difluorobenzo[1,3]dioxolyl group,
(1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of
(1-2-1) a lower alkyl group,
10 (1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a lower alkyl group optionally substituted with one or more halogen atoms; and a lower alkoxy group
15 optionally substituted with one or more halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms, and
(1-3) an oxazolyl group optionally substituted with one or
20 more members selected from the group consisting of
(1-3-1) a lower alkyl group,
(1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
25 halogen atom; and a lower alkyl group optionally substituted with one or more halogen atoms.

[0121]

R^2 is preferably one of the following (2-1) to (2-4):
(2-1) a lower alkyl group optionally substituted with one or
30 more members selected from the group consisting of a hydroxy group; and a phenyl group optionally substituted with one or more lower alkyl groups optionally substituted with one or more halogen atoms,
(2-2) a 2-oxo-1,3-dioxolanyl group, and
35 (2-3) a group represented by the formula:

[0122]



[0123]

wherein

5 * is a bonding site;

R^{2A} is one of the following (2A-1) to (2A-2):

(2A-1) a hydrogen atom, and

(2A-2) a lower alkyl group; and

R^{2B} is one of the following (2B-1) to (2B-6):

10 (2B-1) a lower alkoxy group optionally substituted with one or more members selected from the group consisting of a lower alkoxy group; a carboxy group; a lower alkoxy-carbonyl group; a hydroxy group; a phenyl lower alkoxy-carbonyl group; a lower alkenyloxy-carbonyl group; a morpholinyl group; a benzyloxycarbonyl group; and a
15 tetrahydropyran-2-yloxy group,

(2B-2) a lower alkyl group;

(2B-3) a lower alkylamino group optionally substituted with one or more lower alkoxy-carbonyl groups;

20 (2B-4) a cycloalkyl group;

(2B-5) a cycloalkoxy group; and

(2B-6) a phenyl group,

(2-4) a hydrogen atom.

[0124]

25 R² is more preferably one of the following groups:

a hydrogen atom;

a 1-(((2-carboxy-2,2-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-carboxy-1,1-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-hydroxyethoxy)carbonyl)oxy)ethyl group;

30 a 1-(butyryloxy)ethyl group;

a 1-(isobutyryloxy)ethyl group;

an acetoxymethyl group; and

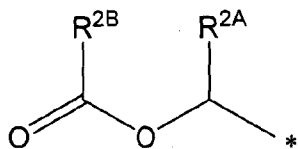
a butyryloxymethyl group.

[0125]

In another embodiment, R² is preferably
a hydrogen atom, or

5 a group represented by the formula:

[0126]



[0127]

wherein

10 * is a bonding site;

R^{2A} is one of the following (2A-1) to (2A-2):

(2A-1) a hydrogen atom, and

(2A-2) a lower alkyl group; and

R^{2B} is one of the following (2B-1) to (2B-2):

15 (2B-1) a lower alkoxy group optionally substituted with one
or more members selected from the group consisting of a
carboxy group; a lower alkoxy-carbonyl group; a hydroxy
group; a phenyl lower alkoxy-carbonyl group; a lower
alkenyloxy-carbonyl group; and a tetrahydropyran-2-yloxy
20 group, and

(2B-2) a lower alkyl group.

[0128]

Compound (1) excludes the following compounds:

5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;

25 5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-
carbonitrile;

5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

30 5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

methyl 4-[4-(4-cyano-1,2,3-triazol-5-yl)styryl]benzoate;

5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

- 5-{4-[4-(*N,N*-dimethylamino)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[2-(biphenyl-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5 5-{4-[4-(2-oxo-2*H*-chromen-3-yl)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[4-(benzo[d]oxazol-2-yl)styryl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[2-(2-methoxynaphthalen-1-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 10 triazole-4-carbonitrile;
- 5-{4-[2-(4-methoxynaphthalen-1-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 15 5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 5-[4-(4-formylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
- 20 5-{4-[2-(4'-formylbiphenyl-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
- 4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
- 4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
- 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
- 25 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
- 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
- 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
- (5-(5-cyano-1,2,3-triazol-4-yl)furan-2-yl)methyl acetate;
- 2-[4-(4'-benzoxazole-2-yl-stilbene-4-yl)-5-cyano-1,2,3-triazole-*N*-yl]acetic acid methyl ester;
- 30 triazole-*N*-yl]acetic acid methyl ester;
- 4-(4-(4-(1*H*-benzo[d]imidazol-2-yl)styryl)phenyl)-*N*-trityl-1,2,3-triazole-5-carbonitrile;
- 2-(4-(4-(4-(1*H*-benzo[d]imidazol-2-yl)styryl)phenyl)-5-cyano-1,2,3-triazol-*N*-yl)acetamide;
- 35 2-(4-(4-(4-(1*H*-benzo[d]imidazol-2-yl)styryl)phenyl)-5-cyano-

1,2,3-triazol-N-yl)acetic acid;
4-(4-(4-(1H-benzo[d]imidazol-2-yl)styryl)phenyl)-N-(2-oxo-2-phenylethyl)-1,2,3-triazole-5-carbonitrile; and
4-(4'-benzoxazole-2-yl-stilbene-4-yl)-5-cyano-N-acetamide-
5 1,2,3-triazole;
and salts thereof.

[0129]

Compound (1) is preferably Compound (1aa) or Compound (1bb).

10 Compound (1aa) excludes the following compounds:

5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-
15 carbonitrile;
5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-
20 carbonitrile;
5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
25 4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
30 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
35 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;

4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole; and
4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile; and
4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
5 and salts thereof.

[0130]

Table 1 lists abbreviations, symbols and terms used in
the preparations, Reference Examples, Examples, and Formulae
in the above and subsequent descriptions of the present
10 specification (including the tables) have the following
meanings.

Table 1 List of Abbreviation

[0131]

Abbreviation	Description
AcOEt	ethyl acetate
AcOK	potassium acetate
AcOH	acetic acid
BF ₃	boron trifluoride
BINAP	2,2'-bis(diphenylphosphino)-1,1'-binaphthyl
DEAD	diethyl azodicarboxylate
DMF	<i>N,N</i> -dimethylformamide
DIPEA	<i>N,N</i> -diisopropylethylamine
DMA	dimethylacetamide
DME	1,2-dimethoxyethane
DMSO	dimethyl sulfoxide
Et ₂ O	diethyl ether
Et ₃ N	triethylamine
EtOH	ethyl alcohol
IBX	2-iodoxybenzoic acid
MeOH	methyl alcohol
MsCl	methanesulfonyl chloride
MeI	iodomethane
<i>n</i> -BuLi	<i>n</i> -butyllithium
NBS	<i>N</i> -bromosuccinimide
NCS	<i>N</i> -chlorosuccinimide
NMP	<i>N</i> -methylpyrrolidone
Pd(OAc) ₂	palladium(II) acetate
Pd(PPh ₃) ₄	tetrakis(triphenylphosphine)palladium(0)
Pd/C	palladium on carbon
PPh ₃	triphenylphosphine
SO ₃ Py	sulfur trioxide pyridine complex
TBME	tert-butyl methyl ether
TFA	trifluoroacetic acid
THF	tetrahydrofuran
tert-BuONa	sodium tert-butoxide

Ref. Ex. No.	Reference Example Number
Ex. No.	Example Number
STR	structure
m. p.	melting point
MS (M+H)	Mass spectrum data

[0132]

Compound (1) can be produced according to, for example, Reaction Schemes 1 to 7. However these reaction schemes are given for just example, and those skilled in the art will readily understand that these reaction schemes are not limited to the disclosed embodiment and that known variations and modifications can be used for these reaction schemes without departing from the scope and spirit of the present invention.

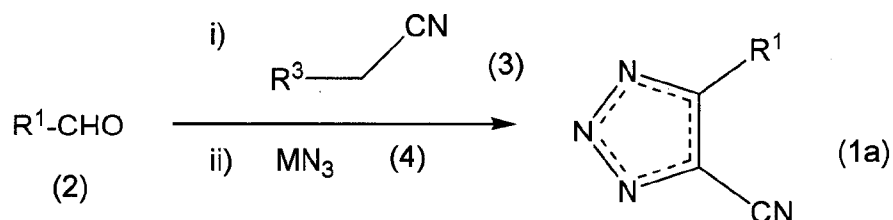
All the starting materials and target compounds shown in Reaction Schemes 1 to 7 may be in the form of suitable salts. Examples of such salts are as described for Compound (1) below.

[0133]

Compound (1a), which is Compound (1) wherein R² is a hydrogen atom, can be produced according to the following Reaction Scheme 1.

[0134]

Reaction Scheme 1



[0135]

wherein R¹ is as defined above; R³ is benzenesulfonyl, nitro, etc; and MN₃ is sodium azide, lithium azide, potassium azide, trimethylsilyl azide, etc.

Compound (1a) can be produced by subjecting Compound (2) and Compound (3) to the Knoevenagel condensation in a suitable solvent, in the presence of a catalyst, and then subjecting

the resulting compound to 1,3-dipolar addition with Compound (4), or by reacting Compound (2), Compound (3) and Compound (4) in a suitable solvent without catalyst.

Examples of the solvent include water, methanol, ethanol, *N,N*-dimethylformamide, *N*-methylpyrrolidone, acetonitrile, acetone, ethyl acetate, diethyl ether, tetrahydrofuran, hexane, benzene, toluene, mixed solvents thereof, etc.

Examples of the catalyst include piperidine, pyridine, acetic acid, benzoic acid, *p*-toluene sulfonic acid, sodium hydroxide, aluminum oxide, potassium fluoride, potassium acetate, *N*-benzyl-*N,N,N*-triethylammonium chloride, tetrabutylammonium fluoride, mixed catalysts thereof, etc.

Compound (3) is usually used in an amount of at least about 1 mol, preferably about 1 to 2 mol, per 1 mol of Compound (2).

Compound (4) is usually used in an amount of at least 1 mol, preferably about 1 to 2 mol, per 1 mol of Compound (2).

The catalyst is usually used in an amount of about 0.1 to 2 mol, preferably about 0.5 to 1 mol, per 1 mol of Compound (2).

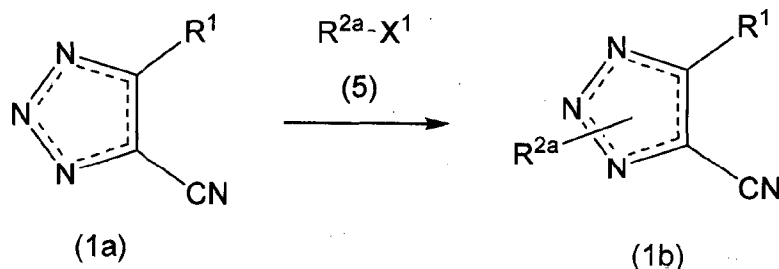
The reaction is usually carried out at about room temperature to 150°C, preferably about 80 to 110°C. The reaction is usually finished in about 1 to 12 hours.

[0136]

Compound (1b), which is Compound (1) wherein R^2 is not a hydrogen atom, can be produced according to the following Reaction Scheme 2.

[0137]

Reaction Scheme 2



[0138]

wherein R^1 is as defined above; R^{2a} is a lower alkyl group or a heterocyclyl group, each of which is optionally substituted; and X^1 is a leaving group.

5 Examples of the leaving group for X^1 include a halogen atom, a lower alkanesulfonyloxy group optionally substituted with one or more halogen atoms (e.g., methanesulfonyloxy, trifluoromethanesulfonyloxy), an arenesulfonyloxy group (e.g., benzenesulfonyloxy) and the like, in which preferred is a
10 halogen atom.

Compound (1b) can be produced by reacting Compound (1a) with Compound (5) in a suitable solvent, in the presence of a base.

Examples of the solvent include *N,N*-dimethylformamide, *N*-
15 methylpyrrolidone, acetonitrile, acetone, ethyl acetate, diethyl ether, tetrahydrofuran, hexane, benzene, toluene, mixed solvents thereof, etc.

Examples of the base include sodium carbonate, sodium bicarbonate, sodium hydride, potassium *tert*-butoxide,
20 triethylamine, diisopropylethylamine, 4-dimethylaminopyridine, etc.

Compound (5) is usually used in an amount of at least about 1 mol, preferably about 1 to 2 mol, per 1 mol of Compound (1a).

25 The base is usually used in an amount of at least about 1 mol, preferably about 1 to 2 mol, per 1 mol of Compound (1a).

The reaction is usually carried out at about room temperature to 150°C, preferably about 40 to 100°C. The reaction is usually finished in about 1 to 24 hours.

30 When R^{2a} has carboxy group(s) and/or hydroxy group(s), a protecting group generally used in peptide chemistry and the like may be introduced into these groups. After the reaction, the objective compound can be obtained by removing the protecting group according to a method known per se.

35 Examples of the carboxy-protecting group include a benzyl

group, an allyl group, a tert-butyl group, etc.

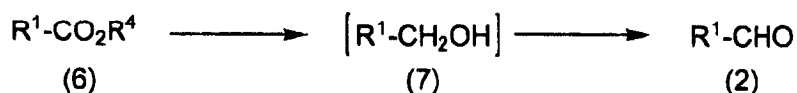
Examples of the hydroxy-protecting group include a tetrahydropyran-2-yl group, etc.

[0139]

5 Compound (2) can be produced according to one of the following non-limiting Reaction Schemes 3 to 7, or the like.

[0140]

Reaction Scheme 3



10 [0141]

wherein R^1 is as defined above; and R^4 is a hydrogen atom, an alkyl group, an aryl group or an acyl group.

The reaction for producing Compound (2) or Compound (7) from Compound (6) can be carried out in a suitable solvent, in
15 the presence of a suitable reducing agent.

Examples of the solvent include diethyl ether, dimethoxyethane, dioxane, methanol, ethanol, tetrahydrofuran, hexane, toluene, dichloromethane, 1,2-dichloroethane, mixed solvents thereof, etc.

20 Examples of the reducing agent include hydride reducing agents such as borane, sodium borohydride, lithium aluminium hydride, diisobutylaluminum hydride, sodium bis(2-methoxyethoxy)aluminum hydride, etc.

The reducing agent is usually used in an amount of at
25 least 0.25 to 10 mol, preferably about 1 to 5 mol, per 1 mol of Compound (6).

The reaction is usually carried out at about -78 to 100°C , preferably about -78 to 70°C . The reaction is usually finished in about 1 to about 12 hours.

30 The reaction for producing Compound (2) from Compound (7) can be carried out in a suitable solvent, in the presence of an oxidizing agent.

Examples of the solvent include *N,N*-dimethylformamide,

dimethyl sulfoxide, ethyl acetate, dioxane, acetonitrile, acetone, dichloromethane, 1,2-dichloroethane, chloroform, mixed solvents thereof, etc.

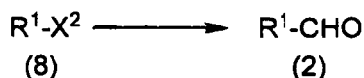
Examples of the oxidizing agent include pyridinium
5 dichlorochlomite, manganese(IV) oxide, 2,2,6,6-tetramethylpiperidine 1-oxyl (TEMPO) - oxidizing agents (sodium hypochlorite - potassium bromide, bromine, iodine, sodium nitrite, oxygen, etc.), 2-iodoxybenzoic acid, Dess-Martin reagent, dimethylsulfoxide (Swern oxidation, etc.), etc.

10 The oxidizing agent is usually used in an amount of at least 1 mol, preferably about 1 to 2 mol, per 1 mol of Compound (7).

The reaction is usually carried out at about -100 to 100°C, preferably about -80 to 70°C. The reaction is usually
15 finished in about 1 to about 12 hours.

[0142]

Reaction Scheme 4



[0143]

20 wherein R¹ is as defined above; and X² is a halogen atom.

The reaction for producing Compound (2) from Compound (8) can be carried out by subjecting Compound (8) to a formylation reaction.

This formylation reaction can be carried out in a
25 suitable solvent, in the presence of an organometal reagent and a formylating reagent.

Examples of the solvent include diethyl ether, tetrahydrofuran, toluene, hexane, pentane, mixed solvents thereof, etc.

30 Examples of the organometal reagent include organolithium reagents (n-butyllithium, etc), organo magnesium reagents (ethylmagnesium bromide, isopropylmagnesium chloride, etc.), etc.

Examples of the formylating reagent include N,N-

dimethylformamide, 1-formylpiperidine, 4-formylraorpholine, etc.

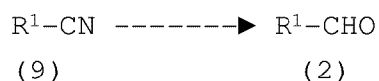
The organometal reagent is usually used in an amount of 1 mol per 1 mol of Compound (8) .

5 The formylating reagent is usually used in an amount of at least 1 mol, preferably about 5 to 20 mol, per 1 mol of Compound (8) .

The reaction is usually carried out at about -150 to 0 °C, preferably about -90 to -40°C. The reaction is usually
10 finished in about 1 to about 6 hours.

[0144]

Reaction Scheme 5



15 [0145]

wherein R¹ is as defined above.

The reaction for producing Compound (2) from Compound (9) can be carried out in a suitable solvent, in the presence of a catalytic hydrogenation reducing agent.

20 Examples of the solvent include tetrahydrofuran, acetic acid, formic acid, water, mixed solvents thereof, etc. Examples of the catalytic hydrogenation reducing agent include Raney™ nickel, etc.

The catalytic hydrogenation reducing agent is usually
25 used in an amount of 0.3 to 5 mol per 1 mol of Compound (9) . The reaction is usually carried out at about 60 to 150°C, preferably about 90 to 110°C. The reaction is usually finished in about 1 to about 5 hours.

The reaction for producing Compound (2) from Compound
30 (9) can also be carried out in a suitable solvent in the presence of a reducing agent.

Examples of solvent include tetrahydrofuran, toluene, dichloromethane, 1, 2-dichloroethane, mixed solvents thereof, etc .

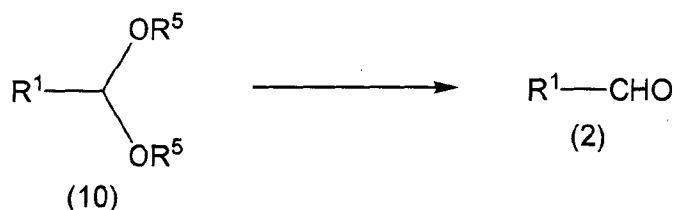
35 Examples of the reducing agent include diisobutylaluminium hydride, etc.

The reducing agent is usually used in an amount of at least 0.25 mol to 5 mol, preferably about 0.25 to 2 mol, per 1 mol of Compound (9).

The reaction is usually carried out at about -150 to 0 °C, preferably about -90 to -40°C. The reaction is usually finished in about 1 to about 5 hours.

[0146]

Reaction Scheme 6



10 [0147]

wherein R¹ is as defined above; and R⁵ is a lower alkyl group.

The reaction for producing Compound (2) from Compound (10) can be carried out in a suitable solvent, in the presence of an acid.

15 Examples of the solvent include water, diethyl ether, dioxane, tetrahydrofuran, acetonitrile, ethyl acetate, acetone, N,N-dimethylformamide, metanol, ethanol, dichloromethane, toluene, etc.

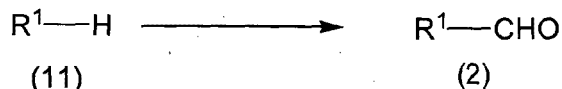
Examples of the acid include inorganic acids such as 20 hydrochloric acid, sulfuric acid, acetic acid, methanesulfonic acid, p-toluenesulfonic acid, trifluoroacetic acid, hydrochloric acid, etc.

The acid is usually used in an amount of 0.1 to 100 mol, preferably about 1 to 30 mol, per 1 mol of Compound (10).

25 The reaction is usually carried out at about 0 to 100°C. The reaction is usually finished in about 0.5 to about 12 hours.

[0148]

Reaction Scheme 7



30

[0149]

wherein R¹ is as defined above.

Compound (2) can be produced by subjecting Compound (11) to the Vilsmeier-Haack reaction in a suitable solvent, in the presence of the Vilsmeier reagent produced by a *N,N*-dimethylformamide and phosphorus oxychloride, etc.

Examples of the solvent include dichloromethane, chloroform, tetrachloromethane, 1,2-dichloroethane, *N,N*-dimethylformamide, toluene, etc.

The Vilsmeier reagent is usually used in an amount of 1-5 mol, preferably about 1 to 2 mol, per 1 mol of Compound (11).

The reaction is usually carried out at about 0 to 100 °C. The reaction is usually finished in about 0.5 to about 12 hours.

[0150]

Compound (1), intermediate compounds therefor and starting compounds therefor can be produced according to the above-mentioned reaction schemes. They can also be produced according to the synthesis methods described in the Reference Examples and Examples of the present specification and in consideration of the techniques known at the time of filing of the present application or known techniques.

The starting compounds and intermediate compounds shown in the above-mentioned reaction schemes can be subjected, where necessary before being applied to reactions, to protection of a functional group with a suitable protecting group by a known method, and to deprotection of the protecting group by a known method after completion of the reaction.

In addition, compounds in the form in which a solvate (for example, hydrate, ethanolate, etc.) was added to the starting material compounds and object compounds shown in each of the reaction formula are included in each of the formula.

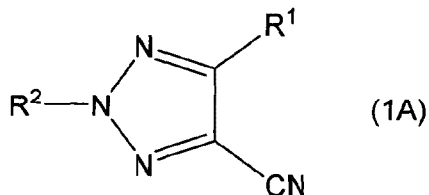
Compound (1) encompasses isomers such as optical isomers, stereoisomers, positional isomers, rotational isomers and the like.

[0151]

Compound (1) encompasses the following compounds:

a compound represented by the formula (1A):

[0152]

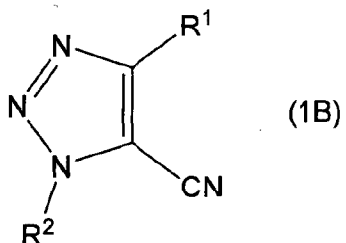


5

[0153]

a compound represented by the formula (1B):

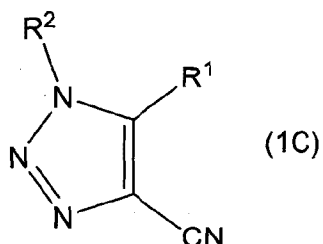
[0154]



10 [0155]

and a compound represented by the formula (1C):

[0156]



[0157]

15 That is, Compound (1) encompasses
 2H-[1,2,3]triazole-4-carbonitrile compound (2H-
 [1,2,3]triazole-5-carbonitrile compound) (Compound (1A)),
 3H-[1,2,3]triazole-4-carbonitrile compound (1H-
 [1,2,3]triazole-5-carbonitrile compound) (Compound (1B)) and
 20 1H-[1,2,3]triazole-4-carbonitrile compound (3H-
 [1,2,3]triazole-5-carbonitrile compound) (Compound (1C)).

When R^2 is not a hydrogen atom, Compound (1A) is preferable from among Compound (1).

[0158]

The starting material compounds and object compounds shown in the above-mentioned reaction schemes can be used in an appropriate salt form.

Each of the object compounds obtained according to the above-mentioned reaction schemes can be isolated and purified from the reaction mixture by, for example, after cooling the reaction mixture, performing an isolation procedure such as filtration, concentration, extraction, etc., to separate a crude reaction product, and then subjecting the crude reaction product to a general purification procedure such as column chromatography, recrystallization, etc.

15 [0159]

Among Compound (1), those having a basic group or groups can easily form salts with common pharmaceutically acceptable acids. Examples of such acids include hydrochloric acid, hydrobromic acid, nitric acid, sulfuric acid, phosphoric acid and other inorganic acids, methansulfonic acid, *p*-toluenesulfonic acid, AcOH, citric acid, tartaric acid, maleic acid, fumaric acid, malic acid, lactic acid and other organic acids, etc.

Among Compound (1), those having an acidic group or groups can easily form salts by reacting with pharmaceutically acceptable basic compounds. Examples of such basic compounds include sodium hydroxide, potassium hydroxide, calcium hydroxide, sodium carbonate, potassium carbonate, sodium hydrogencarbonate, potassium hydrogencarbonate, etc.

30 [0160]

In Compound (1), one or more atoms can be substituted with one or more isotopic atoms. Examples of the isotopic atoms include deuterium (^2H), tritium (^3H), ^{13}C , ^{14}N , ^{18}O , etc.

[0161]

35 The following is an explanation of pharmaceutical

preparations comprising Compound (1) as an active ingredient. Such pharmaceutical preparations are obtained by formulating Compound (1) into general pharmaceutical preparations, using typically employed diluents or excipients such as fillers, extenders, binders, wetting agents, disintegrants, surfactants, lubricants, etc.

[0162]

The form of such pharmaceutical preparations can be selected from various forms according to the purpose of therapy. Typical examples include tablets, pills, powders, solutions, suspensions, emulsions, granules, capsules, suppositories, injections (solutions, suspensions, etc.) and the like.

[0163]

To form tablets, any of various known carriers can be used, including, for example, lactose, white sugar, sodium chloride, glucose, urea, starch, calcium carbonate, kaolin, crystalline cellulose and other excipients; water, EtOH, propanol, simple syrup, glucose solutions, starch solutions, gelatin solutions, carboxymethyl cellulose, shellac, methylcellulose, potassium phosphate, polyvinylpyrrolidone and other binders; dry starch, sodium alginate, agar powder, laminaran powder, sodium hydrogencarbonate, calcium carbonate, aliphatic acid esters of polyoxyethylenesorbitan, sodium lauryl sulfate, stearic acid monoglyceride, starch, lactose and other disintegrants; white sugar, stearin, cacao butter, hydrogenated oils and other disintegration inhibitors; quaternary ammonium base, sodium lauryl sulfate and other absorption promoters; glycerin, starch and other wetting agents; starch, lactose, kaolin, bentonite, colloidal silicic acid and other adsorbents; purified talc, stearates, boric acid powder, polyethylene glycol and other lubricants; etc.

Such tablets may be coated with general coating materials as required, to prepare, for example, sugar-coated tablets, gelatin-coated tablets, enteric-coated tablets, film-coated

tablets, double- or multi-layered tablets, etc.

To form pills, any of various known carriers can be used, including, for example, glucose, lactose, starch, cacao butter, hydrogenated vegetable oils, kaolin, talc and other
5 excipients; gum arabic powder, tragacanth powder, gelatin, EtOH and other binders; laminaran, agar and other disintegrants; etc.

[0164]

To form suppositories, any of various known carriers can
10 be used, including, for example, polyethylene glycol, cacao butter, higher alcohols, esters of higher alcohols, gelatin, semisynthetic glycerides, etc.

[0165]

To form an injection, a solution, emulsion or suspension
15 is sterilized and preferably made isotonic with blood. Any of various known widely used diluents can be employed to prepare the solution, emulsion or suspension. Examples of such diluents include water, EtOH, propylene glycol, ethoxylated isostearyl alcohol, polyoxylated isostearyl alcohol, aliphatic
20 acid esters of polyoxyethylene sorbitan, etc. In this case, the pharmaceutical preparation may contain sodium chloride, glucose or glycerin in an amount sufficient to prepare an isotonic solution, and may contain general solubilizers, buffers, analgesic agents, etc., and further, if necessary,
25 coloring agents, preservatives, flavors, sweetening agents, etc., and/or other medicines.

[0166]

The proportion of Compound (1) in the pharmaceutical preparation is not limited and can be suitably selected from a
30 wide range. It is typically preferable that the pharmaceutical preparation contain Compound (1) in a proportion of 1 to 70 wt%.

[0167]

The route of administration of the pharmaceutical
35 preparation according to the present invention is not limited,

and the preparation can be administered by a route suitable for the form of the preparation, the patient's age and sex, the conditions of the disease, and other conditions.

For example, tablets, pills, solutions, suspensions,
5 emulsions, granules and capsules are administered orally.
[0168]

Injectons are intravenously administered singly or as mixed with general injection transfusions such as glucose solutions, amino acid solutions or the like, or singly
10 administered intramuscularly, intracutaneously, subcutaneously or intraperitoneally, as required. Suppositories are administered intrarectally.
[0169]

The dosage of the pharmaceutical preparation is suitably
15 selected according to the method of use, the patient's age and sex, the severity of the disease, and other conditions, and is typically about 0.001 to about 100 mg/kg body weight/day, preferably 0.001 to 50 mg/kg body weight/day, in single or divided doses.
20 [0170]

Hydrophobic penetrating cations, e.g. triphenylphosphonium derivatives and rodamine 123 derivatives, are known as carriers which lead various molecules toward mitochondria (Selective Targeting of
25 Bioactive Compounds to Mitochondria by Michael P. Murphy, *Trends in biotechnology*, Vol. 15, Issue 8 (1997), Pages 326-330). Because the citric cycle exists within the mitochondria, the citric acid activators are likely to be more potent by means of binding covalently to the hydrophobic
30 penetrating cation or mixing with it.

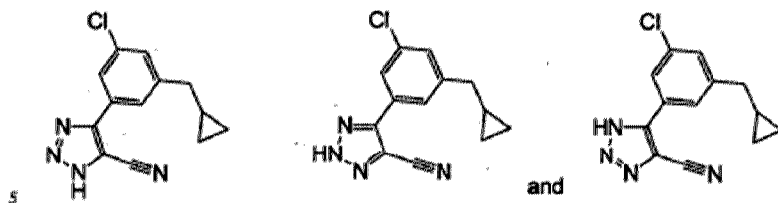
Examples

[0171]

Working examples of compounds used in the invention are shown below, being followed by the Pharmacological Test
35 results of these compounds.

The following compounds of Reference Examples and Examples are shown as one tautomer, which are not limited,

and the other two tautomers are also encompassed therein. For example, the compound of Example 1 encompasses the three tautomers :



[0173]

Reference Example 1

Synthesis of 3-bromo-2-oxo-pentanoic acid methyl ester

To a suspension of copper (II) bromide (13.12 g, 58.7 mmol) in AcOEt (80 ml) was added 2-oxo-pentanoic acid methyl ester (2.55 g, 19.6 mmol) in chloroform (40 ml). The reaction mixture was refluxed for 8 hr. After cooling to room temperature, the reaction mixture was filtered through a pad of Celite™. The filtrate was concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (3.30 g, 81%) as a colorless oil

¹H-NMR (CDCl₃) δ: 1.08 (3H, t, J = 7.3 Hz), 1.95-2.20 (2H, m), 3.93 (3H, s), 4.98 (1H, dd, J = 6.2, 8.1 Hz).

[0174]

Reference Example 2

Synthesis of 2- (6-trifluoromethyl-pyridin-2-yl) -thiazole-4- carboxylic acid ethyl ester

To a solution of 6-trifluoromethyl-pyridine-2-carbothioic acid amide (884 mg, 4.29 mmol) in EtOH (10 ml) was added ethyl bromopyruvate (0.656 ml, 5.23 mmol), and the reaction mixture was reflux for 4 hr. The reaction mixture was concentrated.

The residue was purified by silica gel column chromatography (hexane/AcOEt = 9/1 to 2/1) to give the title compound (1.13 g, 88%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 7.1 Hz), 4.47 (2H, q, J =

7.1 Hz), 7.73 (1H, d, J = 7.9 Hz), 8.01 (1H, t, J = 7.9 Hz),
8.31 (1H, s), 8.52 (1H, d, J = 7.9 Hz).

[0175]

Reference Example 3

5 Synthesis of 2-hexyl-thiazole-4-carboxylic acid ethyl ester

The title compound was obtained using heptanethioic acid
amide and ethyl bromopyruvate in the same manner as in

Reference Example 2.

¹H-NMR (CDCl₃) δ: 0.86-0.91 (3H, m), 1.26-1.46 (9H, m), 1.75-
10 1.85 (2H, m), 3.06 (2H, t, J = 7.8 Hz), 4.42 (2H, q, J = 7.1
Hz), 8.05 (1H, s).

[0176]

Reference Example 4

15 Synthesis of 5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-
thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 5-trifluoromethyl-
pyridine-2-carbothioic acid amide and 3-bromo-2-oxo-pentanoic
acid methyl ester in the same manner as in Reference Example 2.

¹H-NMR (CDCl₃) δ: 1.42 (3H, t, J = 7.5 Hz), 3.34 (2H, q, J =
20 7.5 Hz), 3.99 (3H, s), 8.03 (1H, dd, J = 1.9, 8.4 Hz), 8.38
(1H, d, J = 8.4 Hz), 8.84 (1H, d, J = 1.9 Hz).

[0177]

Reference Example 5

25 Synthesis of 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-
carboxylic acid methyl ester

The title compound was obtained using 3-trifluoromethyl-
thiobenzamide and 3-bromo-2-oxo-pentanoic acid methyl ester in
the same manner as in Reference Example 2.

¹H-NMR (CDCl₃) δ: 1.40 (3H, t, J = 7.5 Hz), 3.33 (2H, q, J =
30 7.5 Hz), 3.98 (3H, s), 7.57 (1H, t, J = 7.8 Hz), 7.68 (1H, d,
J = 7.8 Hz), 8.11 (1H, d, J = 7.8 Hz), 8.19 (1H, s).

[0178]

Reference Example 6

35 Synthesis of 5-ethyl-2-(6-trifluoromethyl-pyridin-3-yl)-
thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 6-trifluoromethyl-thionicotinamide and 3-bromo-2-oxo-pentanoic acid methyl ester in the same manner as in Reference Example 2.

¹H-NMR (CDCl₃) δ: 1.42 (3H, t, J = 7.5 Hz), 3.35 (2H, q, J = 7.5 Hz), 3.99 (3H, s), 7.77 (1H, dd, J = 0.4, 8.2 Hz), 8.45-8.48 (1H, m), 9.19 (1H, d, J = 2.0 Hz).

[0179]

Reference Example 7

Synthesis of 5-methyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 5-trifluoromethyl-pyridine-2-carbothioic acid amide and 3-bromo-2-oxo-butyric acid methyl ester in the same manner as in Reference Example 2.

¹H-NMR (CDCl₃) δ: 2.86 (3H, s), 3.99 (3H, s), 8.03 (1H, dd, J = 1.7, 8.3 Hz), 8.37 (1H, d, J = 8.3 Hz), 8.84-8.85 (1H, m).

[0180]

Reference Example 8

Synthesis of 2-(5-chloro-pyridin-2-yl)-5-methyl-thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 5-chloro-pyridine-2-carbothioic acid amide and 3-bromo-2-oxo-butyric acid methyl ester in the same manner as in Reference Example 2.

¹H-NMR (CDCl₃) δ: 2.83 (3H, s), 3.97 (3H, s), 7.77 (1H, dd, J = 2.4, 8.5 Hz), 8.20 (1H, dd, J = 0.7, 8.5 Hz), 8.53 (1H, dd, J = 0.7, 2.4 Hz).

[0181]

Reference Example 9

Synthesis of 2-(3-trifluoromethyl-phenoxy)-thiazole-4-carboxylic acid ethyl ester

To a solution of 2-bromo-thiazole-4-carboxylic acid ethyl ester (300 mg, 1.27 mmol) in DMF (6 ml) were added *m*-hydroxybenzotrifluoride (227 mg, 1.398 mmol) and K₂CO₃ (527 mg, 3.81 mmol). The reaction mixture was stirred at 100°C for 5 hr. After cooling to room temperature, the reaction was quenched by addition of water, and the mixture was extracted with AcOEt.

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The combined organic layers were washed with water and brine, dried over MgSO_4 , and concentrated *in vacuo* to give the title compound (395 mg, 98%) as a pale yellow oil.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.38 (3H, t, $J = 7.1$ Hz), 4.38 (2H, q, $J =$
5 7.1 Hz), 7.54-7.58 (4H, m), 7.78 (1H, s).

[0182]

Reference Example 10

Synthesis of 2-(4-chloro-phenylsulfanyl)-thiazole-4-carboxylic acid ethyl ester

10 To a solution of 2-bromo-thiazole-4-carboxylic acid ethyl ester (250 mg, 1.27 mmol) in DMF (6 ml) were added *p*-chlorobenzenethiol (168 mg, 1.165 mmol) and K_2CO_3 (439 mg, 3.18 mmol). The reaction mixture was stirred at 100°C for 1 hr. After cooling to room temperature, the reaction was quenched
15 by addition of water, and the mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over MgSO_4 , and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (259 mg, 82%) as a
20 white solid.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.40 (3H, t, $J = 7.1$ Hz), 4.42 (2H, q, $J =$
7.1 Hz), 7.41-7.45 (2H, m), 7.58-7.62 (2H, m), 8.02 (1H, s).

[0183]

Reference Example 11

25 Synthesis of 5-methyl-2-(3-trifluoromethyl-phenylsulfanyl)-thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 2-bromo-5-methyl-thiazole-4-carboxylic acid methyl ester and 3-(trifluoromethyl)thiophenol in the same manner as in Reference
30 Example 10.

$^1\text{H-NMR}$ (CDCl_3) δ : 2.70 (3H, s), 3.94 (3H, s), 7.54 (1H, t, $J =$
7.8 Hz), 7.67 (1H, d, $J = 7.8$ Hz), 7.77 (1H, d, $J = 7.8$ Hz),
7.86 (1H, s).

[0184]

35 Reference Example 12

Synthesis of 2-[N-(4-chloro-phenyl)-N-methyl-amino]-thiazole-4-carboxylic acid ethyl ester

To a solution of 2-(4-chloro-phenylamino)-thiazole-4-carboxylic acid ethyl ester (116 mg, 0.41 mmol) in DMF (3 ml) was added NaH (21 mg, 0.533 mmol), and the reaction mixture was stirred at room temperature for 30 min, and then MeI (31 μ l, 0.49 mmol) was added to the solution. The reaction mixture was stirred at room temperature overnight. After addition of water, the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over MgSO_4 , and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane/AcOEt = 9/1 to 3/1) to give the title compound (49 mg, 40%) as a white solid.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.38 (3H, t, $J = 7.1$ Hz), 3.57 (3H, s), 4.37 (2H, q, $J = 7.1$ Hz), 7.30-7.36 (2H, m), 7.38-7.42 (3H, m).

[0185]

Reference Example 13

Synthesis of 2-[N-ethyl-N-(3-trifluoromethyl-phenyl)-amino]-thiazole-4-carboxylic acid ethyl ester.

The title compound was obtained using 2-(3-trifluoromethyl-phenylamino)-thiazole-4-carboxylic acid ethyl ester and iodoethane in the same manner as in Reference Example 12.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.27 (3H, t, $J = 7.1$ Hz), 1.38 (3H, t, $J = 7.1$ Hz), 4.12 (2H, q, $J = 7.1$ Hz), 4.36 (2H, q, $J = 7.1$ Hz), 7.38 (1H, s), 7.56-7.57 (3H, m), 7.63 (1H, m).

[0186]

Reference Example 14

Synthesis of 2-(3-chloro-4-fluoro-phenyl)-thiazole-4-carboxylic acid ethyl ester

To a solution of 2-bromo-thiazole-4-carboxylic acid ethyl ester (150 mg, 0.635 mmol) in 1,4-dioxane (3 ml), were added 3-chloro-4-fluorophenylboronic acid (111 mg, 0.635 mmol), [1,1'-bis(diphenylphosphino)ferrocene]palladium(II) dichloride

(51.9 mg, 0.064 mmol) and potassium triphosphate (405 mg, 1.906 mmol). The reaction mixture was refluxed for 8 hr under nitrogen. 1 mol/l HCl was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic
5 layers were washed with brine, dried over MgSO₄, and concentrated *in vacuo*. The residue was purified by flash column chromatography (hexane/AcOEt = 9/1 to 2/1) to give the title compound (113 mg, 62%) as a white solid.

¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 7.1 Hz), 4.46 (2H, q, J =
10 7.1 Hz), 7.23 (1H, t, J = 8.6 Hz), 7.87 (1H, ddd, J = 2.3, 4.5, 8.6 Hz), 8.12 (1H, dd, J = 2.3, 6.9 Hz), 8.17 (1H, s).

[0187]

Reference Example 15

Synthesis of 2-(3-trifluoromethoxy-phenyl)-thiazole-4-
15 carboxylic acid ethyl ester

The title compound was obtained using 2-bromo-thiazole-4-carboxylic acid ethyl ester and 3-(trifluoromethoxy)phenylboronic acid in the same manner as in Reference Example 14.

20 ¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 7.1 Hz), 4.46 (2H, q, J = 7.1 Hz), 7.30-7.34 (1H, m), 7.50 (1H, t, J = 8.0 Hz), 7.90-7.94 (2H, m), 8.20 (1H, s).

[0188]

Reference Example 16

25 Synthesis of 2-(4-chloro-phenyl)-5-(4-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid ethyl ester

To a solution of p-bromo- α,α,α -trifluorotoluene (168 mg, 0.747 mmol) in toluene (5 ml) were added 2-(4-chloro-phenyl)-thiazole-4-carboxylic acid ethyl
30 ester (200 mg, 0.747 mmol), cesium carbonate (608 mg, 1.868 mmol), *rac*-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl (46.5 mg, 0.075 mmol) and Pd(OAc)₂ (16.77 mg, 0.075 mmol). The reaction mixture was refluxed for 7 hr under nitrogen. Water was added to the reaction mixture, and the mixture was
35 extracted with AcOEt. The combined organic layers were washed

with brine, dried over MgSO_4 , and concentrated *in vacuo*. The residue was purified by flash column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (169 mg, 55%) as a white solid.

5 ^1H -NMR (CDCl_3) δ : 1.26 (3H, t, $J = 7.1$ Hz), 4.32 (2H, q, $J = 7.1$ Hz), 7.43-7.48 (2H, m), 7.65 (2H, d, $J = 8.3$ Hz), 7.71 (2H, d, $J = 8.3$ Hz), 7.92-7.97 (2H, m).

[0189]

Reference Example 17

10 Synthesis of 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazole-4-carboxylic acid ethyl ester

To a solution of 2-formyl-thiazole-4-carboxylic acid ethyl ester (130 mg, 0.702 mmol) and (3-trifluoromethyl-benzyl)-phosphonic acid diethyl ester (239 mg, 0.807 mmol) in 15 THF (3 ml) was added *tert*-BuONa (108 mg, 1.123 mmol) at 0°C. The reaction mixture was stirred overnight at room temperature. Water was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic layers were washed with brine, dried over MgSO_4 , and concentrated *in vacuo*. The 20 residue was purified by flash column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (34 mg, 15%) as a white solid.

^1H -NMR (CDCl_3) δ : 1.43 (3H, t, $J = 7.1$ Hz), 4.46 (2H, q, $J = 7.1$ Hz), 7.45-7.61 (4H, m), 7.72 (1H, d, $J = 7.5$ Hz), 7.77 (1H, 25 s), 8.13 (1H, s).

[0190]

Reference Example 18

Synthesis of 2-(3-trifluoromethyl-phenylamino)-thiazole-4-carboxylic acid ethyl ester

30 A mixture of 2-bromo-thiazole-4-carboxylic acid ethyl ester (300 mg, 1.271 mmol) and *m*-aminobenzotrifluoride (1 ml) was stirred for 6 hr at 140°C. 1 N HCl was added to the reaction mixture, and the mixture was extracted with Et_2O . The combined organic layers were washed with brine, dried over 35 MgSO_4 , and concentrated *in vacuo*. The residue was purified by

flash column chromatography (hexane/AcOEt = 4/1 to 3/2) to give the title compound (342 mg, 85%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 1.39 (3H, t, J = 7.1 Hz), 4.38 (2H, q, J = 7.1 Hz), 7.35 (1H, d, J = 7.5 Hz), 7.49 (1H, t, J = 7.8 Hz),
5 7.53-7.62 (3H, m), 7.81 (1H, s).

[0191]

Reference Example 19

Synthesis of [2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol

10 To a suspension of 2-(6-trifluoromethyl-pyridin-2-yl)-thiazole-4-carboxylic acid ethyl ester (500 mg, 1.65 mmol) and NaBH₄ (313 mg, 8.27 mmol) in DME (6 ml) was added dropwise MeOH (2.68 ml) at 50°C. The reaction mixture was stirred for 1.5 hr at 65°C. Water was added to the reaction mixture, and the
15 mixture was extracted with AcOEt. The combined organic layers were washed with brine, dried over MgSO₄, and concentrated *in vacuo* to give the title compound (442 mg, quant.) as a white solid.

¹H-NMR (CDCl₃) δ: 2.22 (1H, t, J = 5.9 Hz), 4.86 (2H, d, J =
20 5.9 Hz), 7.37 (1H, t, J = 0.8 Hz), 7.69 (1H, dd, J = 0.8, 7.8 Hz), 7.97 (1H, t, J = 7.8 Hz), 8.35 (1H, d, J = 7.8 Hz).

[0192]

Reference Example 20

Synthesis of [2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-
25 methanol

The title compound was obtained using 2-(3-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.52 (1H, br), 4.85 (2H, s), 7.25 (1H, s),
30 7.56 (1H, t, J = 7.8 Hz), 7.68 (1H, d, J = 7.8 Hz), 8.10 (1H, d, J = 7.8 Hz), 8.22 (1H, s).

[0193]

Reference Example 21

Synthesis of [2-(3-chloro-4-fluoro-phenyl)-thiazol-4-yl]-
35 methanol

The title compound was obtained using 2-(3-chloro-4-fluoro-phenyl)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.10-2.61(1H, br), 4.83(2H, s), 7.18-7.24 (2H, m), 7.79 (1H, ddd, J = 2.3, 4.5, 8.6 Hz), 8.01 (1H, dd, J = 2.3, 6.9 Hz).

[0194]

Reference Example 22

Synthesis of [2-(4-chloro-phenylsulfanyl)-thiazol-4-yl]-methanol

The title compound was obtained using 2-(4-chloro-phenylsulfanyl)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.13-2.19 (1H, br), 4.73 (2H, d, J = 5.1 Hz), 7.11 (1H, s), 7.38-7.41(2H, m), 7.54-7.57 (2H, m).

[0195]

Reference Example 23

Synthesis of [5-ethyl-2-(6-trifluoromethyl-pyridin-3-yl)-thiazol-4-yl]-methanol

The title compound was obtained using 5-ethyl-2-(6-trifluoromethyl-pyridin-3-yl)-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 1.36 (3H, t, J = 7.5 Hz), 2.34 (1H, t, J = 5.7 Hz), 2.92 (2H, q, J = 7.5 Hz), 4.76 (2H, d, J = 5.7 Hz), 7.75 (1H, d, J = 8.2 Hz), 8.37 (1H, dd, J = 1.8, 8.2 Hz), 9.19 (1H, d, J = 1.8 Hz).

[0196]

Reference Example 24

Synthesis of [5-methyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol

The title compound was obtained using 5-methyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.33 (1H, brs), 2.53 (3H, s), 4.75 (2H, d, J = 4.7 Hz), 7.99-8.01 (1H, m), 8.25 (1H, d, J = 8.3 Hz), 8.82-

8.83 (1H, m).

[0197]

Reference Example 25

Synthesis of [2-(5-chloro-pyridin-2-yl)-5-methyl-thiazol-4-yl]-methanol

The title compound was obtained using 2-(5-chloro-pyridin-2-yl)-5-methyl-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.30 (1H, t, J = 5.8 Hz), 2.50 (3H, s), 4.73 (2H, d, J = 5.8 Hz), 7.74 (1H, dd, J = 2.4, 8.5 Hz), 8.08 (1H, dd, J = 0.6, 8.5 Hz), 8.52 (1H, dd, J = 0.6, 2.4 Hz).

[0198]

Reference Example 26

Synthesis of [2-(4-chloro-benzyloxy)-thiazol-4-yl]-methanol

To a solution of 4-chlorobenzyl alcohol (302 mg, 2.12 mmol) in THF (3 ml) was added NaH (119 mg, 2.97 mmol), and the reaction mixture was stirred at room temperature for 30 min. Then 2-bromo-thiazole-4-carboxylic acid ethyl ester (200 mg, 0.847 mmol) was added to the solution. The mixture was refluxed for 2 hr. The reaction was quenched by addition of water, and then the mixture was washed with AcOEt. The aqueous solution was acidified with HCl and extracted with AcOEt. The combined organic layers was washed with brine, dried over MgSO₄, and concentrated *in vacuo*. Triethylamine (0.142 ml, 1.02 mmol) and THF (20 ml) were added to the residue and then ethyl chlorocarbonate (0.089 ml, 0.932 mmol) was added to the solution at 0°C, and the mixture was stirred for 30 min. After filtration of precipitate, NaBH₄ (96 mg, 2.54 mmol) in water (1 ml) was added to the filtrate at 0°C. The mixture was stirred for 1 hr at same temperature. The reaction was quenched by addition of water, and the mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over MgSO₄, and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane/AcOEt = 9/1 to 3/1) to give the title compound (118 mg, 54%) as a

colorless oil.

¹H-NMR (CDCl₃) δ: 2.02-2.06 (1H, m), 4.58 (2H, d, J = 5.4 Hz), 5.40 (2H, s), 6.56-6.58 (1H, m), 7.34-7.41 (4H, m).

[0199]

5 Reference Example 27

Synthesis of [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol

To a solution of [2-(4-chloro-phenyl)-thiazol-4-yl]-methanol (462 mg, 2.05 mmol) in DMF (4 ml) was added NBS (383
10 mg, 2.15 mmol). The reaction mixture was stirred overnight at room temperature. Water was added to the reaction mixture and the precipitate was filtered. The obtained solid was dissolved in AcOEt, and the solution was washed with water and brine, dried over MgSO₄, and concentrated *in vacuo* to give the title
15 compound (560 mg, 90%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 2.33-2.38 (1H, m), 4.75 (2H, d, J = 6.1 Hz), 7.40-7.44 (2H, m), 7.78-7.82 (2H, m).

[0200]

Reference Example 28

20 Synthesis of [5-bromo-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol

The title compound was obtained using [2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

25 ¹H-NMR (CDCl₃) δ: 2.43 (1H, t, J = 6.1 Hz), 4.77 (2H, d, J = 6.1 Hz), 7.70 (2H, d, J = 8.2 Hz), 7.98 (2H, d, J = 8.2 Hz).

[0201]

Reference Example 29

Synthesis of [5-bromo-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol
30

The title compound was obtained using [2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

35 ¹H-NMR (CDCl₃) δ: 2.41 (1H, t, J = 6.1 Hz), 4.77 (2H, d, J = 6.1 Hz), 7.58 (1H, t, J = 7.8 Hz), 7.70 (1H, d, J = 7.8 Hz),

8.02 (1H, d, J = 7.8 Hz), 8.15 (1H, s).

[0202]

Reference Example 30

Synthesis of [5-bromo-2-(4-chloro-phenoxy)-thiazol-4-yl]-
5 methanol

The title compound was obtained using [2-(4-chloro-phenoxy)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

¹H-NMR (CDCl₃) δ: 2.07 (1H, t, J = 6.3 Hz), 4.54 (2H, d, J =
10 6.3 Hz), 7.19-7.24 (2H, m), 7.36-7.41 (2H, m).

[0203]

Reference Example 31

Synthesis of [5-bromo-2-(3-chloro-4-fluoro-phenyl)-thiazol-4-yl]-methanol

15 The title compound was obtained using [2-(3-chloro-4-fluoro-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

¹H-NMR (CDCl₃) δ: 2.48 (1H, brs), 4.75 (2H, s), 7.21 (1H, t, J = 8.6 Hz), 7.71 (1H, ddd, J = 2.3, 4.4, 8.6 Hz), 7.96 (1H, dd,
20 J = 2.3, 6.9 Hz).

[0204]

Reference Example 32

Synthesis of [5-bromo-2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol

25 The title compound was obtained using [2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

¹H-NMR (CDCl₃) δ: 2.35 (1H, t, J = 6.0 Hz), 4.78 (2H, d, J = 6.0 Hz), 7.70 (1H, dd, J = 0.7, 7.9 Hz), 7.99 (1H, t, J = 7.9
30 Hz), 8.31 (1H, d, J = 7.9 Hz).

[0205]

Reference Example 33

Synthesis of [5-propyl-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol

35 To a solution of [5-((E)-1-propen-1-yl)-2-(3-

trifluoromethyl-phenyl)-thiazol-4-yl]-methanol (127 mg, 0.424 mmol) in EtOH (4 ml) was added 5% Pd/C-ethylenediamine complex (20 mg). The reaction mixture was stirred at room temperature for 1 hr under hydrogen. After filtration, the filtrate was
5 concentrated to give the title compound (126 mg, 99%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 1.01 (3H, t, J = 7.3 Hz), 1.66-1.75 (2H, m), 2.40 (1H, t, J = 5.9 Hz), 2.83 (2H, t, J = 7.5 Hz), 4.73 (2H, d, J = 5.9 Hz), 7.55 (1H, t, J = 7.8 Hz), 7.65 (1H, d, J = 7.8
10 Hz), 8.05 (1H, d, J = 7.8 Hz), 8.17 (1H, s).

[0206]

Reference Example 34

Synthesis of [2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-methanol

15 To a solution of [2-(4-chloro-phenyl)-5-vinyl-thiazol-4-yl]-methanol (72 mg, 0.286 mmol) in EtOH (4 ml) was added 5% Pd/C-ethylenediamine complex (20 mg). The reaction mixture was stirred at room temperature for 3 hr under hydrogen. After filtration, the filtrate was concentrated to give the title
20 compound (60 mg, 83%) as a white solid.

¹H-NMR (CDCl₃) δ: 1.32 (3H, t, J = 7.5 Hz), 2.44-2.68 (1H, br), 2.86 (2H, q, J = 7.5 Hz), 4.71 (2H, s), 7.37-7.40 (2H, m), 7.80-7.84 (2H, m).

[0207]

25 Reference Example 35

Synthesis of [2-(4-chloro-phenyl)-5-propyl-thiazol-4-yl]-methanol

The title compound was obtained using [2-(4-chloro-phenyl)-5-((E)-1-propen-1-yl)-thiazol-4-yl]-methanol in the
30 same manner as in Reference Example 34.

¹H-NMR (CDCl₃) δ: 1.00 (3H, t, J = 7.3 Hz), 1.64-1.74 (2H, m), 2.43-2.49 (1H, br), 2.80 (2H, t, J = 7.5 Hz), 4.70 (2H, d, J = 4.0 Hz), 7.37-7.40 (2H, m), 7.80-7.84 (2H, m).

[0208]

35 Reference Example 36

Synthesis of [2-(4-chloro-phenoxy)-5-ethyl-thiazol-4-yl]-methanol

The title compound was obtained using [2-(4-chloro-phenoxy)-5-vinyl-thiazol-4-yl]-methanol in the same manner as
5 in Reference Example 34.

¹H-NMR (CDCl₃) δ: 1.24 (3H, t, J = 7.6 Hz), 2.09-2.13 (1H, m), 2.73 (2H, q, J = 7.6 Hz), 4.50 (2H, d, J = 5.4 Hz), 7.19-7.23 (2H, m), 7.35-7.37 (2H, m).

[0209]

10 Reference Example 37

Synthesis of [2-(4-chloro-phenyl)-5-isobutyl-thiazol-4-yl]-methanol

The title compound was obtained using [2-(4-chloro-phenyl)-5-(2-methyl-1-propen-1-yl)-thiazol-4-yl]-methanol in
15 the same manner as in Reference Example 34.

¹H-NMR (CDCl₃) δ: 0.98 (6H, d, J = 6.6 Hz), 1.84-1.91 (1H, m), 2.29-2.60 (1H, br), 2.69 (2H, d, J = 7.2 Hz), 4.69 (2H, s), 7.38-7.41 (2H, m), 7.82-7.85 (2H, m).

[0210]

20 Reference Example 38

Synthesis of [2-(4-chloro-phenyl)-5-methyl-thiazol-4-yl]-methanol

To the solution of [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol (200 mg, 0.657 mmol) in 1,4-dioxane (4 ml) were
25 added methylboronic acid (59.0 mg, 0.985 mmol), Pd(Ph₃P)₄ (76 mg, 0.066 mmol) and K₂CO₃ (272 mg, 1.970 mmol). The reaction mixture was refluxed for 16 hr under nitrogen. After evaporation, water was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic layers
30 were washed with brine, dried over MgSO₄, and concentrated *in vacuo*. The residue obtained was purified by flash column chromatography (hexane/AcOEt = 4/1 to 1/2) to give the title compound (130 mg, 83%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 2.42 (1H, t, J = 5.8 Hz), 2.47 (3H, s), 4.71
35 (2H, d, J = 5.8 Hz), 7.36-7.41 (2H, m), 7.80-7.83 (2H, m).

[0211]

Reference Example 39

Synthesis of [5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol

5 The title compound was obtained using [5-bromo-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 38.

¹H-NMR (CDCl₃) δ: 2.45-2.50 (4H, m), 4.73 (2H, d, J = 5.8 Hz), 7.67 (2H, d, J = 8.2 Hz), 7.99 (2H, d, J = 8.2 Hz).

10 [0212]

Reference Example 40

Synthesis of [5-methyl-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol

15 The title compound was obtained using [5-bromo-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 38.

¹H-NMR (CDCl₃) δ: 2.49 (3H, s), 2.56 (1H, t, J = 5.9 Hz), 4.73 (2H, d, J = 5.9 Hz), 7.54 (1H, t, J = 7.8 Hz), 7.64 (1H, d, J = 7.8 Hz), 8.03 (1H, d, J = 7.8 Hz), 8.15 (1H, s).

20 [0213]

Reference Example 41

Synthesis of [2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-methanol

25 The title compound was obtained using [5-bromo-2-(3-chloro-4-fluoro-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 38.

¹H-NMR (CDCl₃) δ: 2.38 (1H, t, J = 5.8 Hz), 2.48 (3H, s), 4.71 (2H, d, J = 5.8 Hz), 7.18 (1H, t, J = 8.6 Hz), 7.73 (1H, ddd, J = 2.3, 4.5, 8.6 Hz), 7.97 (1H, dd, J = 2.3, 7.0 Hz).

30 [0214]

Reference Example 42

Synthesis of [5-methyl-2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol

35 The title compound was obtained using [5-bromo-2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol in the

same manner as in Reference Example 38.

¹H-NMR (CDCl₃) δ: 2.30 (1H, t, J = 5.8 Hz), 2.51 (3H, s), 4.74 (2H, d, J = 5.8 Hz), 7.65 (1H, dd, J = 0.8, 7.8 Hz), 7.94 (1H, t, J = 7.8 Hz), 8.30 (1H, d, J = 7.8 Hz).

5 [0215]

Reference Example 43

Synthesis of [2-(4-chloro-phenyl)-5-vinyl-thiazol-4-yl]-methanol

To a solution of [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol (200 mg, 0.657 mmol) in DME/H₂O = 3/1 (4 ml) were added 1,1'-bis(diphenylphosphino)ferrocene-palladium dichloride (16.21 mg, 0.020 mmol), sodium phosphate, tribasic (374 mg, 0.985 mmol) and vinylboronic acid pinacol cyclic ester (0.148 ml, 0.854 mmol). The reaction mixture was refluxed for 8 hr under nitrogen. Water was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic layers were washed with brine, dried over MgSO₄, and concentrated *in vacuo*. The residue was purified by flash column chromatography (hexane/AcOEt = 4/1 to 1/2) to give the title compound (104 mg, 63%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 2.52 (1H, t, J = 5.9 Hz), 4.79 (2H, d, J = 5.9 Hz), 5.35 (1H, d, J = 10.9 Hz), 5.56 (1H, d, J = 17.2 Hz), 6.87 (1H, dd, J = 10.9, 17.2 Hz), 7.40-7.43 (2H, m), 7.83-7.88 (2H, m).

25 [0216]

Reference Example 44

Synthesis of [2-(4-chloro-phenyl)-5-((E)-1-propen-1-yl)-thiazol-4-yl]-methanol

The title compound was obtained using [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol and trans-1-propen-1-ylboronic acid in the same manner as in Reference Example 43.

¹H-NMR (CDCl₃) δ: 1.92 (3H, dd, J = 1.7, 6.7 Hz), 2.19-2.66 (1H, br), 4.76 (2H, s), 6.07 (1H, dq, J = 15.4, 6.7 Hz), 6.55 (1H, dq, J = 15.4, 1.7 Hz), 7.37-7.42 (2H, m), 7.81-7.86 (2H, m).

35 [0217]

Reference Example 45

Synthesis of [5-((E)-1-propen-1-yl)-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol

The title compound was obtained using [5-bromo-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol and trans-1-propen-1-ylboronic acid in the same manner as in Reference Example 43.

¹H-NMR (CDCl₃) δ: 1.93 (3H, dd, J = 1.7, 6.7 Hz), 2.39 (1H, brs), 4.76-4.81 (2H, m), 6.11 (1H, dq, J = 15.4, 6.7 Hz), 6.57 (1H, dq, J = 15.4, 1.7 Hz), 7.55 (1H, t, J = 7.8 Hz), 7.66 (1H, d, J = 7.8 Hz), 8.06 (1H, d, 7.8 Hz), 8.18 (1H, s).

[0218]

Reference Example 46

Synthesis of [2-(4-chloro-phenoxy)-5-vinyl-thiazol-4-yl]-methanol

The title compound was obtained using [5-bromo-2-(4-chloro-phenoxy)-thiazol-4-yl]-methanol and vinylboronic acid pinacol ester in the same manner as in Reference Example 43.

¹H-NMR (CDCl₃) δ: 2.14 (1H, t, J = 6.2 Hz), 4.58 (2H, q, J = 6.2 Hz), 5.19 (1H, d, J = 10.9 Hz), 5.31 (1H, d, J = 17.1 Hz), 6.77 (1H, dd, J = 10.9, 17.1 Hz), 7.22-7.25 (2H, m), 7.37-7.40 (2H, m).

[0219]

Reference Example 47

Synthesis of [2-(4-chloro-phenyl)-5-(2-methyl-1-propen-1-yl)-thiazol-4-yl]-methanol

The title compound was obtained using [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol and 2,2-dimethylethenylboronic acid pinacol ester in the same manner as in Reference Example 43.

¹H-NMR (CDCl₃) δ: 1.93 (3H, s), 1.97 (3H, s), 2.65 (1H, t, J = 5.8 Hz), 4.73 (2H, d, J = 5.8 Hz), 6.32 (1H, s), 7.38-7.41 (2H, m), 7.83-7.86 (2H, s).

[0220]

Reference Example 48

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Synthesis of 2-(4-chloro-phenylsulfanyl)-thiazole-4-carbaldehyde

To a solution of [2-(4-chloro-phenylsulfanyl)-thiazol-4-yl]-methanol (80 mg, 0.310 mmol) in DMSO (2 ml) was added IBX (104 mg, 0.372 mmol). The reaction mixture was stirred for 2 hr at room temperature. Water and AcOEt were added to the reaction mixture, and the precipitate was filtered. The filtrate was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over MgSO₄, and concentrated in vacuo. The residue was purified by flash column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (62 mg, 78%) as a white solid.

¹H-NMR (CDCl₃) δ: 7.43-7.47 (2H, m), 7.60-7.64 (2H, m), 8.02 (1H, s), 9.95 (1H, s).

[0221]

Reference Example 49

Synthesis of 2-(4-chloro-phenyl)-5-propyl-thiazole-4-carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-propyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.04 (3H, t, J = 7.3 Hz), 1.71-1.83 (2H, m), 3.26 (2H, t, J = 7.6 Hz), 7.41-7.46 (2H, m), 7.85-7.90 (2H, m), 10.19 (1H, s).

[0222]

Reference Example 50

Synthesis of 5-propyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carbaldehyde

The title compound was obtained using [5-propyl-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.05 (3H, t, J = 7.3 Hz), 1.76-1.83 (2H, m), 3.28 (2H, t, J = 7.6 Hz), 7.60 (1H, t, J = 7.8 Hz), 7.71 (1H, d, J = 7.8 Hz), 8.11 (1H, d, J = 7.8 Hz), 8.21 (1H, s), 10.22 (1H, s).

[0223]

Reference Example 51

Synthesis of 2-(4-chloro-phenoxy)-5-ethyl-thiazole-4-carbaldehyde

5 The title compound was obtained using [2-(4-chloro-phenoxy)-5-ethyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.31 (3H, t, J = 7.5 Hz), 3.20 (2H, q, J = 7.5 Hz), 7.25-7.28 (2H, m), 7.37-7.40 (2H, m), 9.98 (1H, s).

10 [0224]

Reference Example 52

Synthesis of 2-(4-chloro-phenyl)-5-isobutyl-thiazole-4-carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-isobutyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.02 (6H, d, J = 6.6 Hz), 1.95-2.03 (1H, m), 3.17 (2H, d, J = 7.2 Hz), 7.42-7.45 (2H, m), 7.86-7.89 (2H, m), 10.18 (1H, s).

20 [0225]

Reference Example 53

Synthesis of 5-ethyl-2-(6-trifluoromethyl-pyridin-3-yl)-thiazole-4-carbaldehyde

The title compound was obtained using [5-ethyl-2-(6-trifluoromethyl-pyridin-3-yl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.42 (3H, t, J = 7.5 Hz), 3.37 (2H, q, J = 7.5 Hz), 7.80 (1H, d, J = 8.2 Hz), 8.44 (1H, dd, J = 1.8, 8.2 Hz), 9.23 (1H, d, J = 1.8 Hz), 10.24 (1H, s).

30 [0226]

Reference Example 54

Synthesis of 5-methyl-2-(6-trifluoromethyl-pyridin-2-yl)-thiazole-4-carbaldehyde

The title compound was obtained using [5-methyl-2-(6-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol in the

same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 2.87 (3H, s), 7.72 (1H, dd, J = 0.7, 7.9 Hz), 8.01 (1H, t, J = 7.9 Hz), 8.40 (1H, d, J = 7.9 Hz), 10.21 (1H, s).

5 [0227]

Reference Example 55

Synthesis of 5-methyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazole-4-carbaldehyde

The title compound was obtained using [5-methyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 2.89 (3H, s), 8.05-8.08 (1H, m), 8.35 (1H, d, J = 8.3 Hz), 8.85-8.86 (1H, m), 10.22 (1H, s).

[0228]

15 Reference Example 56

Synthesis of 2-(5-chloro-pyridin-2-yl)-5-methyl-thiazole-4-carbaldehyde

The title compound was obtained using [2-(5-chloro-pyridin-2-yl)-5-methyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 2.86 (3H, s), 7.80 (1H, dd, J = 2.3, 8.5 Hz), 8.17 (1H, dd, J = 0.7, 8.5 Hz), 8.55 (1H, dd, J = 0.7, 2.3 Hz), 10.19 (1H, s).

[0229]

25 Reference Example 57

Synthesis of 5-methyl-2-(4-trifluoromethyl-phenyl)-thiazole-4-carbaldehyde

The title compound was obtained using [5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 2.87 (3H, s), 7.72 (2H, d, J = 8.2 Hz), 8.05 (2H, d, J = 8.2 Hz), 10.22 (1H, s).

[0230]

Reference Example 58

35 Synthesis of 5-methyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-

carbaldehyde

The title compound was obtained using [5-methyl-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

5 $^1\text{H-NMR}$ (CDCl_3) δ : 2.87 (3H, s), 7.60 (1H, t, $J = 7.8$ Hz), 7.71 (1H, d, $J = 7.8$ Hz), 8.09 (1H, d, $J = 7.8$ Hz), 8.20 (1H, s), 10.22 (1H, s).

[0231]

Reference Example 59

10 Synthesis of 2-(4-chloro-phenyl)-5-methyl-thiazole-4-carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-methyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

15 $^1\text{H-NMR}$ (CDCl_3) δ : 2.84 (3H, s), 7.41-7.46 (2H, m), 7.84-7.89 (2H, m), 10.20 (1H, s).

[0232]

Reference Example 60

Synthesis of 2-(4-chloro-benzyloxy)-thiazole-4-carbaldehyde

20 The title compound was obtained using [2-(4-chloro-benzyloxy)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

$^1\text{H-NMR}$ (CDCl_3) δ : 5.52 (2H, s), 7.36-7.43 (4H, m), 7.64 (1H, s), 9.74 (1H, s).

25 [0233]

Reference Example 61

Synthesis of 2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazole-4-carbaldehyde

30 The title compound was obtained using [2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

$^1\text{H-NMR}$ (CDCl_3) δ : 2.85 (3H, s), 7.23 (1H, t, $J = 8.6$ Hz), 7.78 (1H, ddd, $J = 2.3, 4.4, 8.6$ Hz), 8.03 (1H, dd, $J = 2.3, 6.9$ Hz), 10.19 (1H, s).

35 [0234]

Reference Example 62

Synthesis of 2-(4-chloro-phenyl)-5-ethyl-thiazole-4-carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H-NMR (CDCl₃) δ: 1.39 (3H, t, J = 7.5 Hz), 3.32 (2H, q, J = 7.5 Hz), 7.41-7.46 (2H, m), 7.85-7.90 (2H, m), 10.19 (1H, s).
[0235]

10 Reference Example 63

Synthesis of 5-methyl-2-(3-trifluoromethyl-phenylsulfanyl)-thiazole-4-carbaldehyde

To a suspension of 5-methyl-2-(3-trifluoromethyl-phenylsulfanyl)-thiazole-4-carboxylic acid methyl ester (122 mg, 0.366 mmol) and NaBH₄ (69 mg, 8.27 mmol) in DME (4 ml) was added dropwise MeOH (0.38 ml) at 60°C. The reaction mixture was stirred for 1.5 hr at 60°C. Water was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated *in vacuo*.

To a solution of the residue in DMSO (2 ml) was added IBX (123 mg, 0.439 mmol). The reaction mixture was stirred overnight at room temperature. Water and AcOEt were added to the reaction mixture, and the precipitate was filtered. The filtrate was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue was purified by flash column chromatography (hexane/AcOEt = 1/0 to 4/1) to give the title compound (86 mg, 77%) as a white solid.

¹H-NMR (CDCl₃) δ: 2.73 (3H, s), 7.56 (1H, t, J = 7.8 Hz), 7.68 (1H, d, J = 7.8 Hz), 7.80 (1H, d, J = 7.8 Hz), 7.88 (1H, s), 10.08 (1H, s).

[0236]

Reference Example 64

35 Synthesis of 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-

thiazole-4-carbaldehyde

The title compound was obtained using 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.

5 ¹H-NMR (CDCl₃) δ: 7.38 (1H, d, J = 16.2 Hz), 7.51-7.63 (3H, m), 7.74 (1H, d, J = 7.6 Hz), 7.80 (1H, s), 8.13 (1H, s), 10.06 (1H, s).

[0237]

Reference Example 65

10 Synthesis of 2-(3-trifluoromethoxy-phenyl)-thiazole-4-carbaldehyde

The title compound was obtained using 2-(3-trifluoromethoxy-phenyl)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.

15 ¹H-NMR (CDCl₃) δ: 7.34-7.37 (1H, m), 7.53 (1H, t, J = 8.3 Hz), 7.90-7.93 (2H, m), 8.21 (1H, s), 10.12 (1H, s).

[0238]

Reference Example 66

20 Synthesis of 2-(3-trifluoromethyl-phenoxy)-thiazole-4-carbaldehyde

The title compound was obtained using 2-(3-trifluoromethyl-phenoxy)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.

25 ¹H-NMR (CDCl₃) δ: 7.56-7.61 (4H, m), 7.78 (1H, s), 9.79 (1H, s).
[0239]

Reference Example 67

Synthesis of 2-[N-(4-chloro-phenyl)-N-methyl-amino]-thiazole-4-carbaldehyde

30 The title compound was obtained using 2-[N-(4-chloro-phenyl)-N-methyl-amino]-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 3.57 (3H, s), 7.31-7.36 (2H, m), 7.40-7.44 (3H, m), 9.74 (1H, s).

[0240]

35 Reference Example 68

Synthesis of 2-(4-chloro-phenyl)-5-(4-trifluoromethyl-phenyl)-thiazole-4-carbaldehyde

The title compound was obtained using 2-(4-chloro-phenyl)-5-(4-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.
¹H-NMR (CDCl₃) δ: 7.46-7.50 (2H, m), 7.72-7.79 (4H, m), 7.95-7.99 (2H, m), 10.07 (1H, s).

[0241]

Reference Example 69

10 Synthesis of 2-[N-ethyl-N-(3-trifluoromethyl-phenyl)-amino]-thiazole-4-carbaldehyde

The title compound was obtained using 2-[N-ethyl-N-(3-trifluoromethyl-phenyl)-amino]-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.
15 ¹H-NMR (CDCl₃) δ: 1.29 (3H, t, J = 7.1 Hz), 4.10 (2H, q, J = 7.1 Hz), 7.39 (1H, s), 7.57-7.63 (4H, m), 9.75 (1H, s).

[0242]

Reference Example 70

Synthesis of 2-hexyl-thiazole-4-carbaldehyde

20 The title compound was obtained using 2-hexyl-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 0.87-0.92 (3H, m), 1.29-1.44 (6H, m), 1.78-1.88 (2H, m), 3.06 (2H, t, J = 7.8 Hz), 8.07 (1H, s), 10.00
25 (1H, s).

[0243]

Reference Example 71

Synthesis of 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carbaldehyde

30 The title compound was obtained using 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 1.40 (3H, t, J = 7.5 Hz), 3.34 (2H, q, J = 7.5 Hz), 7.59 (1H, t, J = 7.8 Hz), 7.71 (1H, d, J = 7.8 Hz),
35 8.11 (1H, d, J = 7.8 Hz), 8.21 (1H, s), 10.22 (1H, s).

[0244]

Reference Example 72

Synthesis of 5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazole-4-carbaldehyde

5 The title compound was obtained using 5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 63.
 $^1\text{H-NMR}$ (CDCl_3) δ : 1.42 (3H, t, $J = 7.5$ Hz), 3.36 (2H, q, $J = 7.5$ Hz), 8.07 (1H, dd, $J = 2.1, 8.3$ Hz), 8.35 (1H, d, $J = 8.3$
10 Hz), 8.86 (1H, d, $J = 2.1$ Hz), 10.21 (1H, s).

[0245]

Reference Example 73

Synthesis of 5-bromo-2-(4-chloro-phenyl)-thiazole-4-carbaldehyde

15 To a solution of 2-(4-chloro-phenyl)-thiazole-4-carbaldehyde (600 mg, 2.68 mmol) in CH_3CN (10 ml) was added NBS (1.196 g, 6.44 mmol). The reaction mixture was stirred for 1 hr at 50°C . Additional NBS (645 mg, 3.62 mmol) was added to solution, and the mixture was refluxed for 1 hr. After
20 concentration, the residue was purified by flash column chromatography (hexane/AcOEt = 9/1 to 2/1) to give the title compound (89 mg, 11%) as pale yellow solid.
 $^1\text{H-NMR}$ (CDCl_3) δ : 7.44-7.48 (2H, m), 7.85-7.89 (2H, m), 10.10 (1H, s).

25 [0246]

Reference Example 74

Synthesis of 2-(4-chloro-phenyl)-5-methoxy-thiazole-4-carbaldehyde

To a solution of 5-bromo-2-(4-chloro-phenyl)-thiazole-4-carbaldehyde (89 mg, 0.294 mmol) in MeOH (4 ml) was added sodium methoxide (284 mg, 1.471 mmol). The reaction mixture was stirred overnight at room temperature. Water was added to the reaction mixture and the precipitate was filtered. The obtained solid was dissolved in AcOEt, and the solution was
35 dried over MgSO_4 , and concentrated *in vacuo*. The residue was

purified by flash column chromatography (hexane/AcOEt = 2/1 to 1/1) to give the title compound (42 mg, 56%) as a white solid. ¹H-NMR (CDCl₃) δ: 4.21 (3H, s), 7.41-7.43 (2H, m), 7.80-7.83 (2H, m), 10.01 (1H, s).

5 [0247]

Reference Example 75

Synthesis of 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazole-5-carboxylic acid ethyl ester

To a solution of ethyl 2-bromothiazole-5-carboxylate (500 mg, 2.118 mmol) in DME (10 ml) were added trans-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester (663 mg, 2.224 mmol), 1,1'-bis(diphenylphosphino)ferrocene-palladium dichloride (86 mg, 0.106 mmol) and 2M sodium carbonate solution (3.18 ml, 6.35 mmol). The reaction mixture was stirred for 4 hr at 80°C under nitrogen. Water was added to the reaction mixture, and the mixture was extracted with AcOEt. The combined organic layers were washed with brine, dried over MgSO₄, and concentrated *in vacuo*. The residue was purified by flash column chromatography (hexane/AcOEt = 1/0 to 3/1) to give the title compound (512 mg, 74%) as a white solid. ¹H-NMR (CDCl₃) δ: 1.40 (3H, t, J = 7.1 Hz), 4.39 (2H, q, J = 7.1 Hz), 7.32 (1H, d, J = 16.1 Hz), 7.53-7.62 (3H, m), 7.72-7.80 (2H, m), 8.39 (1H, s).

[0248]

25 Reference Example 76

Synthesis of {2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazol-5-yl}-methanol

To a suspension of LiAlH₄ (59 mg, 1.564 mmol) in THF (10 ml) was added dropwise 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazole-5-carboxylic acid ethyl ester (512 mg, 1.564 mmol) in THF (4 ml) at 0°C. 59 μl of water, 59 μl of 15% aqueous NaOH solution and 177 μl of water were added to the reaction mixture at 0°C. After filtration of the precipitate, the filtrate was concentrated *in vacuo* to give the title compound (410 mg, 92%) as a yellow solid.

¹H-NMR (CDCl₃) δ: 2.13-2.17 (1H, m), 4.90 (2H, d, J = 5.3 Hz), 7.30 (1H, d, J = 16.3 Hz), 7.41 (1H, d, J = 16.3 Hz), 7.47-7.59 (2H, m), 7.68-7.76 (2H, m), 7.76 (1H, s).

[0249]

5 Reference Example 77

Synthesis of 2-trifluoromethyl-6-vinyl-pyridine

To a solution of 545 mg of 2-chloro-6-trifluoromethylpyridine and 554 mg of vinylboronic acid pinacol cyclic ester in 12 mL of 1,2-dimethoxyethane/water
10 (3/1) were added 122 mg of 1,1'-bis(diphenylphosphino)ferrocene-palladium(II) dichloride CH₂Cl₂ complex and 1.71 g of sodium phosphate tribasic dodecahydrate. The reaction mixture was stirred at 80°C under argon for 6 hr. The reaction was quenched by addition of water (15 mL), and
15 extracted with AcOEt. The organic solution was dried over Na₂SO₄. After concentration, the dark red oil was purified by silica gel column (hexane → hexane/AcOEt 10%) to give the title compound (336 mg, 65%) as colorless oil.

¹H-NMR (CDCl₃) δ: 5.60 (1H, d, J = 10.8 Hz), 6.31 (1H, d, J = 17.4 Hz), 6.87 (1H, dd, J = 10.8, 17.4 Hz), 7.53 (1H, d, J = 7.9 Hz), 7.54 (1H, d, J = 7.9 Hz), 7.82 (1H, t, J = 7.9 Hz).

[0250]

Reference Example 78

Synthesis of 4-trifluoromethyl-2-vinyl-pyridine

25 The title compound was obtained using 2-chloro-4-(trifluoromethyl)pyridine in the same manner as in Reference Example 77.

¹H-NMR (CDCl₃) δ: 5.61 (1H, d, J = 10.8 Hz), 6.31 (1H, d, J = 17.4 Hz), 6.87 (1H, dd, J = 10.8, 17.4 Hz), 7.37 (1H, d, J = 5.1 Hz), 7.53 (1H, s), 8.75 (1H, d, J = 5.1 Hz).

[0251]

Reference Example 79

Synthesis of 4-trifluoromethyl-2-vinyl-pyrimidine

The title compound was obtained using 2-chloro-4-(trifluoromethyl)pyrimidine in the same manner as in Reference
35

Example 77.

^1H -NMR (CDCl_3) δ : 5.86 (1H, d, J = 10.4 Hz), 6.77 (1H, d, J = 17.3 Hz), 6.94 (1H, dd, J = 10.4, 17.3 Hz), 7.45 (1H, d, J = 5.0 Hz), 8.94 (1H, d, J = 5.0 Hz).

5 [0252]

Reference Example 80

Synthesis of 3-(1-methyl-2-phenyl-ethoxy)-5-trifluoromethyl-benzonitrile

To a solution of 187 mg of 3-hydroxy-5-trifluoromethyl-benzonitrile in 4 ml of tetrahydrofuran were added 289 mg of PPh_3 , 136 mg of 1-phenyl-2-propanol and 0.58 ml of DEAD at 0°C . The reaction mixture was stirred at 0°C for 1 hr and at room temperature for 24 hr. The reaction mixture was concentrated and the residue was purified by silica gel column chromatography (hexane/AcOEt 2% $\rightarrow$ hexane/AcOEt 20%) to give the title compound (205 mg, 67%) as a colorless oil.

^1H -NMR (CDCl_3) δ : 1.36 (3H, d, J = 6.1 Hz), 2.91 (1H, dd, J = 5.8, 13.9 Hz), 3.07 (1H, dd, J = 6.7, 13.9 Hz), 4.60-4.66 (1H, m), 7.20-7.33 (7H, m), 7.42 (1H, s).

20 [0253]

Reference Example 81

Synthesis of 3-methoxymethoxy-5-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-benzonitrile

To a solution of 360 mg of 3-methoxymethoxy-benzonitrile in 8 ml of tetrahydrofuran were added 29 mg of (1,5-cyclooctadiene)(methoxy)iridium(I) dimer, 24 mg of 4,4'-di-tert-butyl-2,2'-dipyridyl and 560 mg of bis(pinacolato)diboron. The resulting mixture was stirred under reflux for 16 hr. The dark red solution was concentrated to give the crude product (638 mg) as a wine red oil. This crude product was used for the next step without further purification.

^1H -NMR (CDCl_3) δ : 1.35 (12H, s), 3.48 (3H, s), 5.21 (2H, s), 7.38 (1H, s), 7.64 (1H, s), 7.72 (1H, s).

[0254]

35 Reference Example 82

Synthesis of 3-(2,5-bis(trifluoromethyl)benzyloxy)-5-trifluoromethyl-benzonitrile

To a suspension of 200 mg of 3-hydroxy-5-trifluoromethyl-benzonitrile and 265 mg of K_2CO_3 in 4 ml of CH_3CN was added
5 0.235 ml of 2,5-bis(trifluoromethyl)benzyl bromide. The reaction mixture was stirred at 80°C for 2 hr. The mixture was filtered and the filtrate was concentrated to give the title compound (440 mg, quant.) as a white solid.

^1H NMR ($CDCl_3$) δ : 5.34 (2H, s), 7.43 (1H, s), 7.48 (1H, s),
10 7.59 (1H, s), 7.78 (1H, d, $J = 8.0$ Hz), 7.90 (1H, d, $J = 8.0$ Hz), 8.01 (1H, s).

[0255]

Reference Example 83

Synthesis of 3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-
15 benzonitrile

To a solution of 218 mg of 2-chloro-4-(trifluoromethyl)pyridine and 373 mg of 3-methoxy-5-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-benzonitrile in 5 ml of dimethoxyethane were added 49 mg of 1,1'-
20 bis(diphenylphosphino)ferrocene-palladium(II) dichloride CH_2Cl_2 complex and 2 molar sodium carbonate aqueous solution, and the mixture was degassed. The reaction mixture was stirred at 80°C under argon for 3 hr. The reaction was quenched by addition of water, and the mixture was extracted twice with TBME. The
25 organic solution was concentrated and the residue was purified by silica gel column chromatography (hexane/AcOEt 5% $\rightarrow$ hexane/AcOEt 30%) to give the title compound (274 mg, 82%) as a white solid.

^1H -NMR ($CDCl_3$) δ : 3.94 (3H, s), 7.25 (1H, s), 7.53 (1H, d, $J =$
30 5.0 Hz), 7.84 (1H, s), 7.91 (2H, s), 8.99 (1H, d, $J = 5.0$ Hz).

[0256]

Reference Example 84

Synthesis of 3-methoxymethoxy-5-(5-trifluoromethyl-pyridin-2-yl)-benzonitrile

35 The title compound was obtained using 3-methoxymethoxy-5-

(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-benzonitrile and 2-chloro-5-trifluoromethyl-pyridine in the same manner as in Reference Example 83.

¹H-NMR (CDCl₃) δ: 3.52 (3H, s), 5.28 (2H, s), 7.43 (1H, s),
5 7.84 (1H, d, J = 8.4 Hz), 7.97 (2H, s), 8.04 (1H, dd, J = 2.2, 8.4 Hz), 8.97 (1H, s).

[0257]

Reference Example 85

Synthesis of 1-methoxy-3-phenoxy-5-trifluoromethyl-benzene

10 A suspension of 1-methoxy-3-iodo-5-trifluoromethyl-benzene (600 mg, 2.0 mmol), cesium carbonate (1.4 g, 4.30 mmol), cuprous bromide (30 mg, 0.21 mmol), ethyl 2-cyclohexanonecarboxylate 70 mg (4.38 mmol) and phenol (240 mg, 4.38 mmol) in DMSO (1.5 ml) was heated to 80°C for 8 hr under
15 argon. The reaction mixture was allowed to cool to room temperature. After water was added to the reaction mixture, the mixture was extracted by hexane. After silica gel chromatography was charged with the resulting organic layers, it was eluted with AcOEt:hexane (1:10) to give the title
20 compound (471 mg, 89%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 3.81 (3H, s), 6.69 (1H, s), 6.82 (1H, s), 6.85 (1H, s), 7.03-7.05 (2H, m), 7.16-7.19 (1H, m), 7.36-7.39 (2H, m).

[0258]

25 Reference Example 86

Synthesis of 3-(3-methoxy-5-trifluoromethyl-phenyl)-thiophene

The title compound was obtained using 1-iodo-3-methoxy-5-trifluoromethyl-benzene and thiophene-3-boronic acid in the same manner as in Reference Example 83.

30 ¹H-NMR (CDCl₃) δ: 3.89 (3H, s), 7.05 (1H, s), 7.27 (1H, m), 7.36-7.44 (3H, m), 7.51 (1H, dd, J = 1.4, 3.0 Hz).

[0259]

Reference Example 87

Synthesis of trifluoromethanesulfonic acid 3-phenoxy-5-
35 trifluoromethylphenyl ester

To a solution of 1-methoxy-3-phenoxy-5-trifluoromethyl benzene (471.2 mg, 1.76 mmol) in CH_2Cl_2 (2 ml) was added 1M boron tribromide in CH_2Cl_2 (6 ml, 6 mmol) at room temperature. The reaction mixture was stirred for 3 hr. Then water was added dropwise to the reaction mixture. After it was stirred for 0.5 hr, the organic layer was separated. After silica gel chromatography was charged with the resulting organic layer, it was eluted with AcOEt:hexane (1:10) to give 475.6 mg of 3-phenoxy-5-trifluoromethyl-phenol as a pale pink oil.

To a solution of 3-phenoxy-5-trifluoromethyl-phenol (475.6 mg) and DIPEA (0.60 ml) in CH_2Cl_2 (10 ml) was added trifluoromethanesulfonic anhydride (0.36 ml, 2.14 mmol) at 0°C. The reaction mixture was stirred at room temperature for 3 hr. Then water was added dropwise. After it was stirred for 10 min, the organic layer was separated. After silica gel chromatography was charged with the resulting organic layer, it was eluted with AcOEt:hexane (1:10) to give the title compound (639 mg, 94%) as a pale brown oil.

$^1\text{H-NMR}$ (CDCl_3) δ : 7.04 (1H, s), 7.06-7.10 (2H, m), 7.21 (1H, s), 7.23 (1H, s), 7.25-7.29 (1H, m), 7.42-7.47 (2H, m).

[0260]

Reference Example 88

Synthesis of trifluoromethanesulfonic acid 3-(thiophen-3-yl)-5-trifluoromethylphenyl ester

The title compound was obtained using 3-(3-methoxy-5-trifluoromethyl-phenyl)-thiophene in the same manner as in Reference Example 87.

$^1\text{H-NMR}$ (CDCl_3) δ : 7.38 (1H, dd, $J = 1.3, 5.0$ Hz), 7.43 (1H, s), 7.48 (1H, dd, $J = 3.0, 5.0$ Hz), 7.60 (1H, dd, $J = 1.3, 3.0$ Hz), 7.65 (1H, s), 7.85 (1H, s).

[0261]

Reference Example 89

Synthesis of 3-phenoxy-5-trifluoromethyl-benzonitrile

A suspension of trifluoromethanesulfonic acid 3-phenoxy-5-trifluoromethylphenyl ester (638.7 mg, 1.65 mmol), zinc

cyanide (300 mg, 2.56 mmol) and Pd(PPh₃)₄ (190 mg, 0.164 mmol) in DMF (6 ml) was heated to 80°C for 8 hr under argon. The reaction mixture was allowed to cool to room temperature. The reaction mixture was filtered through a layer of Celite with
5 AcOEt. The filtrate was washed twice with water and filtered through a column of silica gel. The eluate was concentrated in vacuo and the crude product was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 10% gradient)) to give the title compound (348 mg, 80%) as a
10 colorless oil.

¹H-NMR (CDCl₃) δ: 7.04-7.08 (2H, m), 7.26-7.30 (1H, m), 7.34 (1H, s), 7.42-7.48 (3H, m), 7.58 (1H, s).

[0262]

Reference Example 90

15 Synthesis of 3-(thiophen-3-yl)-5-trifluoromethyl-benzonitrile

The title compound was obtained using trifluoromethanesulfonic acid 3-(thiophen-3-yl)-5-trifluoromethylphenyl ester in the same manner as in Reference Example 89.

20 ¹H-NMR (CDCl₃) δ: 7.39 (1H, dd, J = 1.3, 5.1 Hz), 7.49 (1H, dd, J = 2.8, 5.1 Hz), 7.61 (1H, dd, J = 1.3, 2.8 Hz), 7.82 (1H, s), 8.03 (2H, s).

[0263]

Reference Example 91

25 Synthesis of 2-chloro-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzonitrile

To a suspension of 19 mg of 1,1'-bis(diphenylphosphino)ferrocene-palladium(II) dichloride CH₂Cl₂ complex and 263 mg of sodium phosphate tribasic dodecahydrate
30 in 1.5 ml of dimethoxyethane were added 100 mg of 3-bromo-2-chloro-benzonitrile and 165 mg of trans-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester and 0.5 ml of water.

The reaction mixture was stirred at 80°C under nitrogen
35 for 7 hr. The reaction was quenched by addition of water and

then AcOEt was added thereto. After separation the aqueous phase was extracted with AcOEt. The organic solution was filtered through a Na₂SO₄ and silica gel pad and concentrated. The residue was purified by silica gel column chromatography
5 (hexane/AcOEt 5% -> hexane/AcOEt 20%) to give the title compound (111 mg, 78%) as a white solid.

¹H-NMR (CDCl₃) δ: 7.15 (1H, d, J = 16.5 Hz), 7.41 (1H, t, J = 8.1 Hz), 7.50-7.64 (4H, m), 7.74-7.77 (2H, m), 7.90 (1H, dd, J = 1.5, 8.1 Hz).

10 [0264]

Reference Example 92

Synthesis of 3-cyclohexylmethoxymethyl-benzaldehyde

To a solution of cyclohexanemethanol (350 mg, 3.07 mmol) in DMF (5 ml) was added 60% NaH (120 mg, 3.0 mmol) at 0°C under
15 argon and the reaction mixture was stirred at 0°C for 15 min. To the reaction mixture was added α-bromo-m-tolunitrile (590 mg, 3.0 mmol) at 0°C, and the reaction mixture was stirred at room temperature overnight. Water was added to the reaction mixture, and the mixture was extracted with AcOEt. The organic
20 layers were washed twice with water, and then dried over anhydrous MgSO₄. The solvents were removed under reduced pressure to give crude product as a pale yellow oil. The crude material was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 7% gradient)) to give 295.7 mg of 3-
25 ((cyclohexylmethoxy)methyl)benzonitrile as a colorless oil.

A suspension of 3-((cyclohexylmethoxy)methyl)benzonitrile (295.7 mg) and Raney Ni (1.0 g) in 88% formic acid (10 ml) was heated to 100°C for 1.5 hr. The reaction mixture was allowed to cool to room temperature. The reaction mixture was diluted
30 with diisopropyl ether and filtered through a layer of Celite. The filtrate was washed three times with water, and then dried over anhydrous MgSO₄. The solvents were removed under reduced pressure, and the resulting crude product was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 7%
35 gradient)) to give the title compound (262 mg, 38%) as a

colorless oil.

¹H-NMR (CDCl₃) δ: 0.85-1.00 (2H, m), 1.00-1.40 (3H, m), 1.60-1.95 (6H, m), 3.30 (2H, d, J = 6.5 Hz), 4.56 (2H, s), 7.51 (1H, t, J = 7.5 Hz), 7.62 (1H, d, J = 7.5 Hz), 7.80 (1H, d, J = 7.5 Hz), 7.85 (1H, s), 10.03 (1H, s).

[0265]

Reference Example 93

Synthesis of 3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethyl-benzaldehyde

To a solution of 440 mg of 3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethyl-benzonitrile in 1 ml of THF were added 2 ml of formic acid (90%) and 250 mg of Raney Ni. The reaction mixture was stirred at 100°C for 2 hr. After cooling to room temperature the mixture was diluted with AcOEt and filtered. The filtrate was concentrated. The residue was diluted with water and the mixture was extracted with CH₂Cl₂ twice. The organic solution was washed with water and brine, dried over MgSO₄, and concentrated to give the title compound (440 mg, quant.) as a white solid.

¹H-NMR (CDCl₃) δ: 5.38 (2H, s), 7.53 (1H, s), 7.67 (1H, s), 7.80-7.75 (2H, m), 7.89 (1H, d, J = 8.2 Hz), 8.05 (1H, s), 10.05 (1H, s).

[0266]

Reference Example 94

Synthesis of 3-(1-methyl-2-phenyl-ethoxy)-5-trifluoromethyl-benzaldehyde

The title compound was obtained using 3-(1-methyl-2-phenyl-ethoxy)-5-trifluoromethyl-benzonitrile in the same manner as in Reference Example 93.

¹H-NMR (CDCl₃) δ: 1.36 (3H, d, J = 6.0 Hz), 2.90 (1H, dd, J = 6.0, 13.8 Hz), 3.09 (1H, dd, J = 6.5, 13.8 Hz), 4.67-4.73 (1H, m), 7.20-7.33 (6H, m), 7.49 (1H, s), 7.65 (1H, s), 9.97 (1H, s).

[0267]

Reference Example 95

Synthesis of 3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-benzaldehyde

The title compound was obtained using 3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-benzonitrile in the same manner
5 as in Reference Example 93.

¹H-NMR (CDCl₃) δ: 3.96 (3H, s), 7.50-7.53 (2H, m), 7.90 (1H, s), 7.99 (1H, s), 8.12 (1H, s), 8.90 (1H, d, J = 5.0 Hz), 10.08 (1H, s).

[0268]

10 Reference Example 96

Synthesis of 3-hydroxy-5-(5-trifluoromethyl-pyridin-2-yl)-benzaldehyde

The title compound was obtained using 3-methoxymethoxy-5-(5-trifluoromethyl-pyridin-2-yl)-benzonitrile in the same
15 manner as in Reference Example 93.

¹H-NMR (DMSO-d₆) δ: 7.39 (1H, s), 7.90 (1H, s), 8.17 (1H, s), 8.25 (1H, d, J = 8.5 Hz), 8.33 (1H, dd, J = 2.2, 8.5 Hz), 9.08 (1H, s), 10.04 (1H, s).

[0269]

20 Reference Example 97

Synthesis of 2-chloro-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

The title compound was obtained using 2-chloro-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzonitrile in the same
25 manner as in Reference Example 93.

¹H-NMR (CDCl₃) δ: 7.13 (1H, d, J = 16.2 Hz), 7.43 (1H, t, J = 7.7 Hz), 7.53-7.65 (3H, m), 7.74-7.79 (2H, m), 7.87-7.93 (2H, m), 10.59 (1H, s).

[0270]

30 Reference Example 98

Synthesis of 6-(tert-butyl-dimethyl-silyloxymethyl)-pyridine-2-carbaldehyde

To a solution of 610 mg of [6-(tert-butyl-dimethyl-silyloxymethyl)-pyridin-2-yl]-methanol in 8 ml of CH₃CN was
35 added 876 mg of IBX. The reaction mixture was stirred at 70°C

for 1 hr. The reaction was diluted with isopropyl ether and the resulting suspension was filtered. The filtrate was concentrated to give the title compound (567 mg, 94%) as a colorless oil.

5 $^1\text{H-NMR}$ (CDCl_3) δ : 0.16 (6H, s), 0.98 (9H, s), 4.93 (2H, s), 7.75-7.92 (3H, m), 10.03 (1H, s).

[0271]

Reference Example 99

Synthesis of 1-[6-(tert-butyl-dimethyl-silyloxymethyl)-
10 pyridin-2-yl]-propan-1-ol

To a solution of 563 mg of 6-(tert-butyl-dimethyl-silyloxymethyl)-pyridine-2-carbaldehyde in 8 ml of THF was added 1.46 ml of 2 molar ethylmagnesium chloride at -20°C . The reaction mixture was stirred at same temperature for 2 hr and
15 warmed to room temperature. The reaction was quenched by addition of saturated ammonium chloride aqueous solution, and the mixture was extracted twice with AcOEt. The organic solution was washed with water and brine, and concentrated. The residue was purified by silica gel column chromatography
20 (hexane/AcOEt 5% $\rightarrow$ hexane/AcOEt 20%) to give the title compound (296 mg, 47%) as a pale pink solid.

$^1\text{H-NMR}$ (CDCl_3) δ : 0.12 (6H, s), 0.92-0.98 (12H, m), 1.66-1.73 (1H, m), 1.83-1.89 (1H, m), 4.32 (1H, d, $J = 5.4$ Hz), 4.64-4.68 (1H, m), 4.83 (2H, s), 7.09 (1H, d, $J = 7.8$ Hz), 7.40 (1H,
25 d, $J = 7.8$ Hz), 7.69 (1H, t, $J = 7.8$ Hz).

[0272]

Reference Example 100

Synthesis of {6-[1-(4-trifluoromethyl-benzyloxy)-propyl]-
pyridin-2-yl}-methanol

30 To a solution of 290 mg of 1-[6-(tert-butyl-dimethyl-silyloxymethyl)-pyridin-2-yl]-propan-1-ol and 0.175 ml of α' -bromo- α,α,α -trifluoro-p-xylene in 4 ml of DMF was added 50 mg of NaH (60 wt%) at 0°C . The reaction mixture was stirred at room temperature for 15 hr. The
35 reaction was quenched by addition of 1 molar HCl, and the

mixture was extracted twice with AcOEt. The organic solution was washed with water and brine, and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 20% -> hexane/AcOEt 40%) to give the title compound (255 mg, 5 76%) as a white solid.

¹H-NMR (CDCl₃) δ: 0.96 (3H, t, J = 7.4 Hz), 1.84-1.91 (2H, m), 3.86 (1H, t, J = 5.0 Hz), 4.43-4.57 (3H, m), 4.76 (2H, d, J = 5.0 Hz), 7.14 (1H, d, J = 7.8 Hz), 7.35 (1H, d, J = 7.8 Hz), 7.45 (2H, d, J = 8.1 Hz), 7.60 (2H, d, J = 8.1 Hz), 7.71 (1H, 10 t, J = 7.8 Hz).

[0273]

Reference Example 101

Synthesis of 6-[1-(4-trifluoromethyl-benzyloxy)-propyl]-pyridine-2-carbaldehyde

15 To a solution of 250 mg of {6-[1-(4-trifluoromethyl-benzyloxy)-propyl]-pyridin-2-yl}-methanol in 4 ml of DMSO was added 280 mg of IBX. The reaction mixture was stirred at room temperature for 3 hr. The reaction was quenched by addition of water, and the mixture was extracted twice with AcOEt. The 20 organic solution was washed with water and brine, and concentrated. The residue was filtered through a silica gel short column to give the title compound (249 mg, quant.) as a pale blue oil.

¹H-NMR (CDCl₃) δ: 0.99 (3H, t, J = 7.5 Hz), 1.88-1.97 (2H, m), 25 4.49-4.59 (3H, m), 7.46 (2H, d, J = 8.1 Hz), 7.60 (2H, d, J = 8.1 Hz), 7.67-7.70 (1H, m), 7.89-7.90 (2H, m), 10.08 (1H, s).

[0274]

Reference Example 102

Synthesis of (3-diethoxymethyl-phenyl)-methanol

30 To a solution of 3-(diethoxymethyl)benzaldehyde (2.51 g, 12.1 mmol) in EtOH (40 ml) was added NaBH₄ (0.68 g, 18.1 mmol) at 0°C. The reaction mixture was stirred overnight at room temperature. Water was added to the reaction mixture at 0°C, and the mixture was extracted twice with AcOEt. The combined 35 organic layers were washed with water and brine, dried over

Na₂SO₄, and concentrated *in vacuo* to give the title compound (2.45 g, 96%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.22-1.27 (6H, m), 1.64 (1H, t, J = 6.1 Hz), 3.51-3.66 (4H, m), 4.72 (2H, d, J = 6.1 Hz), 5.50 (1H, s),
5 7.33-7.41 (3H, m), 7.48 (1H, s).

[0275]

Reference Example 103

Synthesis of methanesulfonic acid 2,5-bis-trifluoromethyl-benzyl ester

10 To a solution of 2,5-bis(trifluoromethyl)benzyl alcohol (1.50 g, 6.15 mmol) in AcOEt (30 ml) were added Et₃N (1.72 ml, 12.3 mmol) and MsCl (0.57 ml, 7.38 mmol) at 0°C. The reaction mixture was stirred overnight at room temperature. Water was added to the reaction mixture, and the mixture was extracted
15 twice with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo* to give the title compound (2.00 g, 100%) as a white solid.

¹H-NMR (CDCl₃) δ: 3.11 (3H, s), 5.45 (2H, s), 7.78 (1H, d, J = 8.2 Hz), 7.87 (1H, d, J = 8.2 Hz), 7.93 (1H, s).

20 [0276]

Reference Example 104

Synthesis of methanesulfonic acid 3-fluoro-5-trifluoromethyl-benzyl ester

The title compound was obtained using 3-fluoro-5-
25 (trifluoromethyl)benzyl alcohol in the same manner as in Reference Example 103.

¹H-NMR (CDCl₃) δ: 3.06 (3H, s), 5.26 (2H, s), 7.32-7.39 (2H, m), 7.47 (1H, s).

[0277]

30 Reference Example 105

Synthesis of methanesulfonic acid 3-diethoxymethyl-benzyl ester

The title compound was obtained using 3-diethoxymethyl-benzyl alcohol in the same manner as in Reference Example 103.

35 ¹H-NMR (CDCl₃) δ: 1.23-1.27 (6H, m), 2.93 (3H, s), 3.51-3.65

(4H, m), 5.26 (2H, s), 5.51 (1H, s), 7.34-7.40 (2H, m), 7.42-7.53 (2H, m).

[0278]

Reference Example 106

5 Synthesis of methanesulfonic acid 2,4-bis-trifluoromethyl-benzyl ester

To solution of 2,4-bistrifluoromethylbenzaldehyde (1.5 g, 6.20 mmol) in EtOH (20 ml) was added NaBH₄ (100 mg, 2.74 mmol) at room temperature, and the reaction mixture was stirred for
10 2 hr. The solvents were removed under reduced pressure. The residue that was diluted with AcOEt was washed with dilute HCl and water (3 times), and the organic layer was dried over anhydrous MgSO₄. The solvents were removed under reduced pressure to give 1.54 g of a crude (2,4-
15 bis(trifluoromethyl)phenyl)methanol as a colorless oil.

To a solution of (2,4-bis(trifluoromethyl)phenyl)methanol (1.54 g) and Et₃N (1.2 ml, 8.63 mmol) in CH₂Cl₂ (50 ml) was added dropwise MsCl (0.55 ml, 7.11 mmol) at 0°C. The reaction mixture was stirred at 0°C for 2 hr. Then water was added. The
20 organic layers were separated and washed with diluted HCl and water (3 times), and then dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give the title compound (1.91 g, 96%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 3.10 (3H, s), 5.46 (2H, s), 7.83-7.92 (2H, m),
25 7.97 (1H, s).

[0279]

Reference Example 107

Synthesis of 3-trifluoromethoxy-5-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-benzaldehyde

To a solution of 3-bromo-5-trifluoromethoxy-benzaldehyde
30 (1.20 g, 4.46 mmol) in DMSO (20 mL) were added bis(neopentylglycolato)diboron (1.11 g, 4.91 mmol), [1,1'-bis(diphenylphosphino)ferrocene]palladium(II) dichloride (0.11 g, 0.134 mmol) and AcOK (1.31, 13.4 mmol). The reaction
35 mixture was stirred for 2.5 hr at 80°C under nitrogen. Water

was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water (twice) and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by
5 silica gel flash column chromatography (Hexane:AcOEt=100:0-70:30) to give the title compound (0.72 g, 53%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.04 (6H, s), 3.80 (4H, s), 7.77 (1H, s), 7.87 (1H, s), 8.22 (1H, s), 10.04 (1H, s).

10 [0280]

Reference Example 108

Synthesis of 3-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-5-trifluoromethyl-benzaldehyde

The title compound was obtained using 3-bromo-5-
15 trifluoromethylbenzaldehyde and bis(pinacolato)diboron in the same manner as in Reference Example 107.

¹H-NMR (CDCl₃) δ: 1.40 (12H, s), 8.24 (1H, s), 8.31 (1H, s), 8.49 (1H, s), 10.11 (1H, s).

[0281]

20 Reference Example 109

Synthesis of 3-chloro-5-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-benzaldehyde

The title compound was obtained using 3-bromo-5-chloro-benzaldehyde and bis(neopentyl glycolato)diboron in the same
25 manner as in Reference Example 107.

¹H-NMR (CDCl₃) δ: 1.04 (6H, s), 3.80 (4H, s), 7.90 (1H, s), 8.01 (1H, s), 8.16 (1H, s), 10.00 (1H, s).

[0282]

Reference Example 110

30 Synthesis of 4-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-3-methyl-benzaldehyde

The title compound was obtained using 4-bromo-3-methyl-benzaldehyde and bis(neopentyl glycolato)diboron in the same manner as in Reference Example 107.

35 ¹H-NMR (CDCl₃) δ: 1.05 (6H, s), 2.58 (3H, s), 3.80 (4H, s),

7.61-7.66 (2H, m), 7.85-7.89 (1H, m), 9.99 (1H, s).

[0283]

Reference Example 111

Synthesis of 3-tert-butyl-5-(4,4,5,5-tetramethyl-
5 [1,3,2]dioxaborolan-2-yl)-benzaldehyde

The title compound was obtained using 3-bromo-5-tert-butyl-benzaldehyde and bis(pinacolato)diboron in the same manner as in Reference Example 107.

¹H-NMR (CDCl₃) δ: 1.39 (12H, s), 1.40 (9H, s), 8.02-8.04 (1H,
10 m), 8.10-8.12 (1H, m), 8.13-8.15 (1H, m), 10.06 (1H, s).

[0284]

Reference Example 112

Synthesis of 3-(3-hydroxy-phenyl)-thiophene-2-carbaldehyde

To a solution of 3-bromothiophene-2-carboxaldehyde (1.30
15 g, 6.81 mmol) in DME (26 ml) were added 3-hydroxyphenylboronic acid (1.03 g, 7.49 mmol), [1,1'-bis(diphenylphosphino)ferrocene]palladium(II) dichloride (0.17 g, 0.204 mmol) and 2M sodium carbonate solution (7.49 ml, 15.0 mmol). The reaction mixture was stirred for 2 hr at 80°C under
20 nitrogen. Water was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=65:35-
25 50:50) to give the title compound (1.32 g, 95%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 5.31 (1H, s), 6.92-6.96 (2H, m), 7.03-7.05 (1H, m), 7.22 (1H, d, J = 5.0 Hz), 7.35 (1H, t, J = 7.8 Hz), 7.74-7.75 (1H, m), 9.91 (1H, s).

30 [0285]

Reference Example 113

Synthesis of 1-(3-diethoxymethyl-benzyloxy)-3,5-bis-trifluoromethyl-benzene

To a solution of 3-diethoxymethyl-benzyl bromide (0.50 g,
35 1.74 mmol) in DMF (8 ml) were added 3,5-

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bis(trifluoromethyl)phenol (0.42 g, 1.82 mmol) and K_2CO_3 (0.36 g, 2.60 mmol). The reaction mixture was stirred for 2 hr at 80°C. After cooling to room temperature, water was added to the reaction mixture, and the mixture was extracted twice with
5 AcOEt. The combined organic layers were washed with water and brine, dried over Na_2SO_4 , and concentrated in vacuo. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=100:0-90:10) to give the title compound (0.25 g, 34%) as a colorless oil.
10 ^1H -NMR ($CDCl_3$) δ : 1.24 (6H, t, J = 7.0 Hz), 3.49-3.67 (4H, m), 5.16 (2H, s), 5.53 (1H, s), 7.38-7.49 (6H, m), 7.55 (1H, s).
[0286]

Reference Example 114

Synthesis of (3,5-bis-trifluoromethyl-benzyl)-(3-
15 ([1,3]dioxolan-2-yl)-phenyl)-amine

To a solution of 2-(3-bromophenyl)-1,3-dioxolane (2.00 g, 8.73 mmol) in toluene (40 ml) were added 3,5-bis(trifluoromethyl)benzylamine (2.12 g, 8.73 mmol), $Pd(OAc)_2$ (98 mg, 0.437 mmol), rac-BINAP (0.54g 0.873 mmol) and tert-
20 BuONa (0.92 g, 9.61 mmol). The reaction mixture was stirred for 2.5 hr at 100°C under argon atmosphere. After cooling to room temperature, the mixture was filtered through a pad of Celite and concentrated in vacuo. The residue obtained was purified by silica gel flash column chromatography
25 (Hexane:AcOEt=100:0-75:25) to give the title compound (2.74 g, 80%) as an orange solid.
 ^1H -NMR ($CDCl_3$) δ : 3.98-4.18 (4H, m), 4.19-4.32 (1H, m), 4.48 (2H, d, J = 5.9 Hz), 5.74 (1H, s), 6.53-6.62 (1H, m), 6.77 (1H, s), 6.88 (1H, d, J = 7.8 Hz), 7.19 (1H, t, J = 7.8 Hz), 7.79
30 (1H, s), 7.84 (2H, s).

[0287]

Reference Example 115

Synthesis of (3,5-bis-trifluoromethyl-benzyl)-(3-
([1,3]dioxolan-2-yl)-phenyl)-methyl-amine

35 To a solution of (3,5-bis-trifluoromethyl-benzyl)-(3-

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5 ([1,3]dioxolan-2-yl)-phenyl)-amine (0.50 g, 1.28 mmol) in DMF (10 ml) was added NaH (61 mg, 1.53 mmol, 60 wt% in mineral oil) at 0°C. After the resulting suspension was stirred for 15 min, MeI (0.16 ml, 2.56 mmol) was added. The reaction mixture was stirred overnight at room temperature. Saturated aqueous NH₄Cl solution was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=100:0-85:15) to give the title compound (0.22 g, 42%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 3.04 (3H, s), 4.01-4.16 (4H, m), 4.61 (2H, s), 5.78 (1H, s), 6.69-6.72 (1H, m), 6.89-6.91 (2H, m), 7.23-7.28 (1H, m), 7.71 (2H, s), 7.98 (1H, s).

[0288]

Reference Example 116

Synthesis of 2-(3-bromo-5-chloro-phenyl)-[1,3]dioxolane

To a solution of 3-bromo-5-chloro-benzaldehyde (2.00 g, 9.13 mmol) in toluene (15 ml) were added ethylene glycol (0.76 ml, 9.13 mmol) and p-toluenesulfonic acid (87 mg, 0.457 mmol). The reaction mixture was refluxed for 6 hr using Dean-Stark apparatus. After cooling to room temperature, saturated aqueous NaHCO₃ solution was added to the reaction mixture at 0°C, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=100:0-90:10) to give the title compound (1.49 g, 62%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 4.00-4.13 (4H, m), 5.76 (1H, s), 7.40 (1H, s), 7.50-7.51 (2H, m).

[0289]

Reference Example 117

35 Synthesis of 1-(3-chloro-5-([1,3]dioxolan-2-yl)-phenyl)-4-

trifluoromethyl-piperidine

The title compound was obtained using 4-trifluoromethyl-piperidine and 2-(3-bromo-5-chloro-phenyl)-1,3-dioxolane in the same manner as in Reference Example 114.

5 $^1\text{H-NMR}$ (CDCl_3) δ : 1.67-1.76 (2H, m), 1.94-1.98 (2H, m), 2.09-2.24 (1H, m), 2.70-2.77 (2H, m), 3.74-3.80 (2H, m), 4.00-4.15 (4H, m), 5.73 (1H, s), 6.85-6.87 (1H, m), 6.89-6.91 (1H, m), 6.95-6.96 (1H, m).

[0290]

10 Reference Example 118

Synthesis of (3,5-bis-trifluoromethyl-benzyl)-triphenyl-phosphonium iodide

A suspension of 3,5-bis(trifluoromethyl)benzyl bromide (1.0 g, 3.26 mmol) and sodium iodide (1.0 g, 6.67 mmol) in
15 acetone (10 ml) was stirred under reflux for 0.5 hr. The reaction mixture was filtered and the solvents were removed under reduced pressure. The residue was diluted with CH_2Cl_2 and was filtered. The solvents were removed under reduced pressure. To a solution of the resulting residue in CH_3CN was added PPh_3
20 (1.0 g, 3.81 mmol). The mixture was stirred under reflux for 1 hr. The reaction mixture was allowed to cool to room temperature. The solvents were removed under reduced pressure. To the residue was added AcOEt and hexane to give a suspension. The suspension was filtrated to give the title compound (1.89
25 g, 94%) as pale yellow prisms.

$^1\text{H-NMR}$ (CDCl_3) δ : 5.84 (2H, d, $J = 14.9$ Hz), 7.57 -7.75 (9H, m), 7.75-7.90 (9H, m).

[0291]

Reference Example 119

30 Synthesis of (3-trifluoromethyl-benzyl)-phosphonic acid diethyl ester

A solution of 3-trifluoromethylbenzyl bromide (2.53 g, 10.6 mmol) and triethyl phosphite (3 ml, 17.5 mmol) was heated at 140°C at 10 hr. The excess of reagents were removed *in vacuo*.
35 The residue was purified by silica gel column chromatography

(AcOEt:hexane = 1:2) to give the title compound (2.82 g, 90%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.22-1.29 (6H, m), 3.19 (2H, d, J = 21.8 Hz), 3.98-4.14 (4H, m), 7.26-7.55 (4H, m).

5 [0292]

Reference Example 120

Synthesis of (3-diethoxymethyl-benzyl)-phosphonic acid diethyl ester

To a solution of potassium t-butoxide (1 g, 8.91 mmol) in
10 tetrahydrofuran (8 ml) was added diethyl phosphite (1.1 ml, 8.54 mmol) at 0°C under argon. The mixture was stirred at 0°C for 45 min. To the reaction mixture was added a solution of 3-(diethoxymethyl)benzyl methanesulfonate (1.2 g, 4.2 mmol) in tetrahydrofuran (5 ml) at 0°C, and the mixture was stirred at
15 room temperature overnight. Water was added to the reaction mixture, and the mixture was extracted with AcOEt-hexane (1:4). The organic layers were washed with brine, and dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give crude product as a colorless oil. The crude
20 material was purified by silica gel (neutral) column chromatography (AcOEt/hexane = 1:2) to give the title compound (977 mg, 70%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.15-1.3 (12H, m), 3.16 (2H, d, J = 21.5 Hz), 3.5-3.7 (4H, m), 3.9-4.05 (4H, m), 5.49 (1H, s), 7.25-7.4 (4H,
25 m).

[0293]

Reference Example 121

Synthesis of (6-bromo-benzofuran-2-yl)-methanol

The title compound was obtained using 6-bromo-benzofuran-
30 2-carboxylic acid ethyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 4.76 (2H, s), 6.64 (1H, s), 7.33-7.43 (2H, m), 7.63 (1H, s).

[0294]

35 Reference Example 122

Synthesis of 6-bromo-benzofuran-2-carbaldehyde

The title compound was obtained using (6-bromo-benzofuran-2-yl)-methanol in the same manner as in Reference Example 48.

5 $^1\text{H-NMR}$ (CDCl_3) δ : 7.47-7.54 (2H, m), 7.63 (1H, d, $J = 8.4$ Hz), 7.80 (1H, s), 9.88 (1H, s).

[0295]

Reference Example 123

Synthesis of 2-(3'-trifluoromethyl-biphenyl-3-yl)-ethanol

10 The title compound was obtained using 3-bromophenethyl alcohol and 3-(trifluoromethyl)phenylboronic acid in the same manner as in Reference Example 91.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.44 (1H, t, $J = 6.0$ Hz), 2.96 (2H, t, $J = 6.0$ Hz), 3.93 (2H, q, $J = 6.0$ Hz), 7.27-7.62 (6H, m), 7.75-
15 7.83 (2H, m).

[0296]

Reference Example 124

Synthesis of 4-hydroxy-3-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

20 The title compound was obtained using 3-bromo-4-hydroxybenzaldehyde and (*E*)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

$^1\text{H-NMR}$ (DMSO-d_6) δ : 7.07 (1H, d, $J = 8.4$ Hz), 7.48 (1H, d, $J =$
25 16.6 Hz), 7.57 (1H, d, $J = 16.6$ Hz), 7.62-7.63 (2H, m), 7.72 (1H, dd, $J = 2.0, 8.4$ Hz), 7.93 (2H, s), 8.19 (1H, d, $J = 2.0$ Hz), 9.85 (1H, s).

[0297]

Reference Example 125

30 Synthesis of trifluoromethanesulfonic acid 4-formyl-2-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl ester

To a solution of 200 mg of 4-hydroxy-3-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde in CH_2Cl_2 were added 0.179 ml of DIPEA and 0.139 ml of
35 trifluoromethanesulfonic anhydride at 0°C , and the mixture was

stirred at room temperature for 18 hr. The reaction was quenched by addition of water. The aqueous phase was extracted twice with AcOEt. The organic layer were washed with water and brine, and concentrated. The residue was purified by silica
5 gel column chromatography (hexane/AcOEt 5% => hexane/AcOEt 20%) to give the title compound (74 mg, 26%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 7.33 (1H, d, J = 16.4 Hz), 7.38 (1H, d, J = 16.4 Hz), 7.51-7.62 (3H, m), 7.74-7.78 (2H, m), 7.90 (1H, dd,
10 J = 2.0, 8.5 Hz), 8.30 (1H, d, J = 2.0 Hz), 10.09 (1H, s).

[0298]

Reference Example 126

Synthesis of {4-trifluoromethyl-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-methanol

15 The title compound was obtained using (3-bromo-4-trifluoromethyl-phenyl)-methanol and (E)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 1.95 (1H, s), 4.82 (2H, s), 7.13 (1H, d, J =
20 16.1 Hz), 7.38 (1H, d, J = 8.1 Hz), 7.48-7.57 (3H, m), 7.67-7.79 (4H, m).

[0299]

Reference Example 127

Synthesis of 2-(3-chloro-4-fluoro-phenyl)-4-trifluoromethyl-thiazole-5-carboxylic acid ethyl ester
25

The title compound was obtained using 2-bromo-4-trifluoromethyl-thiazole-5-carboxylic acid ethyl ester and 3-chloro-4-fluorophenylboronic acid in the same manner as in Reference Example 91.

30 ¹H-NMR (CDCl₃) δ: 1.41 (3H, t, J = 7.1 Hz), 4.42 (2H, q, J = 7.1 Hz), 7.23-7.29 (1H, m), 7.86 (1H, ddd, J = 2.3, 4.4, 8.6 Hz), 8.09 (1H, dd, J = 2.3, 6.8 Hz).

[0300]

Reference Example 128

35 Synthesis of 2-(4-trifluoromethoxy-phenyl)-oxazole-4-

carboxylic acid ethyl ester

To the solution of 4-(trifluoromethoxy)benzamide (500 mg, 2.437 mmol) in EtOH (4 ml) was added ethyl bromopyruvate (0.918 ml, 7.31 mmol). The reaction mixture was stirred at
5 150°C for 20 min by using a microwave reactor. After concentration, the residue was purified by flash column chromatography (hexane/AcOEt = 9/1 to 2/1) to give the title compound (180 mg, crude) as a white solid.

¹H-NMR (CDCl₃) δ: 1.42 (3H, t, J = 7.1 Hz), 4.44 (2H, q, J =
10 7.1 Hz), 7.29-7.35 (2H, m), 8.14-8.19 (2H, m), 8.29 (1H, s).
[0301]

Reference Example 129

Synthesis of 3-(5-fluoro-benzoxazol-2-yl)-benzoic acid methyl ester

15 To a solution of methyl hydrogen isophthalate (1.5 g, 8.33 mmol) and 2-amino-4-fluorophenol (1.058 g, 8.33 mmol) in methanesulfonic acid (15 ml, 231 mmol) was added slowly phosphoric anhydride (5.91 g, 41.6 mmol). The reaction mixture was stirred for 2 hr at 80°C. After the reaction mixture was
20 cooled to 0°C, saturated aqueous NaHCO₃ solution was added to the reaction mixture. The precipitate was collected by filtration, washed with water and CH₃CN:water (1:1) and air-dried at 60°C to give the title compound (1.08 g, 48%) as a brown solid.

25 ¹H-NMR (DMSO-d₆) δ: 3.94 (3H, s), 7.30-7.38 (1H, m), 7.72-7.92 (3H, m), 8.20-8.24 (1H, m), 8.43-8.48 (1H, m), 8.72-8.74 (1H, m).

[0302]

Reference Example 130

30 Synthesis of [3-(5-fluoro-benzoxazol-2-yl)-phenyl]-methanol

To a solution of 3-(5-fluoro-benzoxazol-2-yl)-benzoic acid methyl ester (0.50 g, 1.84 mmol) in THF (10 ml) was added LiAlH₄ (0.07 g, 1.84 mmol) at 0°C. The reaction mixture was stirred for 3.5 hr at the same temperature. Water, 15% NaOH
35 aqueous solution and water were added successively to the

reaction mixture. The suspension was filtered through a pad of Celite. Water was added to the filtrate, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated *in vacuo* to give the title compound (332 mg, 74%) as an orange solid.

¹H-NMR (DMSO-d₆) δ: 1.81 (1H, t, J = 5.6 Hz), 4.82 (2H, d, J = 5.6 Hz), 7.05-7.13 (1H, m), 7.43-7.60 (4H, m), 8.14-8.19 (1H, m), 8.25 (1H, s).

[0303]

10 Reference Example 131

Synthesis of 3-[2-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-propionic acid methyl ester

The title compound was obtained using methyl 3-(2-hydroxyphenyl)propionate and 2,5-bis(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 2.65-2.70 (2H, m), 3.06 (2H, t, J = 7.9 Hz), 3.67 (3H, s), 5.32 (2H, s), 6.88 (1H, d, J = 8.3 Hz), 6.93 (1H, t, J = 6.5 Hz), 7.19-7.26 (2H, m), 7.71 (1H, d, J = 8.3 Hz), 7.65 (1H, d, J = 8.3 Hz), 8.11 (1H, s).

20 [0304]

Reference Example 132

Synthesis of 3-[2-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-propan-1-ol

The title compound was obtained using 3-[2-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-propionic acid methyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 1.38 (1H, t, J = 5.6 Hz), 1.88-1.97 (2H, m), 2.83 (2H, t, J = 7.3 Hz), 3.66-3.72 (2H, m), 5.32 (2H, s), 6.89 (1H, d, J = 8.2 Hz), 6.98 (1H, t, J = 7.4 Hz), 7.18-7.24 (2H, m), 7.71 (1H, d, J = 8.2 Hz), 7.85 (1H, d, J = 8.2 Hz), 8.14 (1H, s).

[0305]

Reference Example 133

Synthesis of 2-(4-chloro-phenyl)-5-methyl-oxazole-4-carboxylic acid methyl ester

35 acid methyl ester

To a solution of methyl acetoacetate (0.108 ml, 1 mmol) in DMF (3 ml) were added 4-chlorobenzylamine (1.5 mmol), iodine (305 mg, 1.200 mmol), copper(II) acetate hydrate (19.96 mg, 0.100 mmol) and tert-butyl hydroperoxide (0.333 ml, 2.000 mmol). After the reaction mixture was stirred for 4 hr at room temperature, additional 4-chlorobenzylamine (0.5 mmol) was added to the reaction again. The reaction mixture was stirred for 14 hr at rt. The reaction was quenched by addition of water, and the mixture was extracted three times with AcOEt. The organic solution was washed with water, 10% sodium thiosulfate aqueous solution, and brine and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 5% -> hexane/AcOEt 20%) to give the title compound (67 mg, 27%) as a white solid.

¹H-NMR (CDCl₃) δ: 2.71 (3H, s), 3.95 (3H, s), 7.42-7.45 (2H, m), 7.99-8.02 (2H, m).

[0306]

Reference Example 134

Synthesis of [2-(4-chloro-phenyl)-5-methyl-oxazol-4-yl]-methanol

The title compound was obtained using 2-(4-chloro-phenyl)-5-methyl-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

¹H-NMR (CDCl₃) δ: 2.40 (3H, s), 4.59 (2H, s), 7.39-7.42 (2H, m), 7.91-7.94 (2H, m).

[0307]

Reference Example 135

Synthesis of 5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazole-4-carboxylic acid methyl ester

The title compound was obtained using 3-cyclopropyl-3-oxopropionic acid methyl ester and 3-(trifluoromethyl)benzylamine in the same manner as in Reference Example 133.

¹H-NMR (CDCl₃) δ: 1.21-1.28 (4H, m), 2.81-2.90 (1H, m), 3.98 (3H, s), 7.58 (1H, t, J = 7.8 Hz), 7.71 (1H, d, J = 7.8 Hz),

8.18 (1H, d, $J = 7.8$ Hz), 8.25 (1H, s).

[0308]

Reference Example 136

Synthesis of 2-(3-chloro-phenyl)-5-cyclopropyl-oxazole-4-
5 carboxylic acid methyl ester

The title compound was obtained using methyl 3-cyclopropyl-3-oxopropionate and 3-chlorobenzylamine in the same manner as in Reference Example 133.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.19-1.23 (4H, m), 2.80-2.87 (1H, m), 3.97
10 (3H, s), 7.35-7.43 (2H, m), 7.88 (1H, dt, $J = 1.5, 7.5$ Hz),
7.98 (1H, t, $J = 1.5$ Hz).

[0309]

Reference Example 137

Synthesis of [5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-
15 oxazol-4-yl]-methanol

The title compound was obtained using 5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

$^1\text{H-NMR}$ (CDCl_3) δ : 0.99-1.10 (4H, m), 1.96-2.05 (1H, m), 2.20
20 (1H, s), 4.68 (2H, s), 7.56 (1H, t, $J = 7.7$ Hz), 7.66 (1H, d,
 $J = 7.7$ Hz), 8.13 (1H, d, $J = 7.7$ Hz), 8.20 (1H, s).

[0310]

Reference Example 138

Synthesis of 3-bromo-5-ethoxymethyl-benzaldehyde

25 To a solution of 1,3-dibromo-5-ethoxymethyl-benzene (1.42 g, 4.83 mmol) in dry Et_2O (28 ml) was added dropwise $n\text{-BuLi}$ (1.907 ml, 5.07 mmol, 2.66 M solution in hexane) at -78°C under nitrogen. The reaction mixture was stirred for 1 hr at the same temperature. DMF (3.72 ml, 48.3 mmol) was added to the
30 reaction mixture, and stirring was continued for 1 hr.

Saturated aqueous NH_4Cl solution was added to the reaction mixture, and the mixture was extracted twice with AcOEt . The combined organic layers were washed with water and brine, dried over Na_2SO_4 , and concentrated *in vacuo*. The residue
35 obtained was purified by silica gel flash column

chromatography (Hexane:AcOEt=100:0-80:20) to give the title compound (978 mg, 83%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.28 (3H, t, J = 7.0 Hz), 3.59 (2H, q, J = 7.0 Hz), 4.55 (2H, s), 7.76 (1H, s), 7.78 (1H, s), 7.92 (1H, s), 9.96 (1H, s).

[0311]

Reference Example 139

Synthesis of (3-bromo-5-chloro-phenyl)-cyclopropyl-methanol

To a solution of 3-bromo-5-chloro-benzaldehyde (1.5 g, 6.83 mmol) in THF (20 mL) was added dropwise cyclopropylmagnesium bromide (11.7 mL, 8.20 mmol, 0.7 M solution in THF) at 0°C. The reaction mixture was stirred for 5 hr at the same temperature. Saturated aqueous NH₄Cl solution was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=100:0-85:15) to give the title compound (807 mg, 45%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 0.40-0.52 (2H, m), 0.61-0.70 (2H, m), 1.11-1.19 (1H, m), 1.97 (1H, d, J = 3.0 Hz), 3.94 (1H, dd, J = 3.0, 8.5 Hz), 7.37 (1H, s), 7.42-7.43 (1H, m), 7.48 (1H, s).

[0312]

Reference Example 140

Synthesis of 1-bromo-3-chloro-5-cyclopropylmethyl-benzene

To a solution of (3-bromo-5-chloro-phenyl)-cyclopropyl-methanol (493 mg, 1.89 mmol) in CH₂Cl₂ (15 ml) were added triethylsilane (0.90 ml, 5.65 mmol), BF₃-Et₂O complex (0.465 ml, 3.77 mmol) at 0°C. The reaction mixture was stirred for 2 hr at the same temperature. Saturated aqueous NaHCO₃ solution was added to the reaction mixture, and the mixture was extracted twice with CH₂Cl₂. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column

chromatography (Hexane/AcOEt=100:0-95:5) to give the title compound (430 mg, 93%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 0.18-0.22 (2H, m), 0.55-0.59 (2H, m), 0.91-0.98 (1H, m), 2.49 (2H, d, J = 7.0 Hz), 7.19 (1H, s), 7.29 (1H, s), 7.34-7.35 (1H, m).

[0313]

Reference Example 141

Synthesis of 1,3-dibromo-5-cyclopropyl-benzene

To a solution of diethyl zinc (12.6 ml, 13.8 mmol, 1.1 M solution in hexane) in 1,2-dichloroethane (25 ml) was added TFA (1.03 ml, 13.8 mmol) at 0°C under nitrogen. After the reaction mixture was stirred for 20 min at the same temperature, diiodomethane (1.12 ml, 13.8 mmol) was added, and stirring was continued for 20 min. 1,3-Dibromo-5-vinyl-benzene (1.45 g, 5.54 mmol) in 1,2-dichloroethane (10 ml) was added dropwise to the resulting mixture, and stirring was continued for 4 hr at 80°C under nitrogen. The reaction mixture was concentrated *in vacuo*. 1N NaOH aqueous solution was added to the residue, and the mixture was extracted twice with CH₂Cl₂. The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column

chromatography (Hexane:AcOEt=100:0-95:5) to give the title compound (1.13 g, 74%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 0.67-0.71 (2H, m), 0.96-1.02 (2H, m), 1.79-1.85 (1H, m), 7.12 (1H, s), 7.13 (1H, s), 7.46-7.47 (1H, m).

[0314]

Reference Example 142

Synthesis of 3-bromo-5-cyclopropyl-benzaldehyde

The title compound was obtained using 1,3-dibromo-5-cyclopropyl-benzene in the same manner as in Reference Example 138.

¹H-NMR (CDCl₃) δ: 0.74-0.79 (2H, m), 1.04-1.10 (2H, m), 1.91-1.98 (1H, m), 7.45-7.50 (2H, m), 7.75-7.78 (1H, m), 9.91 (1H, s).

[0315]

Reference Example 143

Synthesis of 1,3-dibromo-5-cyclobutoxy-benzene

The title compound was obtained using 3,5-dibromo-phenol
5 and cyclobutanol in the same manner as in Reference Example 80.

¹H-NMR (CDCl₃) δ: 1.64-1.74 (1H, m), 1.83-1.91 (1H, m), 2.10-
2.19 (2H, m), 2.41-2.47 (2H, m), 4.55-4.62 (1H, m), 6.88 (1H,
s), 6.89 (1H, s), 7.21-7.22 (1H, m).

[0316]

10 Reference Example 144

Synthesis of 3-bromo-5-cyclobutoxy-benzaldehyde

The title compound was obtained using 1,3-dibromo-5-
cyclobutoxy-benzene in the same manner as in Reference Example
138.

15 ¹H-NMR (CDCl₃) δ: 1.67-1.77 (1H, m), 1.85-1.93 (1H, m), 2.12-
2.22 (2H, m), 2.44-2.52 (2H, m), 4.68 (1H, quint, J = 7.2 Hz),
7.20 (1H, s), 7.22 (1H, s), 7.56 (1H, s), 9.88 (1H, s).

[0317]

Reference Example 145

20 Synthesis of 2-(4-chloro-phenyl)-4-ethyl-thiazole-5-carboxylic
acid methyl ester

The title compound was obtained using 4-chloro-
thiobenzamide and methyl 2-chloro-3-oxopentanoate in the same
manner as in Reference Example 2.

25 ¹H-NMR (CDCl₃) δ: 1.34 (3H, t, J = 7.5 Hz), 3.19 (2H, q, J =
7.5 Hz), 3.90 (3H, s), 7.41-7.44 (2H, m), 7.90-7.93 (2H, m).

[0318]

Reference Example 146

30 Synthesis of 3-[(Z)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-
benzaldehyde

To solution of 3-(diethoxymethyl)benzaldehyde (0.18 ml,
0.885 mmol), 18-crown-6-ether (20 mg, 0.076 mmol) and (3,5-
bis-trifluoromethyl-benzyl)triphenyl phosphonium iodide (500
mg, 0.812 mmol) in CH₂Cl₂ was slowly added potassium t-butoxide
35 (200 mg, 1.78 mmol) at -78°C. After the reaction mixture was

stirred at same temperature for 7 hr, water was added, and the mixture was acidified with 5N HCl. The layer of CH₂Cl₂ was separated. After silica gel chromatography was charged with the layer, the elution from AcOEt:hexane (1:10) gave a crude product. The crude product was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 5% gradient)) to give the title compound (159 mg, 54%) as a colorless oil. ¹H-NMR (CDCl₃) δ: 6.72 (1H, d, J = 12.2 Hz), 6.87 (1H, d, J = 12.2 Hz), 7.40-7.47 (2H, m), 7.62 (2H, s), 7.71 (1H, s), 7.73 (1H, m), 7.76-7.81 (1H, m), 9.94 (1H, s). [0319]

Reference Example 147

Synthesis of 3-(5-fluoro-benzoxazol-2-yl)-benzaldehyde

To a solution of [3-(5-fluoro-benzoxazol-2-yl)-phenyl]-methanol (332 mg, 1.37 mmol) in DMSO (3.5 mL) was added IBX (573 mg, 2.05 mmol) at room temperature. The reaction mixture was stirred for 1.5 hr at the same temperature. Water and AcOEt were added to the reaction mixture, and the precipitate was filtered through a pad of Celite. The filtrate was extracted twice with AcOEt. The combined organic layers were washed with water, saturated aqueous sodium bicarbonate solution and brine, dried over Na₂SO₄, and concentrated in vacuo to give the title compound (268 mg, 81%) as a brown solid.

¹H-NMR (CDCl₃) δ: 7.10-7.17 (1H, m), 7.45-7.58 (2H, m), 7.73 (1H, t, J = 8.0 Hz), 8.08 (1H, d, J = 7.5 Hz), 8.50 (1H, d, J = 7.5 Hz), 8.74 (1H, s), 10.14 (1H, s).

[0320]

Reference Example 148

Synthesis of 3-[2-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-propionaldehyde

The title compound was obtained using 3-[2-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-propan-1-ol in the same manner as in Reference Example 147.

¹H-NMR (CDCl₃) δ: 2.78-2.83 (2H, m), 3.05 (2H, t, J = 7.5 Hz),

5.32 (2H, s), 6.88 (1H, d, J = 8.3 Hz), 6.97 (1H, t, J = 7.5 Hz), 7.20-7.24 (2H, m), 7.72 (1H, d, J = 8.3 Hz), 7.86 (1H, d, J = 8.3 Hz), 8.05 (1H, s), 9.82 (1H, s).

[0321]

5 Reference Example 149

Synthesis of 5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazole-4-carbaldehyde

The title compound was obtained using [5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-methanol in the same
10 manner as in Reference Example 147.

¹H-NMR (CDCl₃) δ: 1.28-1.33 (4H, m), 2.68-2.77 (1H, m), 7.61 (1H, t, J = 7.8 Hz), 7.73 (1H, d, J = 7.8 Hz), 8.17 (1H, d, J = 7.8 Hz), 8.23 (1H, s), 10.06 (1H, s).

[0322]

15 Reference Example 150

Synthesis of 3-trifluoromethyl-5-[2-(6-trifluoromethyl-pyridin-2-yl)-ethyl]-benzaldehyde

To a solution of 116 mg of 3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-benzaldehyde in 4 mL of
20 EtOH was added 30 mg of 5% Pd/C-ethylenediamine complex, and the reaction mixture was stirred at 30°C for 3 hr. After filtration, the filtrate was concentrated to give a mixture of the title compound and benzyl alcohol (109 mg) as a brown oil. To a solution of the mixture in 2 mL of DMSO was added IBX
25 (141 mg, 0.504 mmol). The reaction mixture was stirred at room temperature for 2 hr. The reaction was quenched by addition of water, and then the mixture was extracted twice with TBME. The organic solution was washed with water and brine, and concentrated to give the title compound (100 mg, 86%) as a
30 pale yellow oil.

¹H-NMR (CDCl₃) δ: 3.22-3.31 (4H, m), 7.26 (1H, d, J = 7.6 Hz), 7.53 (1H, d, J = 7.6 Hz), 7.70 (1H, s), 7.75 (1H, t, J = 7.6 Hz), 7.92 (1H, s), 7.96 (1H, s), 10.02 (1H, s).

[0323]

35 Reference Example 151

Synthesis of 3-(3,5-bis-trifluoromethyl-phenoxy)methyl)-benzaldehyde

To a solution of 1-(3-diethoxymethyl-benzyloxy)-3,5-bis-trifluoromethyl-benzene (0.25 g, 0.592 mmol) in THF (7.5 mL) was added 2N HCl (7.5 ml). The reaction mixture was stirred for 2.5 hr at room temperature. Saturated aqueous NaHCO₃ solution was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated in vacuo to give the title compound (0.23 g, 100%) as a white solid.

¹H-NMR (CDCl₃) δ: 5.22 (2H, s), 7.41 (2H, s), 7.51 (1H, s), 7.61 (1H, t, J = 7.6 Hz), 7.72 (1H, d, J = 7.6 Hz), 7.90 (1H, d, J = 7.6 Hz), 7.98 (1H, s), 10.07 (1H, s).

[0324]

Reference Example 152

Synthesis of 3-[N-(3,5-bis-trifluoromethyl-benzyl)-N-methyl-amino]-benzaldehyde

The title compound was obtained using (3,5-bis-trifluoromethyl-benzyl)-(3-([1,3]dioxolan-2-yl)-phenyl)-methyl-amine in the same manner as in Reference Example 151.

¹H-NMR (CDCl₃) δ: 3.12 (3H, s), 4.68 (2H, s), 6.95-6.98 (1H, m), 7.23-7.29 (2H, m), 7.40 (1H, t, J = 7.6 Hz), 7.68 (2H, s), 7.80 (1H, s), 9.95 (1H, s).

[0325]

Reference Example 153

Synthesis of 5-(3-trifluoromethyl-phenoxy)-thiophene-2-carbaldehyde

To a solution of 5-bromothiophene-2-carboxaldehyde (0.85 g, 4.45 mmol) in NMP (10 ml) were added 3-hydroxybenzotrifluoride (0.80 ml, 6.68 mmol) and cesium carbonate (2.18 g, 6.68 mmol). The reaction mixture was stirred for 5 hr at 110°C. Water was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with water and brine,

dried over Na_2SO_4 , and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt= 90:10-80:20) to give the title compound (0.89 g, 74%) as an orange oil.

5 ^1H -NMR (CDCl_3) δ : 6.58 (1H, d, J = 6.6 Hz), 7.35-7.38 (1H, m), 7.44 (1H, s), 7.49-7.57 (3H, m), 9.75 (1H, s).

[0326]

Reference Example 154

Synthesis of 1-(3,4-difluoro-phenyl)-1H-indole-6-carbaldehyde

10 A suspension of indole-6-carbaldehyde (145 mg, 1.00 mmol), 1,2-difluoro-4-iodobenzene (200 μl , 1.66 mmol), copper(I) iodide (40 mg, 0.21 mmol), potassium phosphate (450 mg, 2.12 mmol) and N,N' -dimethylethylenediamine (40 μl , 0.37 mmol) in toluene 2 ml was stirring at 110°C for 10 hr under argon. The
15 reaction mixture was cooled to room temperature, diluted with hexane, and then purified by silica gel chromatography (AcOEt:hexane = 1 : 10) to give the title compound (134 mg, 52%) as a white solid.

^1H -NMR (CDCl_3) δ : 6.77 (1H, dd, J = 0.9, 3.3 Hz), 7.25-7.33 (1H, 20 m), 7.33-7.43 (2H, m), 7.48 (1H, d, J = 3.3 Hz), 7.72 (1H, dd, J = 1.2, 8.4 Hz), 7.80 (1H, d, J = 8.4 Hz), 7.99 (1H, m), 10.05 (1H, s).

[0327]

Reference Example 155

25 Synthesis of 3-chloro-5-(4-trifluoromethyl-piperidin-1-yl)-benzaldehyde

The title compound was obtained using 1-(3-chloro-5-diethoxymethyl-phenyl)-4-trifluoromethyl-piperidine in the same manner as in Reference Example 151.

30 ^1H -NMR (CDCl_3) δ : 1.67-1.78 (2H, m), 1.97-2.04 (2H, m), 2.16-2.31 (1H, m), 2.79-2.84 (2H, m), 3.82-3.88 (2H, m), 7.11-7.12 (1H, m), 7.26-7.29 (2H, m), 9.89 (1H, s).

[0328]

Reference Example 156

35 Synthesis of (3'-trifluoromethyl-biphenyl-3-yl)-acetaldehyde

To a solution of 2-(3'-trifluoromethyl-biphenyl-3-yl)-ethanol (533 mg, 2 mmol) in CH₃CN (6 ml) was added IBX (728 mg, 2.60 mmol). The reaction mixture was stirred at 60°C for 4 hr. The reaction was diluted with IPE and the resulting suspension
5 was filtered. The filtrate was concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 5% -> 20%) to give the title compound (354 mg, 67%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 3.80 (2H, s), 7.26 (1H, d, J = 7.2 Hz), 7.44
10 (1H, s), 7.48 (1H, t, J = 7.6 Hz), 7.53-7.58 (2H, m), 7.62 (1H, d, J = 7.6 Hz), 7.76 (1H, d, J = 7.6 Hz), 7.82 (1H, s), 9.82 (1H, s).

[0329]

Reference Example 157

15 Synthesis of 4-trifluoromethyl-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

The title compound was obtained using {4-trifluoromethyl-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-methanol in the same manner as in Reference Example 48.

20 ¹H-NMR (CDCl₃) δ: 7.23 (1H, d, J = 16.1 Hz), 7.48-7.60 (3H, m), 7.73-7.88 (4H, m), 8.28 (1H, s), 10.14 (1H, s).

[0330]

Reference Example 158

Synthesis of 2-(4-chloro-phenyl)-5-methyl-oxazole-4-
25 carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-methyl-oxazol-4-yl]-methanol in the same manner as in Reference Example 48.

30 ¹H-NMR (CDCl₃) δ: 2.72 (3H, s), 7.44-7.48 (2H, m), 7.97-8.01 (2H, m), 10.02 (1H, s).

[0331]

Reference Example 159

Synthesis of 2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiazole-5-carbaldehyde

35 To the solution of {2-[(E)-2-(3-trifluoromethyl-phenyl)-

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vinyl]-thiazol-5-yl)-methanol (410 mg, 1.437 mmol) in AcOEt (16 ml) was added IBX (1.207 g, 4.31 mmol). The reaction mixture was refluxed for 1 hr. After filtration, the filtrate was concentrated. The residue was purified by flash column chromatography (hexane/AcOEt = 9/1 to 3/2) to give the title compound (350 mg, 86%) as a yellow solid.

¹H-NMR (CDCl₃) δ: 7.37 (1H, d, J = 16.1 Hz), 7.56-7.83 (5H, m), 8.42 (1H, s), 10.05 (1H, s).

[0332]

10 Reference Example 160

Synthesis of 3-(2,3-dihydro-indol-1-ylmethyl)-benzaldehyde

A solution of indole (140 mg, 1.23 mmol), methanesulfonic acid 3-diethoxymethyl-benzyl ester (300 mg, 1.04 mmol) and DIPEA (0.35 ml) in CH₃CN (5 ml) was stirred at room temperature overnight and then heated to 80°C for 8 hr. The solvents were removed under reduced pressure. The residue was purified by silica gel chromatography (AcOEt-hexane = 1:4) to give a pale yellow oil.

To solution of the pale yellow oil in CH₃CN (2 ml) was added 1N HCl (1 ml) and the mixture was stirred at room temperature for 1 hr. The reaction mixture was basified with saturated NaHCO₃ aqueous solution and extracted with AcOEt, and the organic layer was dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give crude product as a pale brown oil. The crude material was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 15% gradient)) to give the title compound (224 mg, 95%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 3.00 (2H, t, J = 8.2 Hz), 3.34 (2H, t, J = 8.2 Hz), 4.32 (2H, s), 6.46 (1H, d, J = 7.8 Hz), 6.70 (1H, dt, J = 0.9, 7.4 Hz), 7.03-7.13 (2H, m), 7.51 (1H, t, J = 7.6 Hz), 7.66 (1H, d, J = 7.6 Hz), 7.80 (1H, d, J = 7.6 Hz), 7.90 (1H, s), 10.02 (1H, s).

[0333]

35 Reference Example 161

Synthesis of 3-(1-phenyl-ethoxy)-5-trifluoromethyl-benzaldehyde

The title compound was obtained using 3-hydroxy-5-trifluoromethyl-benzaldehyde and (1-bromoethyl)benzene in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 1.72 (3H, d, J = 6.4 Hz), 5.45 (1H, q, J = 6.4 Hz), 7.29-7.42 (6H, m), 7.51 (1H, s), 7.65 (1H, s), 9.94 (1H, s).

[0334]

Reference Example 162

Synthesis of 3-(2,5-bis-trifluoromethyl-benzyloxy)-5-methoxy-benzaldehyde

The title compound was obtained using 3-hydroxy-5-methoxy-benzaldehyde and 2,5-bis(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 3.87 (3H, s), 5.32 (2H, s), 6.81 (1H, s), 7.08-7.11 (2H, m), 7.72 (1H, d, J = 8.1 Hz), 7.85 (1H, d, J = 8.1 Hz), 8.06 (1H, s), 9.93 (1H, s).

[0335]

Reference Example 163

Synthesis of 3-cyclopropylmethoxy-5-(5-trifluoromethyl-pyridin-2-yl)-benzaldehyde

The title compound was obtained using 3-hydroxy-5-(5-trifluoromethyl-pyridin-2-yl)-benzaldehyde and cyclopropylmethyl bromide in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 0.37-0.43 (2H, m), 0.67-0.73 (2H, m), 1.26-1.33 (1H, m), 3.97 (2H, d, J = 6.9 Hz), 7.50 (1H, s), 7.90-7.93 (2H, m), 7.99-8.02 (1H, m), 8.13 (1H, s), 8.97 (1H, s), 10.07 (1H, s).

[0336]

Reference Example 164

Synthesis of 3-(3-trifluoromethyl-benzyloxy)-5-(5-trifluoromethyl-pyridin-2-yl)-benzaldehyde

The title compound was obtained using 3-hydroxy-5-(5-

trifluoromethyl-pyridin-2-yl)-benzaldehyde and 3-(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 5.27 (2H, s), 7.48-7.68 (5H, m), 7.77 (1H, s),
5 7.93 (1H, d, J = 8.3 Hz), 8.03-8.06 (2H, m), 8.18 (1H, s),
10.09 (1H, s).

[0337]

Reference Example 165

Synthesis of 2-ethoxy-3-[(E)-2-(3-trifluoromethyl-phenyl)-
10 vinyl]-benzaldehyde

The title compound was obtained using 2-hydroxy-3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde and iodoethane in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 1.49 (3H, t, J = 7.0 Hz), 4.08 (2H, q, J =
15 7.0 Hz), 7.19 (1H, d, J = 16.5 Hz), 7.27 (1H, t, J = 7.7 Hz),
7.45 (1H, d, J = 16.5 Hz), 7.50-7.57 (2H, m), 7.72 (1H, d, J =
7.4 Hz), 7.76 (1H, s), 7.81 (1H, dd, J = 1.7, 7.7 Hz), 7.88
(1H, dd, J = 1.7, 7.7 Hz), 10.44 (1H, s).

[0338]

20 Reference Example 166

Synthesis of 3-{[N-(4-fluoro-phenyl)-N-methyl-amino]-methyl}-benzaldehyde

To a suspension of 155 mg of 3-chloromethyl-benzaldehyde and 207 mg of K₂CO₃ in 4 ml of CH₃CN was added 150 mg of 4-
25 fluoro-N-methylaniline. The reaction mixture was stirred at
80°C for 2 hr and room temperature for 3 days. The mixture was
filtered and then concentrated. The residue was purified by
silica gel column chromatography (hexane/AcOEt 10% → 20%) to
give the title compound (240 mg, 99%) as a light yellow oil.

30 ¹H-NMR (CDCl₃) δ: 2.99 (3H, s), 4.53 (2H, s), 6.66-6.70 (2H, m),
6.87-6.96 (2H, m), 7.49-7.51 (2H, m), 7.76-7.79 (2H, m), 10.00
(1H, s).

[0339]

Reference Example 167

35 Synthesis of 3-(benzofuran-2-ylmethoxy)-benzaldehyde

The title compound was obtained using 2-bromomethyl-benzofuran and 3-hydroxybenzaldehyde in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 5.24 (2H, s), 6.83 (1H, s), 7.21-7.35 (3H, m),
5 7.45-7.59 (5H, m), 9.99 (1H, s).

[0340]

Reference Example 168

Synthesis of 3-(2,5-bis-trifluoromethyl-benzyloxy)-benzaldehyde

10 The title compound was obtained using 3-hydroxybenzaldehyde and 2,5-bis(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 5.35 (2H, s), 7.28-7.31 (1H, m), 7.49-7.56
(3H, m), 7.73 (1H, d, J = 8.1 Hz), 7.86 (1H, d, J = 8.1 Hz),
15 8.08 (1H, s), 10.01 (1H, s).

[0341]

Reference Example 169

Synthesis of 3-fluoro-4-(3-trifluoromethyl-phenoxy)-benzaldehyde

20 To a solution of 3,4-difluorobenzaldehyde (0.45 g, 3.17 mmol) in NMP (5 ml) were added 3-hydroxybenzotrifluoride (0.45 ml, 3.80 mmol) and potassium carbonate (0.66 g, 4.75 mmol). The reaction mixture was stirred for 5 hr at 100°C. Water was added to the reaction mixture, and the mixture was extracted.
25 twice with AcOEt. The combined organic layers were washed with water (twice) and brine, dried over Na₂SO₄, and concentrated in vacuo to give the title compound (0.90 g, 100%) as a brown oil.
¹H-NMR (CDCl₃) δ: 7.13-7.40 (3H, m), 7.43-7.57 (2H, m), 7.64-7.77 (2H, m), 9.94 (1H, s).

30 [0342]

Reference Example 170

Synthesis of 3-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-thiophene-2-carbaldehyde

The title compound was obtained using 3-(3-hydroxy-phenyl)-thiophene-2-carbaldehyde and methanesulfonic acid 2,5-

bis-trifluoromethyl-benzyl ester in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 5.35 (2H, s), 7.08-7.14 (3H, m), 7.23 (1H, d, J = 5.0 Hz), 7.44 (1H, t, J = 8.0 Hz), 7.74-7.76 (2H, m), 7.85
5 (1H, d, J = 8.0 Hz), 8.09 (1H, s), 9.88 (1H, s).

[0343]

Reference Example 171

Synthesis of 5-fluoro-2-(3-fluoro-5-trifluoromethyl-benzyloxy)-3-methyl-benzaldehyde

10 The title compound was obtained using methanesulfonic acid 3-fluoro-5-trifluoromethyl-benzyl ester and 5-fluoro-2-hydroxy-3-methyl-benzaldehyde in the same manner as in Reference Example 82.

¹H-NMR (DMSO-d₆) δ: 2.34 (3H, s), 5.12 (2H, s), 7.31-7.37 (1H, m), 7.51-7.58 (1H, m), 7.69-7.78 (3H, m), 10.16 (1H, s).
15

[0344]

Reference Example 172

Synthesis of 3-(4,4,4-trifluoro-butoxy)-5-trifluoromethyl-benzaldehyde

20 The title compound was obtained using 3-hydroxy-5-trifluoromethyl-benzaldehyde and 1-bromo-4,4,4-trifluorobutane in the same manner as in Reference Example 82.

¹H-NMR (CDCl₃) δ: 2.07-2.16 (2H, m), 2.27-2.39 (2H, m), 4.14 (2H, t, J = 6.0 Hz), 7.41 (1H, s), 7.55 (1H, s), 7.73 (1H, s),
25 10.02 (1H, s).

[0345]

Reference Example 173

Synthesis of 3-(4-trifluoromethoxy-benzylsulfanylmethyl)-benzaldehyde

30 To a solution of 3-chloromethyl-benzaldehyde (155 mg, 1 mmol) in THF (6 ml) were added potassium carbonate (166 mg, 1.200 mmol) and 4-(trifluoromethoxy)benzyl mercaptan (219 mg, 1.050 mmol). The reaction mixture was stirred at 70°C for 5 hr. The mixture was filtered, and then the filtrate was
35 concentrated. The residue was purified by silica gel column

chromatography (hexane → hexane/AcOEt 20%) to give the title compound (188 mg, 58%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 3.61 (2H, s), 3.68 (2H, s), 7.15 (2H, d, J = 8.0 Hz), 7.26-7.30 (2H, m), 7.48-7.56 (2H, m), 7.76-7.78 (2H, m), 10.01 (1H, s).

[0346]

Reference Example 174

Synthesis of 1-(2,4,5-trifluoro-benzyl)-piperidine-4-carbaldehyde

10 A suspension of 4-piperidinemethanol (260 mg, 2.257 mmol), potassium carbonate (390 mg, 2.82 mmol) and 2,4,5-trifluorobenzyl bromide (423 mg, 1.881 mmol) in *N,N*-dimethylformamide (5 ml) was stirred at room temperature for 2 hr. Water was added to the reaction mixture, and the mixture
15 was extracted with AcOEt. The organic layers were washed with water (twice) and brine, and dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give a colorless oil. A solution of the colorless oil and IBX (632 mg, 2.26 mmol) was stirred at 40°C for 2 hr. To reaction mixture
20 was added water and AcOEt. The mixture was filtrated through a layer of Celite with AcOEt. The filtrate was separated, and the organic layer was washed with water (twice), and dried over Na₂SO₄. The solvents were removed under reduced pressure to give a colorless oil. The crude product was purified by
25 flash chromatography on silica gel (AcOEt/hexane (0 to 50% gradient)) to give the title compound (241 mg, 50%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 1.61-1.80 (2H, m), 1.87-1.97 (2H, m), 2.14-2.31 (3H, m), 2.77-2.86 (2H, m), 3.50 (2H, s), 6.85-6.93 (1H, m), 7.20-7.29 (1H, m), 9.65 (1H, d, J = 0.9 Hz).

[0347]

Reference Example 175

Synthesis of 3-(2-methoxy-benzyloxy)-5-trifluoromethyl-benzaldehyde

35 To a solution of 190 mg of 3-hydroxy-5-trifluoromethyl-

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benzaldehyde in 4 ml of CH₃CN were added 166 mg of K₂CO₃ and 0.149 ml of 2-methoxybenzyl chloride. The reaction mixture was stirred at 80°C for 2 hr. 10 mg of NaI was added thereto, and the reaction was stirred at 80°C for 1 h. After cooling to room temperature, the reaction mixture was filtered, and the filtrate was concentrated to give the title compound (368 mg, quant.) as a brown solid.

¹H-NMR (CDCl₃) δ: 3.90 (3H, s), 5.22 (2H, s), 6.93-7.00 (2H, m), 7.34 (1H, t, J = 7.5 Hz), 7.44 (1H, d, J = 7.5 Hz), 7.52 (1H, s), 7.67 (1H, s), 7.70 (1H, s), 10.00 (1H, s).

[0348]

Reference Example 176

Synthesis of 3-(4-fluoro-phenyl)-benzo[b]thiophene-2-carbaldehyde

The title compound was obtained using 3-bromo-benzo[b]thiophene-2-carboxaldehyde and 4-fluorophenylboronic acid in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.24-7.32 (2H, m), 7.40-7.59 (4H, m), 7.75 (1H, d, J = 8.0 Hz), 7.95 (1H, d, J = 8.0 Hz), 9.93 (1H, s).

[0349]

Reference Example 177

Synthesis of 2-(3-chloro-phenyl)-5-cyclopropyl-oxazole-4-carbaldehyde

The title compound was obtained using 2-(3-chloro-phenyl)-5-cyclopropyl-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 1.25-1.30 (4H, m), 2.67-2.74 (1H, m), 7.38-7.46 (2H, m), 7.87 (1H, dt, J = 1.5, 7.5 Hz), 7.96 (1H, t, J = 1.5 Hz), 10.04 (1H, s).

[0350]

Reference Example 178

Synthesis of 2-(4-chloro-phenyl)-4-methyl-thiazole-5-carbaldehyde

The title compound was obtained using 2-(4-chloro-phenyl)-4-methyl-thiazole-5-carboxylic acid ethyl ester in the

same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 2.79 (3H, s), 7.43-7.48 (2H, m), 7.93-7.97 (2H, m), 10.10 (1H, s).

[0351]

5 Reference Example 179

Synthesis of 4-methyl-2-(3-trifluoromethyl-phenyl)-thiazole-5-carbaldehyde

The title compound was obtained using 4-methyl-2-(3-trifluoromethyl-phenyl)-thiazole-5-carboxylic acid ethyl ester
10 in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 2.81 (3H, s), 7.62 (1H, t, J = 7.8 Hz), 7.76 (1H, d, J = 7.8 Hz), 8.15 (1H, d, J = 7.8 Hz), 8.31 (1H, s), 10.13 (1H, s).

[0352]

15 Reference Example 180

Synthesis of 2-(3-chloro-4-fluoro-phenyl)-4-trifluoromethyl-thiazole-5-carbaldehyde

The title compound was obtained using 2-(3-chloro-4-fluoro-phenyl)-4-trifluoromethyl-thiazole-5-carboxylic acid
20 ethyl ester in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 7.26-7.32 (1H, m), 7.91 (1H, ddd, J = 2.3, 4.4, 8.6 Hz), 8.15 (1H, dd, J = 2.3, 6.8 Hz), 10.23 (1H, d, J = 0.8 Hz).

[0353]

25 Reference Example 181

Synthesis of 2-(4-trifluoromethoxy-phenyl)-oxazole-4-carbaldehyde

The title compound was obtained using 2-(4-trifluoromethoxy-phenyl)-oxazole-4-carboxylic acid ethyl ester
30 in the same manner as in Reference Example 63.

¹H-NMR (CDCl₃) δ: 7.33-7.37 (2H, m), 8.14-8.19 (2H, m), 8.34 (1H, s), 10.02 (1H, s).

[0354]

Reference Example 182

35 Synthesis of 2-(4-chloro-phenyl)-4-ethyl-thiazole-5-

carbaldehyde

The title compound was obtained using 2-(4-chloro-phenyl)-4-ethyl-thiazole-5-carboxylic acid methyl ester in the same manner as in Reference Example 63.

5 ¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 7.5 Hz), 3.13 (2H, q, J = 7.5 Hz), 7.43-7.47 (2H, m), 7.93-7.98 (2H, m), 10.11 (1H, s) [0355]

Reference Example 183

Synthesis of 3-(4-fluoro-benzyl)-5-trifluoromethoxy-
10 benzaldehyde

To a solution of 3-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-5-trifluoromethoxy-benzaldehyde (0.33 g, 1.09 mmol) in DME (10 mL) were added 4-fluorobenzyl bromide (0.136 mL, 1.09 mmol), [1,1'-bis(diphenylphosphino)ferrocene]palladium(II) dichloride (0.027 g, 0.033 mmol) and 2 M aqueous sodium carbonate solution (0.820 mL, 1.64 mmol). The reaction mixture was stirred for 1.5 hr at 80°C under nitrogen. Water was added to the reaction mixture, and the mixture was extracted twice with AcOEt. The combined organic layers were washed with brine,
15 dried over Na₂SO₄, and concentrated *in vacuo*. The residue obtained was purified by silica gel flash column chromatography (Hexane:AcOEt=100:0-85:15) to give the title compound (228 mg, 70%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 4.14 (2H, s), 7.27-7.33 (3H, m), 7.56-7.64
25 (4H, m), 9.97 (1H, s). [0356]

Reference Example 184

Synthesis of 1-(4,4,4-trifluoro-butyl)-1H-indole-6-carbaldehyde

30 To a solution of indole-6-carbaldehyde (145 mg, 1.00 mmol) in DMF (1.5 mL) was added 60% NaH (50 mg, 3.5 mmol) at 0°C under argon, and the reaction mixture was stirred at 0°C for 0.5 hr. To the reaction mixture was added 1-bromo-4,4,4-trifluorobutane (191.9 mg, 1.00 mmol) at 0°C, and stirred at
35 room temperature overnight. Water was added to the reaction

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mixture, and the mixture was extracted with AcOEt. The organic layer was washed twice with water, and then dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give crude product as a pale orange oil. The crude material was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 15% gradient)) to give the title compound (195 mg, 76%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 2.0-2.3 (4H, m), 4.32 (2H, t, J = 6.8 Hz), 6.61 (1H, dd, J = 0.8, 3.1 Hz), 7.32 (1H, d, J = 3.1 Hz), 7.65 (1H, dd, J = 1.3, 8.2 Hz), 7.74 (1H, d, J = 8.2 Hz), 7.9 (1H, s), 10.08 (1H, s).

[0357]

Reference Example 185

Synthesis of 1-(2,4-bis-trifluoromethyl-benzyl)-1H-pyrrole-2-carbaldehyde

The title compound was obtained using pyrrole-2-carboxaldehyde and methanesulfonic acid 2,4-bis-trifluoromethyl-benzyl ester in the same manner as in Reference Example 184.

¹H-NMR (CDCl₃) δ: 5.82 (2H, s), 6.39 (1H, dd, J = 2.6, 4.0 Hz), 6.65 (1H, d, J = 8.2 Hz), 6.96 (1H, m), 7.07 (1H, dd, J = 1.7, 4.0 Hz), 7.65 (1H, d, J = 8.2 Hz), 7.95 (1H, s), 9.58 (1H, d, J = 0.9 Hz).

[0358]

Reference Example 186

Synthesis of 3-(5-trifluoromethyl-pyridin-2-ylloxymethyl)-benzaldehyde

To a solution of (3-diethoxymethyl-phenyl)-methanol (210 mg, 1 mmol) and 2-chloro-5-(trifluoromethyl)pyridine (0.154 ml, 1.200 mmol) in DMF (4 ml) was added NaH (60.0 mg, 1.500 mmol) at 0°C and the mixture was stirred at room temperature for 20 hr. The reaction was quenched by addition of 1 molar HCl (2 ml) and THF (1 ml) at 0°C. The mixture was stirred for 30 min and extracted twice with AcOEt after diluted with water (5 ml). The organic solution was washed with water and brine, filtered

through a Na₂SO₄ short column, and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 5% -> hexane/AcOEt 20%) to give the title compound (277 mg, 98%) as a colorless oil.

5 ¹H-NMR (CDCl₃) δ: 5.53 (2H, s), 6.92 (1H, d, J = 8.7 Hz), 7.56 (1H, t, J = 7.5 Hz), 7.71-7.87 (3H, m), 7.99 (1H, s), 8.46 (1H, s), 10.05 (1H, s).

[0359]

Reference Example 187

10 Synthesis of 3-(4-trifluoromethyl-pyridin-2-ylloxymethyl)-benzaldehyde

The title compound was obtained using (3-diethoxymethyl-phenyl)-methanol and 2-chloro-4-(trifluoromethyl)pyridine in the same manner as in Reference Example 186.

15 ¹H-NMR (CDCl₃) δ: 5.52 (2H, s), 7.07 (1H, s), 7.11 (1H, d, J = 5.3 Hz), 7.56 (1H, t, J = 7.5 Hz), 7.73 (1H, d, J = 7.5 Hz), 7.85 (1H, d, J = 7.5 Hz), 7.99 (1H, s), 8.33 (1H, d, J = 5.3 Hz), 10.05 (1H, s).

[0360]

20 Reference Example 188

Synthesis of 4-[(E)-2-(3-formyl-phenyl)-vinyl]-benzonitrile

To a solution of (3-diethoxymethyl-benzyl)-phosphonic acid diethyl ester (367.6 mg, 1.11 mmol) and 4-cyanobenzaldehyde (170 mg, 1.30 mmol) in tetrahydrofuran (5
25 ml) was added 60% NaH (50 mg, 3.5 mmol) at 0°C under argon, and the reaction mixture was stirred at room temperature overnight. The reaction mixture was acidified by 5N HCl at 0°C, and water was added. The reaction mixture was stirred overnight. The resulting suspension was filtered, and the white powder was
30 washed with water. The resulting powder was purified by silica gel chromatography (CH₂Cl₂) to give the title compound (142 mg, 49%) as a colorless solid.

¹H-NMR (CDCl₃) δ: 7.19 (1H, d, J = 16.3 Hz), 7.27 (1H, d, J = 16.3 Hz), 7.55-7.69 (5H, m), 7.76-7.84 (2H, m), 8.06 (1H, t, J = 1.7 Hz), 10.07 (1H, s).
35

[0361]

Reference Example 189

Synthesis of 3-[2-(5-trifluoromethyl-pyridin-2-yloxy)-ethyl]-benzaldehyde

5 To a solution of 2-chloro-5-(trifluoromethyl)pyridine (0.119 ml, 0.927 mmol) and 2-(3-[1,3]dioxolan-2-yl-phenyl)-ethanol (150 mg, 0.772 mmol) in 3 ml of DMF was added 46 mg of NaH (60wt%) at 0°C and the mixture was stirred at room temperature for 18 hr. The reaction was quenched by addition
10 of 1N HCl and THF (1 ml) at 0°C. The mixture was stirred for 2 hr and extracted twice with TBME. The organic solution was washed with water and brine, filtered through a Na₂SO₄ short column, and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 5% -> hexane/AcOEt
15 20%) to give the title compound (188 mg, 82%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 3.19 (2H, t, J = 6.6 Hz), 4.60 (2H, t, J = 6.6 Hz), 6.95 (1H, s), 7.07 (1H, d, J = 5.4 Hz), 7.50 (1H, t, J = 7.5 Hz), 7.57-7.59 (1H, m), 7.75-7.78 (1H, m), 7.82 (1H, s),
20 8.29 (1H, d, J = 5.4 Hz), 10.02 (1H, s).

[0362]

Reference Example 190

Synthesis of 3-[(E)-2-(4-ethoxy-phenyl)-vinyl]-benzaldehyde

To a solution of (3-diethoxymethyl-benzyl)-phosphonic
25 acid diethyl ester (150 mg, 0.45 mmol) and 4-ethoxybenzaldehyde (80 mg, 1.30 mmol) in tetrahydrofuran (5 ml) was added *tert*-BuONa (100 mg, 1.04 mmol) at 0°C, and the reaction mixture was stirred at room temperature for 3 days. The reaction was worked up and treated in the same manner as
30 in Reference Example 188 to give the title compound (99 mg, 87%) as a yellow solid.

¹H-NMR (CDCl₃) δ: 1.43 (3H, t, J = 7.0 Hz), 4.07 (2H, q, J = 7.0 Hz), 6.90 (2H, d, J = 8.8 Hz), 7.03 (1H, d, J = 16.2 Hz),
7.16 (1H, d, J = 16.2 Hz), 7.45-7.6 (3H, m), 7.7-7.8 (2H, m),
35 8.00 (1H, m), 10.05 (1H, s).

[0363]

Reference Example 191

Synthesis of 3-chloro-5-cyclopropylmethyl-benzaldehyde

The title compound was obtained using 1-bromo-3-chloro-5-cyclopropylmethyl-benzene in the same manner as in Reference Example 138.

¹H-NMR (CDCl₃) δ: 0.22-0.25 (2H, m), 0.58-0.62 (2H, m), 0.96-1.01 (1H, m), 2.61 (2H, d, J = 7.0 Hz), 7.52 (1H, s), 7.66 (1H, s), 7.69-7.70 (1H, m), 9.96 (1H, s).

10 [0364]

Reference Example 192

Synthesis of 4-formyl-2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzonitrile

The title compound was obtained using trifluoromethanesulfonic acid 4-formyl-2-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl ester in the same manner as in Reference Example 89.

¹H-NMR (CDCl₃) δ: 7.41-7.63 (4H, m), 7.80-7.82 (3H, m), 7.86 (1H, d, J = 1.0 Hz), 8.30 (1H, s), 10.14 (1H, s).

20 [0365]

Reference Example 193

Synthesis of 3-[2-(2,4-difluoro-phenyl)-ethyl]-benzaldehyde

The title compound was obtained using 3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-benzaldehyde in the same manner as in Reference Example 150.

¹H-NMR (CDCl₃) δ: 2.89-3.00 (4H, m), 6.73-6.82 (2H, m), 6.99-7.07 (1H, m), 7.39-7.47 (2H, m), 7.69-7.74 (2H, m), 9.99 (1H, s).

[0366]

30 Reference Example 194

Synthesis of 3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-benzaldehyde

The title compound was obtained using 3-formyl-5-methylphenylboronic acid and 5-bromo-2-(trifluoromethyl)pyridine in the same manner as in Reference

Example 112.

¹H-NMR (CDCl₃) δ: 2.55 (3H, s), 7.68 (1H, s), 7.77-7.81 (2H, m), 7.92 (1H, s), 8.06-8.12 (1H, m), 8.96-8.97 (1H, m), 10.08 (1H, s).

5 [0367]

Reference Example 195

Synthesis of 5-ethoxymethyl-4'-fluoro-biphenyl-3-carbaldehyde

The title compound was obtained using 3-bromo-5-ethoxymethyl-benzaldehyde and 4-fluorophenylboronic acid in
10 the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 1.30 (3H, t, J = 7.1 Hz), 3.62 (2H, q, J = 7.1 Hz), 4.64 (2H, s), 7.14-7.18 (2H, m), 7.58-7.61 (2H, m), 7.80 (1H, s), 7.84 (1H, s), 7.96-7.97 (1H, m), 10.09 (1H, s).

[0368]

15 Reference Example 196

Synthesis of 3-cyclopropyl-5-(6-trifluoromethyl-pyridin-3-yl)-benzaldehyde

The title compound was obtained using 3-bromo-5-cyclopropyl-benzaldehyde and 5-(4,4,5,5-tetramethyl-
20 [1,3,2]dioxaborolan-2-yl)-2-trifluoromethyl-pyridine in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 0.82-0.86 (2H, m), 1.00-1.16 (2H, m), 2.05-2.11 (1H, m), 7.58 (1H, s), 7.63 (1H, s), 7.79 (1H, d, J = 8.2 Hz), 7.86-7.88 (2H, m), 8.06-8.09 (1H, m), 1.07 (1H, s).

25 [0369]

Reference Example 197

Synthesis of 3-cyclobutoxy-5-(6-trifluoromethyl-pyridin-3-yl)-benzaldehyde

The title compound was obtained using 3-bromo-5-cyclobutoxy-benzaldehyde and 5-(4,4,5,5-tetramethyl-
30 [1,3,2]dioxaborolan-2-yl)-2-trifluoromethyl-pyridine in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 1.71-1.81 (1H, m), 1.90-1.97 (1H, m), 2.19-2.28 (2H, m), 2.50-2.58 (2H, m), 4.75-4.81 (1H, m), 7.31-7.33
35 (1H, m), 7.35-7.36 (1H, m), 7.66 (1H, t, J = 1.5 Hz), 7.79 (1H,

d, J = 8.0 Hz), 8.07 (1H, dd, J = 2.1, 8.2 Hz), 8.96 (1H, d, J = 2.1 Hz), 10.04 (1H, s).

[0370]

Reference Example 198

5 Synthesis of 2-ethoxy-5-(6-trifluoromethyl-pyridin-3-yl)-benzaldehyde

The title compound was obtained using 5-bromo-2-ethoxy-benzaldehyde and 5-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-2-trifluoromethyl-pyridine in the same manner as in

10 Reference Example 112.

¹H-NMR (CDCl₃) δ: 1.54 (3H, t, J = 7.0 Hz), 4.25 (2H, q, J = 7.0 Hz), 7.14 (1H, d, J = 8.8 Hz), 7.75 (1H, d, J = 8.2 Hz), 7.80 (1H, dd, J = 2.5, 8.8 Hz), 8.04 (1H, dd, J = 2.1, 8.2 Hz), 8.09 (1H, d, J = 2.5 Hz), 8.92-8.94 (1H, m), 10.56 (1H, s).

15 [0371]

Reference Example 199

Synthesis of 4-isopropoxy-3-(6-trifluoromethyl-pyridin-3-yl)-benzaldehyde

The title compound was obtained using 3-bromo-4-isopropoxy-benzaldehyde and 5-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-2-trifluoromethyl-pyridine in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 1.37 (6H, d, J = 6.0 Hz), 4.74-4.80 (1H, m), 7.13 (1H, d, J = 8.6 Hz), 7.75 (1H, d, J = 8.1 Hz), 7.87 (1H, d, J = 2.1 Hz), 7.93 (1H, dd, J = 2.1, 8.6 Hz), 8.03 (1H, dd, J = 2.1, 8.1 Hz), 8.92-8.93 (1H, m), 8.95 (1H, s).

[0372]

Reference Example 200

30 Synthesis of 5-(3-fluoro-5-trifluoromethyl-phenyl)-thiophene-2-carbaldehyde

The title compound was obtained using 5-formyl-2-thiopheneboronic acid and 3-bromo-5-fluorobenzotrifluoride in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 7.36 (1H, d, J = 8.1 Hz), 7.47 (1H, d, J = 4.0 Hz), 7.54 (1H, d, J = 9.1 Hz), 7.70 (1H, s), 7.78 (1H, d,

J = 4.0 Hz), 9.93 (1H, s).

[0373]

Reference Example 201

Synthesis of 4-(4-trifluoromethyl-pyrimidin-2-yl)-benzaldehyde

5 The title compound was obtained using 4-formylphenylboronic acid and 2-chloro-4-(trifluoromethyl)pyrimidine in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 7.59 (1H, d, J = 5.0 Hz), 8.03 (2H, d, J = 8.1 Hz), 8.70 (2H, d, J = 8.1 Hz), 9.11 (1H, d, J = 5.0 Hz), 10.13 (1H, s).

[0374]

Reference Example 202

15 Synthesis of 5'-fluoro-5-methyl-3'-trifluoromethyl-biphenyl-3-carbaldehyde

The title compound was obtained using 3-formyl-5-methylphenylboronic acid and 3-bromo-5-fluorobenzotrifluoride in the same manner as in Reference Example 112.

20 ¹H-NMR (CDCl₃) δ: 2.53 (3H, s), 7.35 (1H, d, J = 8.3 Hz), 7.50 (1H, d, J = 9.3 Hz), 7.65 (2H, s), 7.75 (1H, s), 7.89 (1H, s), 10.07 (1H, s).

[0375]

Reference Example 203

Synthesis of 2-(3,5-bis-trifluoromethyl-benzyl)-benzaldehyde

25 The title compound was obtained using 2-formylphenylboronic acid and 3,5-bis(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 4.57 (2H, s), 7.29 (1H, d, J = 7.4 Hz), 7.52-7.62 (4H, m), 7.70 (1H, s), 7.85-7.87 (1H, m), 10.11 (1H, s).

30 [0376]

Reference Example 204

Synthesis of 3-(2,5-bis-trifluoromethyl-benzyl)-5-chloro-benzaldehyde

35 The title compound was obtained using 3-chloro-5-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-benzaldehyde and 2,5-

bis(trifluoromethyl)benzyl bromide in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 4.30 (2H, s), 7.36 (1H, s), 7.44 (1H, s), 7.52 (1H, s), 7.67 (1H, d, J = 8.2 Hz), 7.76 (1H, s), 7.86 (1H, d, J = 8.2 Hz), 9.94 (1H, s).

[0377]

Reference Example 205

Synthesis of 6-(4-fluoro-phenyl)-benzofuran-2-carbaldehyde

The title compound was obtained using 6-bromo-benzofuran-2-carbaldehyde and 4-fluorophenylboronic acid in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 7.18 (2H, t, J = 8.7 Hz), 7.49-7.63 (4H, m), 7.75 (1H, s), 7.80 (1H, d, J = 8.1 Hz), 9.88 (1H, s).

[0378]

Reference Example 206

Synthesis of 2-((E)-styryl)-5-trifluoromethyl-benzaldehyde

The title compound was obtained using 2-bromo-5-(trifluoromethyl)benzaldehyde and trans-2-phenylvinylboronic acid in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 7.17 (1H, d, J = 16 Hz), 7.37-7.46 (3H, m), 7.60-7.63 (2H, m), 7.84-7.87 (2H, m), 8.04 (1H, d, J = 16 Hz), 8.13 (1H, s), 10.38 (1H, s).

[0379]

Reference Example 207

Synthesis of 3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-benzaldehyde

The title compound was obtained using 2-chloro-6-(trifluoromethyl)pyridine and 3-(4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-5-trifluoromethyl-benzaldehyde in the same manner as in Reference Example 112.

¹H-NMR (CDCl₃) δ: 7.73-7.76 (1H, m), 8.04-8.06 (2H, m), 8.23 (1H, s), 8.61 (1H, s), 8.77 (1H, s), 10.20 (1H, s).

[0380]

Reference Example 208

Synthesis of 4-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-

2-carbaldehyde

The title compound was obtained using 4-bromo-2-furaldehyde and (*E*)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example

5 91.

¹H-NMR (CDCl₃) δ: 6.92-7.07 (2H, m), 7.47-7.53 (3H, m), 7.63 (1H, d, *J* = 7.8 Hz), 7.71 (1H, s), 7.80 (1H, s), 9.70 (1H, s).
[0381]

Reference Example 209

10 Synthesis of 3-[(*E*)-2-(2,4-difluoro-phenyl)-vinyl]-benzaldehyde

The title compound was obtained using 3-bromobenzaldehyde and 2-((*E*)-2-(2,4-difluorophenyl)vinyl)-4,4,5,5-tetramethyl-[1,3,2]-dioxaborolane in the same manner as in Reference

15 Example 91.

¹H-NMR (CDCl₃) δ: 6.83-6.94 (2H, m), 7.16 (1H, d, *J* = 16.5 Hz), 7.29 (1H, d, *J* = 16.5 Hz), 7.53-7.61 (2H, m), 7.76-7.80 (2H, m), 8.02 (1H, s), 10.06 (1H, s).
[0382]

20 Reference Example 210

Synthesis of 2-hydroxy-3-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

The title compound was obtained using 3-bromo-2-hydroxybenzaldehyde and (*E*)-2-(3-

25 trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.07 (1H, t, *J* = 7.7 Hz), 7.27 (1H, d, *J* = 16.5 Hz), 7.47-7.53 (4H, m), 7.72 (1H, d, *J* = 7.4 Hz), 7.77 (1H, s), 7.83 (1H, dd, *J* = 1.6, 7.7 Hz), 9.93 (1H, s), 11.6
30 (1H, s).

[0383]

Reference Example 211

Synthesis of 5-chloro-2-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

35 The title compound was obtained using 2-bromo-5-chloro-

benzaldehyde and (*E*)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.05 (1H, d, J = 16.2 Hz), 7.49-7.58 (3H, m),
5 7.67 (1H, d, J = 8.4 Hz), 7.74 (1H, s), 7.76 (1H, s), 7.82 (1H, d, J = 2.3 Hz), 8.03 (1H, d, J = 16.2 Hz), 10.26 (1H, s).

[0384]

Reference Example 212

Synthesis of 3-chloro-5-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-
10 benzaldehyde

The title compound was obtained using 3-chloro-5-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-benzaldehyde and 5-bromo-2,2-difluoro-1,3-benzodioxole in the same manner as in Reference Example 91.

15 ¹H-NMR (CDCl₃) δ: 7.15-7.18 (1H, m), 7.30-7.33 (2H, m), 7.75 (1H, s), 7.84 (1H, s), 7.90 (1H, s), 10.04 (1H, s).

[0385]

Reference Example 213

Synthesis of 3-(4-trifluoromethyl-pyrimidin-2-yl)-benzaldehyde

20 The title compound was obtained using 3-formylphenylboronic acid and 2-chloro-4-(trifluoromethyl)pyrimidine in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.58-7.61 (1H, m), 7.70 (1H, t, J = 7.7 Hz),
25 8.07-8.09 (1H, m), 8.79-8.82 (1H, m), 9.02 (1H, s), 9.10 (1H, d, J = 5.0 Hz), 10.16 (1H, s).

[0386]

Reference Example 214

Synthesis of 4-(3,5-bis-trifluoromethyl-phenyl)-thiophene-3-
30 carbaldehyde

The title compound was obtained using 3-bromo-4-formylthiophene and 3,5-bis(trifluoromethyl)phenylboronic acid in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.41 (1H, d, J = 3.2 Hz), 7.88-7.90 (3H, m),
35 7.31 (1H, d, J = 3.2 Hz), 9.92 (1H, s).

[0387]

Reference Example 215

Synthesis of 5-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-thiophene-2-carbaldehyde

5 The title compound was obtained using 5-bromothiophene-2-carboxaldehyde and (*E*)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.13-7.21 (3H, m), 7.50-7.58 (2H, m), 7.66-
10 7.70 (2H, m), 7.76 (1H, s), 9.88 (1H, s).

[0388]

Reference Example 216

Synthesis of 3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-benzaldehyde

15 The title compound was obtained using 3-chloro-5-(5,5-dimethyl-[1,3,2]dioxaborinan-2-yl)-benzaldehyde and 2-chloro-4-(trifluoromethyl)pyrimidine in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.62 (1H, d, J = 4.9 Hz), 8.00-8.04 (1H, m),
20 8.77-8.78 (1H, m), 8.91-8.92 (1H, m), 9.11 (1H, d, J = 4.9 Hz), 10.12 (1H, s).

[0389]

Reference Example 217

25 Synthesis of 3-chloro-5-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-benzaldehyde

The title compound was obtained using 3-bromo-5-chloro-benzaldehyde and (*E*)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

30 ¹H-NMR (CDCl₃) δ: 7.15 (1H, d, J = 16.4 Hz), 7.23 (1H, d, J = 16.4 Hz), 7.49-7.56 (2H, m), 7.59-7.78 (4H, m), 7.91 (1H, s), 10.01 (1H, s).

[0390]

Reference Example 218

35 Synthesis of 3-(benzo[*b*]thiophen-3-yl)-5-chloro-benzaldehyde

The title compound was obtained using 3-bromo-5-chloro-benzaldehyde and benzothiophene-3-boronic acid in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.43-7.46 (2H, m), 7.52 (1H, s), 7.84-7.99
5 (5H, m), 10.06 (1H, s).

[0391]

Reference Example 219

Synthesis of 5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-carbaldehyde

10 The title compound was obtained using 5-bromo-2-furaldehyde and (E)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 6.59 (1H, d, J = 3.6 Hz), 7.00 (1H, d, J =
15 16.4 Hz), 7.27 (1H, d, J = 3.6 Hz), 7.41 (1H, d, J = 16.4 Hz), 7.48-7.58 (2H, m), 7.66 (1H, d, J = 7.6 Hz), 7.76 (1H, s), 9.63 (1H, s).

[0392]

Reference Example 220

20 Synthesis of 3-(3,5-bis-trifluoromethyl-phenyl)-thiophene-2-carbaldehyde

The title compound was obtained using 3-bromothiophene-2-carboxaldehyde and 3,5-bis(trifluoromethyl)phenylboronic acid in the same manner as in Reference Example 91.

25 ¹H-NMR (CDCl₃) δ: 7.27 (1H, d, J = 5.0 Hz), 7.84 (1H, d, J = 5.0 Hz), 7.93 (2H, s), 7.98 (1H, s), 9.84 (1H, s).

[0393]

Reference Example 221

Synthesis of 2-fluoro-4-[(E)-2-(3-trifluoromethyl-phenyl)-
30 vinyl]-benzaldehyde

The title compound was obtained using 4-bromo-2-fluorobenzaldehyde and (E)-2-(3-trifluoromethylphenyl)vinylboronic acid pinacol ester in the same manner as in Reference Example 91.

35 ¹H-NMR (CDCl₃) δ: 6.90-7.33 (4H, m), 7.52-7.54 (1H, m), 7.55

(1H, d, J = 7.8 Hz), 7.71 (1H, d, J = 7.5 Hz), 7.79 (1H, s), 7.89 (1H, t, J = 7.8 Hz), 10.35 (1H, s).

[0394]

Reference Example 222

5 Synthesis of 1-(2,5-bis-trifluoromethyl-phenyl)-piperidine-4-carbaldehyde

A suspension of 4-((tetrahydro-2H-pyran-2-yloxy)methyl)piperidine (300 mg, 1.51 mmol), 2,5-bis(trifluoromethyl)bromobenzene (0.261 ml, 1.51 mmol),
10 Pd(OAc)₂ (33.8 mg, 0.151 mmol), *rac*-BINAP (94 mg, 0.151 mmol) and *tert*-BuONa (730 mg, 7.60 mmol) in toluene (10 ml) was heated to 100°C for 10 hr under argon. After the reaction mixture was allowed to cool to room temperature, the reaction mixture was filtered through a layer of Celite with AcOEt. The
15 filtrate was concentrated *in vacuo* and the crude product was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 7% gradient)) to give 1-(2,5-bis(trifluoromethyl)phenyl)-4-((tetrahydro-2H-pyran-2-yloxy)methyl)piperidine (251 mg, 50%) as a pale yellow oil.
20 ¹H-NMR (CDCl₃) 1.4-1.9 (11H, m), 2.7-2.8 (2H, m), 3.1-3.2 (2H, m), 3.30 (1H, dd, J = 6.3, 9.5 Hz), 3.5-3.6 (1H, m), 3.68 (1H, dd, J = 6.8, 9.5 Hz), 3.85-3.95 (1H, m), 4.60 (1H, m), 7.43 (1H, d, J = 8.3 Hz), 7.54 (1H, s), 7.73 (1H, d, J = 8.3 Hz).

To a solution of 1-(2,5-bis(trifluoromethyl)phenyl)-4-
25 ((tetrahydro-2H-pyran-2-yloxy)methyl)piperidine (250.5 mg, 0.765 mmol) in THF (4 ml) was added 5N HCl, and the reaction mixture was stirred at room temperature for 3 hr. The reaction mixture was diluted with AcOEt and basified with 5N aqueous NaOH and saturated aqueous NaHCO₃ solution. The organic layer
30 was washed twice with water, dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure to give a pale brown oil.

To a solution of the pale brown oil in DMSO (2 ml) was added IBX (210 mg, 0.498 mmol) and the reaction mixture was
35 stirred at room temperature overnight. To the resulting

suspension were added AcOEt and water, and the mixture was filtered through a layer of Celite with AcOEt. The organic layers were separated, and washed twice with water, dried over anhydrous MgSO_4 . The solvents were removed under reduced pressure to give crude product as a pale brown oil. The crude material was purified by flash chromatography on silica gel (AcOEt/hexane (0 to 10% gradient)) to give the title compound (132 mg, 58%) as a colorless oil.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.8-1.95 (2H, m), 1.95-2.1 (2H, m), 2.3-2.5 (1H, m), 2.75-2.85 (2H, m), 3.1-3.2 (2H, m), 7.47 (1H, d, $J = 8.4$ Hz), 7.54 (1H, s), 7.76 (1H, d, $J = 8.4$ Hz), 9.73 (1H d, $J = 0.9$ Hz).

[0395]

Reference Example 223

Synthesis of 3-[(E)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-benzaldehyde

A reaction vessel was charged with $\text{Pd}(\text{OAc})_2$ (0.024 g, 0.109 mmol), 3-dimethylaminopropionic acid hydrochloride (0.020 g, 0.131 mmol), K_2CO_3 (0.301 g, 2.179 mmol), 3-vinyl-benzaldehyde (0.144 g, 1.090 mmol), 3-bromo-5-(trifluoromethyl)pyridine (0.295 g, 1.308 mmol) and NMP (4 ml). The reaction mixture was stirred at 120°C under argon for 9 hr. The reaction was quenched by addition of water, and then extracted with TBME (6 ml x2). The organic layer was washed with water and brine, and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 10% -> 30%) to give the title compound (250 mg, 80%) as a light yellow solid.

$^1\text{H-NMR}$ (CDCl_3) δ : 7.22 (1H, d, $J = 16.4$ Hz), 7.31 (1H, d, $J = 16.4$ Hz), 7.59 (1H, t, $J = 7.6$ Hz), 7.79-7.86 (2H, m), 8.08 (2H, s), 8.79 (1H, s), 8.93 (1H, s), 10.08 (1H, s).

[0396]

Reference Example 224

Synthesis of 3-trifluoromethyl-5-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-benzaldehyde

The title compound was obtained using 2-trifluoromethyl-6-vinyl-pyridine and 3-bromo-5-(trifluoromethyl)benzaldehyde in the same manner as in Reference Example 223.

¹H-NMR (CDCl₃) δ: 7.36 (1H, d, J = 16.1 Hz), 7.60 (2H, d, J = 7.7 Hz), 7.83-7.90 (2H, m), 8.08 (2H, s), 8.28 (1H, s), 10.11 (1H, s).

[0397]

Reference Example 225

Synthesis of 3-[(E)-2-(5-trifluoromethyl-pyridin-2-yl)-vinyl]-benzaldehyde

The title compound was obtained using 5-trifluoromethyl-2-vinyl-pyridine and 3-bromobenzaldehyde in the same manner as in Reference Example 223.

¹H-NMR (CDCl₃) δ: 7.29 (1H, d, J = 16.1 Hz), 7.59 (1H, d, J = 8.3 Hz), 7.58 (1H, t, J = 7.6 Hz), 7.81-7.93 (4H, m), 8.12 (1H, s), 8.87 (1H, s), 10.07 (1H, s).

[0398]

Reference Example 226

Synthesis of 3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-benzaldehyde

The title compound was obtained using 4-trifluoromethyl-2-vinyl-pyridine and 3-bromobenzaldehyde in the same manner as in Reference Example 223.

¹H-NMR (CDCl₃) δ: 7.30 (1H, d, J = 16.1 Hz), 7.40 (1H, d, J = 5.0 Hz), 7.55-7.60 (2H, m), 7.78-7.86 (3H, m), 8.11 (1H, s), 8.80 (1H, d, J = 5.0 Hz), 10.07 (1H, s).

[0399]

Reference Example 227

Synthesis of 3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-benzaldehyde

The title compound was obtained using 3-bromobenzaldehyde and 4-trifluoromethyl-2-vinyl-pyrimidine in the same manner as in Reference Example 223.

¹H-NMR (CDCl₃) δ: 7.39 (1H, d, J = 16.0 Hz), 7.46 (1H, d, J = 5.0 Hz), 7.60 (1H, t, J = 7.6 Hz), 7.88-7.91 (2H, m), 8.14-

8.18 (2H, m), 8.98 (1H, d, J = 5.0 Hz), 10.07 (1H, s).

[0400]

Reference Example 228

Synthesis of 5-(3-fluoro-5-trifluoromethyl-phenyl)-1-methyl-
5 1H-pyrrole-2-carbaldehyde

A reaction vessel was charged with 3-bromo-5-fluorobenzotrifluoride (243 mg, 1 mmol), N-methylpyrrole-2-carboxaldehyde (218 mg, 2 mmol), AcOK (196 mg, 2 mmol), Pd(OAc)₂ (23 mg, 0.1 mmol) and DMA (3 ml). The reaction was
10 carried out under microwave irradiation at 180°C for 10 min and quenched by addition of water. The reaction mixture was extracted twice with AcOEt and the combined organic phase was washed with water, and concentrated. The residue was purified by silica gel column chromatography (hexane/AcOEt 10% -> 20%)
15 to give the title compound (76 mg, 28%) as a brown oil.

¹H-NMR (CDCl₃) δ: 3.95 (3H, s), 6.37 (1H, d, J = 4.1 Hz), 7.00 (1H, d, J = 4.1 Hz), 7.32-7.40 (2H, m), 7.49 (1H, s), 9.63 (1H, s).

[0401]

20 Reference Example 229

Synthesis of 3-phenoxy-5-trifluoromethyl-benzaldehyde

A suspension of 3-phenoxy-5-trifluoromethylbenzonitrile (347.8 mg, 1.32 mmol), Raney Ni (0.4 g) in 90% formic acid (3 ml) was heated to 100°C for 1.5 hr. The reaction mixture was
25 allowed to cool to room temperature. The reaction mixture was diluted with AcOEt and filtered through a layer of Celite. The filtrate was washed three times with water, and then dried over anhydrous Na₂SO₄. The solvents were removed under reduced pressure, and the resulting crude product was purified by
30 flash chromatography on silica gel (AcOEt/hexane (0 to 30% gradient)) to give the title compound (307 mg, 87%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 7.05-7.09 (2H, m), 7.22-7.26 (1H, m), 7.40-7.45 (2H, m), 7.50 (1H, s), 7.60 (1H, s), 7.83 (1H, s), 9.99
35 (1H, s).

[0402]

Reference Example 230

Synthesis of 3-(thiophen-3-yl)-5-trifluoromethyl-benzaldehyde

The title compound was obtained using 3-(thiophen-3-yl)-
5 5-trifluoromethyl-benzonitrile in the same manner as in
Reference Example 229.

¹H-NMR (CDCl₃) δ: 7.46 (1H, dd, J = 1.5, 5.0 Hz), 7.48 (1H, dd,
J = 3.0, 5.0 Hz), 7.64 (1H, dd, J = 1.5, 3.0 Hz), 8.05 (1H, s),
8.08 (1H, s), 8.27 (1H, s), 10.12 (1H, s).

10 [0403]

Reference Example 231

Synthesis of 3-(benzofuran-2-yl)-4-fluoro-benzaldehyde

The title compound was obtained using 3-bromo-4-
fluorobenzaldehyde and benzo[b]furan-2-boronic acid in the
15 same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 7.27-7.40 (4H, m), 7.57 (1H, d, J = 7.7 Hz),
7.65 (1H, d, J = 7.2 Hz), 7.86-7.91 (1H, m), 8.60 (1H, dd, J =
2.1, 7.2 Hz), 10.08 (1H, s).

[0404]

20 Reference Example 232

Synthesis of 3-methyl-4-(3-trifluoromethyl-benzyl)-
benzaldehyde

The title compound was obtained using 4-(5,5-dimethyl-
[1,3,2]dioxaborinan-2-yl)-3-methyl-benzaldehyde and 3-
25 (trifluoromethyl)benzyl bromide in the same manner as in
Reference Example 91.

¹H-NMR (CDCl₃) δ: 2.32 (3H, s), 4.11 (2H, s), 7.23-7.30 (2H, m),
7.37-7.44 (2H, m), 7.46-7.52 (1H, m), 7.66-7.73 (2H, m), 9.98
(1H, s).

30 [0405]

Reference Example 233

Synthesis of 3-tert-butyl-5-(5-trifluoromethyl-pyridin-2-yl)-
benzaldehyde

The title compound was obtained using 3-tert-butyl-5-
35 (4,4,5,5-tetramethyl-[1,3,2]dioxaborolan-2-yl)-benzaldehyde

and 2-chloro-5-(trifluoromethyl)pyridine in the same manner as in Reference Example 91.

¹H-NMR (CDCl₃) δ: 1.45 (9H, s), 7.93 (1H, d, J = 8.1 Hz), 8.02-8.04 (2H, m), 8.32 (1H, s), 8.40-8.42 (1H, m), 8.99 (1H, s),
5 10.12 (1H, s).

[0406]

Reference Example 234

Synthesis of 1-(2,5-bis-trifluoromethyl-phenyl)-1H-pyrrole-3-carbaldehyde

10 To a solution of 241 mg of 2,5-bis(trifluoromethyl)aniline in 1 ml of AcOH was added 160 mg of 2,5-dimethoxy-3-tetrahydrofurancarboxaldehyde and the reaction mixture was stirred at 90°C for 2 hr. The reaction was quenched by addition of water, and the mixture was extracted
15 with AcOEt. The organic solution was washed with water and 5wt% NaHCO₃ aqueous solution, and concentrated to give the title compound (318 mg, quant.) as a brown oil.

¹H-NMR (CDCl₃) δ: 6.82-6.88 (2H, m), 7.46 (1H, s), 7.72 (1H, s), 7.89 (1H, d, J = 8.2 Hz), 8.00 (1H, d, J = 8.2 Hz), 9.87 (1H,
20 s).

[0407]

Reference Example 235

Synthesis of 3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-benzaldehyde

25 The title compound was obtained using 3-formyl-5-methylphenylboronic acid and 2-chloro-4-(trifluoromethyl)pyrimidine in the same manner as in Reference Example 91

¹H-NMR (CDCl₃) δ: 2.56 (3H, s), 7.58 (1H, d, J = 5.0 Hz), 7.89
30 (1H, s), 8.61 (1H, s), 8.82 (1H, s), 9.09 (1H, d, J = 5.0 Hz), 10.13 (1H, s).

[0408]

Reference Example 236

Synthesis of 2-(4-chloro-phenyl)-5-propyl-oxazole-4-carboxylic
35 acid methyl ester

The title compound was obtained using methyl 3-oxohexanoate and 4-chlorobenzylamine in the same manner as in Reference Example 133.

¹H NMR (CDCl₃) δ: 1.03 (3H, t, J = 7.5 Hz), 1.76-1.83 (2H, m),
5 3.09 (2H, t, J = 7.6 Hz), 3.94 (3H, s), 7.43-7.46 (2H, m),
8.00-8.03 (2H, m).

[0409]

Reference Example 237

Synthesis of [2-(4-chloro-phenyl)-5-propyl-oxazol-4-yl]-
10 methanol

The title compound was obtained using 2-(4-chloro-phenyl)-5-propyl-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

¹H NMR (CDCl₃) δ: 0.99 (3H, t, J = 7.4 Hz), 1.66-1.78 (2H, m),
15 2.71 (2H, t, J = 7.4 Hz), 3.00 (1H, t, J = 6.0 Hz), 4.59 (2H,
d, J = 6.0 Hz), 7.39-7.42 (2H, m), 7.91-7.94 (2H, m).

[0410]

Reference Example 238

Synthesis of 2-(4-chloro-phenyl)-5-propyl-oxazole-4-
20 carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-propyl-oxazol-4-yl]-methanol in the same manner as in Reference Example 147.

¹H NMR (CDCl₃) δ: 1.04 (3H, t, J = 7.4 Hz), 1.77-1.87 (2H, m),
25 3.07 (2H, t, J = 7.5 Hz), 7.45-7.47 (2H, m), 7.99-8.01 (2H, m),
10.02 (1H, s).

[0411]

Reference Example 239

Synthesis of [2-(4-chloro-phenyl)-5-cyclopropyl-thiazol-4-yl]-
30 methanol

The title compound was obtained using [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol and cyclopropylboronic acid in the same manner as in Reference Example 38.

¹H NMR (CDCl₃) δ: 0.72-0.77 (2H, m), 1.08-1.15 (2H, m), 2.00-
35 2.07 (1H, m), 2.44 (1H, t, J = 5.8 Hz), 4.81 (2H, d, J = 5.8

Hz), 7.36-7.40 (2H, m), 7.77-7.80 (2H, m).

[0412]

Reference Example 240

Synthesis of 2-(4-chloro-phenyl)-5-cyclopropyl-thiazole-4-
5 carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-cyclopropyl-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H NMR (CDCl₃) δ: 0.85-0.90 (2H, m), 1.34-1.45 (2H, m), 3.07-
10 3.15 (1H, m), 7.40-7.43 (2H, m), 7.80-7.40 (2H, m), 10.22 (1H, s).

[0413]

Reference Example 241

Synthesis of [5-methyl-2-(4-trifluoromethoxy-phenoxy)-thiazol-
15 4-yl]-methanol

The title compound was obtained using [5-bromo-2-(4-chloro-phenyl)-thiazol-4-yl]-methanol and methylboronic acid in the same manner as in Reference Example 38.

¹H NMR (CDCl₃) δ: 2.01 (1H, t, J = 6.1 Hz), 2.34 (3H, s), 4.51
20 (2H, d, J = 6.1 Hz), 7.28-7.36 (4H, m).

[0414]

Reference Example 242

Synthesis of 5-methyl-2-(4-trifluoromethoxy-phenoxy)-thiazole-
4-carbaldehyde

25 The title compound was obtained using [5-methyl-2-(4-trifluoromethoxy-phenoxy)-thiazol-4-yl]-methanol in the same manner as in Reference Example 48.

¹H NMR (CDCl₃) δ: 2.72 (3H, s), 7.26-7.38 (4H, m), 9.90 (1H, s).

[0415]

30 Reference Example 243

Synthesis of 2-(4-chloro-phenyl)-5-isopropyl-oxazole-4-carboxylic acid methyl ester

The title compound was obtained using methyl isobutyrylacetate and 4-chlorobenzylamine in the same manner
35 as in Reference Example 133.

¹H NMR (CDCl₃) δ: 1.36 (6H, d, J = 7.2 Hz), 3.80-3.89 (1H, m), 3.94 (3H, s), 7.42-7.44 (2H, m), 7.99-8.02 (2H, m).

[0416]

Reference Example 244

5 Synthesis of [2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-methanol

The title compound was obtained using 2-(4-chloro-phenyl)-5-isopropyl-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 19.

10 ¹H NMR (CDCl₃) δ: 1.34 (6H, d, J = 7.2 Hz), 2.65 (1H, t, J = 6.0 Hz), 3.13-3.22 (1H, m), 4.61 (2H, d, J = 6.0 Hz), 7.40-7.43 (2H, m), 7.92-7.95 (2H, m).

[0417]

Reference Example 245

15 Synthesis of 2-(4-chloro-phenyl)-5-isopropyl-oxazole-4-carbaldehyde

The title compound was obtained using [2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-methanol in the same manner as in Reference Example 147.

20 ¹H NMR (CDCl₃) δ: 1.41 (6H, d, J = 6.9 Hz), 3.65-3.74 (1H, m), 7.44-7.49 (2H, m), 7.98-8.02 (2H, m), 10.04 (1H, s).

[0418]

Reference Example 246

25 Synthesis of 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid methyl ester

The title compound was obtained using 3-trifluoromethyl-thiobenzamide and 3-bromo-2-oxo-pentanoic acid methyl ester in the same manner as in Reference Example 2.

30 ¹H NMR (CDCl₃) δ: 1.40 (3H, t, J = 7.5 Hz), 3.33 (2H, q, J = 7.5 Hz), 3.98 (3H, s), 7.57 (1H, t, J = 7.8 Hz), 7.68 (1H, d, J = 7.8 Hz), 8.11 (1H, d, J = 7.8 Hz), 8.19 (1H, s).

[0419]

Reference Example 247

35 Synthesis of 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carbaldehyde

The title compound was obtained using 5-ethyl-2-(3-trifluoromethyl-phenyl)-thiazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 63.

¹H NMR (CDCl₃) δ: 1.40 (3H, t, J = 7.5 Hz), 3.34 (2H, q, J = 7.5 Hz), 7.59 (1H, t, J = 7.8 Hz), 7.71 (1H, d, J = 7.8 Hz), 8.11 (1H, d, J = 7.8 Hz), 8.21 (1H, s), 10.22 (1H, s).

[0420]

Reference Example 248

Synthesis of 2-(3,4-difluoro-phenyl)-5-isobutyl-oxazole-4-carboxylic acid methyl ester

The title compound was obtained using 5-methyl-3-oxo-hexanoic acid methyl ester and 3,4-difluorobenzylamine in the same manner as in Reference Example 133.

¹H NMR (CDCl₃) δ: 1.00 (3H, s), 1.02 (3H, s), 2.10-2.19 (1H, m), 3.00 (2H, d, J = 7.2 Hz), 3.95 (3H, s), 7.22-7.29 (1H, m), 7.81-7.86 (1H, m), 7.87-7.92 (1H, m).

[0421]

Reference Example 249

Synthesis of 2-(3,4-difluoro-phenyl)-5-isobutyl-oxazole-4-carbaldehyde

The title compound was obtained using 2-(3,4-difluoro-phenyl)-5-isobutyl-oxazole-4-carboxylic acid methyl ester in the same manner as in Reference Example 63.

¹H NMR (CDCl₃) δ: 1.02 (3H, s), 1.03 (3H, s), 2.13-2.20 (1H, m), 2.97 (2H, d, J = 7.1 Hz), 7.27-7.31 (1H, m), 7.81-7.91 (2H, m), 10.00 (1H, s).

[0422]

Reference Example 250

Synthesis of 2-(4-trifluoromethoxy-phenoxy)-thiazole-4-carboxylic acid ethyl ester

The title compound was obtained using 2-bromo-thiazole-4-carboxylic acid ethyl ester and 4-(trifluoromethoxy)phenol in the same manner as in Reference Example 9.

¹H NMR (CDCl₃) δ: 1.38 (3H, t, J = 7.1 Hz), 4.38 (2H, q, J = 7.1 Hz), 7.26-7.29 (2H, m), 7.35-7.38 (2H, m), 7.75 (1H, s).

[0423]

Reference Example 251

Synthesis of [2-(4-trifluoromethoxy-phenoxy)-thiazol-4-yl]-methanol

5 The title compound was obtained using 2-(4-trifluoromethoxy-phenoxy)-thiazole-4-carboxylic acid ethyl ester in the same manner as in Reference Example 19.
 ^1H NMR (CDCl_3) δ : 2.00 (1H, t, $J = 6.2$ Hz), 4.59 (2H, d, $J = 6.2$ Hz), 6.73 (1H, s), 7.23-7.34 (4H, m).

10 [0424]

Reference Example 252

Synthesis of [5-bromo-2-(4-trifluoromethoxy-phenoxy)-thiazol-4-yl]-methanol

15 The title compound was obtained using [2-(4-trifluoromethoxy-phenoxy)-thiazol-4-yl]-methanol in the same manner as in Reference Example 27.

^1H NMR (CDCl_3) δ : 2.06 (1H, t, $J = 6.3$ Hz), 4.55 (2H, d, $J = 6.3$ Hz), 7.24-7.33 (4H, m).

[0425]

20 Reference Example 318

Synthesis of (E)-3-[2,5-bis(trifluoromethyl)-phenyl]-prop-2-en-1-ol

25 To a solution of (E)-3-(2,5-bis-trifluoromethyl-phenyl)-acrylic acid ethyl ester (1.79 g, 5.74 mmol) in CH_2Cl_2 (35 ml) was added diisobutylaluminium hydride (0.94M in hexane) (13.4 ml, 12.6 mmol) at -30°C under argon. After the reaction mixture was stirred at the same temperature for 45 min, methanol was added thereto in order to decompose the excess diisobutylaluminium hydride. Water, CH_2Cl_2 and Celite were
30 added to the reaction mixture, and the mixture was filtered through a pad of Celite. The filtrate was extracted twice with CH_2Cl_2 . The organic layer was washed with water and brine, dried over Na_2SO_4 , and concentrated in vacuo to give the title compound (1.56 g, 100%).

35 ^1H -NMR (CDCl_3) δ : 4.40-4.42 (2H, m), 6.41-6.47 (1H, m), 7.00-

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7.05 (1H, m), 7.61 (1H, d, J = 8.2 Hz), 7.77 (1H, d, J = 8.2 Hz), 7.87 (1H, s).

[0426]

Reference Example 323

5 Synthesis of 5-phenoxy-2-phenyl-benzaldehyde

To a solution of 2-methyl-4-phenoxy-biphenyl (105.4 mg, 0.405 mmol) in CCl₄ (2 ml) were added NBS (180 mg, 1.0 mmol) and 2,2'-azodiisobutyronitrile (catalytic amount). After being stirred for 2 hr under reflux, the reaction mixture was cooled
10 and filtrated. The filtrate was concentrated *in vacuo* to give a colorless oil. To a solution of the oil in 2-butanone (4 ml) and water (2 ml) was added silver nitrate (200 mg, 1.18 mmol). After being stirred for 1 hr under reflux, the reaction mixture was cooled, and extracted with AcOEt. The organic
15 layer was washed with water, dried over anhydrous Na₂SO₄, and then concentrated *in vacuo*. The obtained residue was purified by TLC (AcOEt/hexane = 1/20) to give the title compound (94.2 mg, 85%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 7.06-7.10 (2H, m), 7.15-7.20 (1H, m), 7.30
20 (1H, dd, J = 2.8, 8.4 Hz), 7.35-7.50 (8H, m), 7.59 (1H, d, J = 2.7 Hz), 9.93 (1H, s).

[0427]

Reference Example 342

Synthesis of 4-[2,5-bis(trifluoromethyl)-phenyl]-but-3-yn-1-ol

25 To a solution of 2,5-bis(trifluoromethyl)bromobenzene (2.0g, 6.83 mmol) in THF (20 ml) were added 3-butyne-1-ol (0.62 ml, 8.19 mmol), PdCl₂(PPh₃)₂ (0.19 g, 0.273 mmol), Et₃N (1.90 ml, 13.7 mmol) and CuI (26 mg, 0.137 mmol). After the reaction mixture was refluxed for 2.5 hr, it was filtered through a pad
30 of Celite. The filtrate was concentrated *in vacuo* and the residue was purified by silica gel column chromatography (hexane/AcOEt = 9:1-4:1) to give the title compound (1.49 g, 77%).

¹H-NMR (CDCl₃) δ: 1.80 (1H, t, J = 6.4 Hz), 2.75 (2H, t, J =
35 6.2 Hz), 3.84-3.88 (2H, m), 7.63 (1H, d, J = 8.2 Hz), 7.77 (1H,

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d, J = 8.2 Hz), 7.82 (1H, s).

[0428]

Reference Example 484

Synthesis of (E)-3-[3-[[2,5-bis(trifluoromethyl)-phenyl]-
5 methoxy]-phenyl]-acrylaldehyde

To a solution of 3-(2,5-bis-trifluoromethyl-benzyloxy)-
benzaldehyde (1.00 g, 2.87 mmol) in toluene (20 ml) was added
(triphenylphosphoranylidene)acetaldehyde (1.05 g, 3.45 mmol)
and the reaction mixture was stirred at 100°C overnight. The
10 reaction mixture was concentrated *in vacuo*. The residue was
purified by silica gel column chromatography (hexane/AcOEt =
10:1-9:1) to give the title compound (0.49 g, 45%).
¹H-NMR (CDCl₃) δ: 5.33 (2H, s), 6.67-7.08 (1H, m), 7.09-7.23
(3H, m), 7.37-7.49 (2H, m), 7.73 (1H, d, J = 8.3 Hz), 7.86 (1H,
15 d, J = 8.3 Hz), 8.08 (1H, s), 9.72 (1H, d, J = 7.7 Hz).

[0429]

Reference Example 597

Synthesis of 3-bromo-5-fluoro-phenol

To a solution of 3-bromo-5-fluoroanisole (7.0 g, 36.6
20 mmol) in AcOH (35 ml) was added 47% HBr aq. (35 ml). The
reaction mixture was stirred at 120°C for 23.5 hr. The
reaction was quenched by addition of water and AcOEt. After
neutralized with saturated aqueous NaHCO₃ solution, the
reaction mixture was extracted with AcOEt. The combined
25 organic layers were washed with water and brine, dried over
Na₂SO₄, and concentrated *in vacuo*. The obtained residue was
purified by silica gel column chromatography (hexane/AcOEt =
9/1) to give the title compound (7.69 g, quant.) as a pale
yellow oil.
30 ¹H-NMR (CDCl₃) δ: 6.11 (1H, brs), 6.53 (1H, dt, J = 2.2, 10.0
Hz), 6.79-6.84 (2H, m).

[0430]

Reference Example 600

Synthesis of [3,4-bis(trifluoromethyl)-phenyl]-methanol

35 To a solution of 3,4-bis(trifluoromethyl)benzoic acid

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(1.00 g, 3.87 mmol) in THF (20 ml) at 0°C was added BH₃ THF complex (1.0M THF solution, 8.44 ml, 8.44 mmol). The reaction mixture was stirred at room temperature for 3 hr. The reaction was quenched by addition of 1N HCl aq. at 0°C, and the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The obtained residue was purified by silica gel column chromatography (hexane/AcOEt = 3/1) to give the title compound (820 mg, 87%) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 1.99 (1H, brs), 4.85 (2H, s), 7.67-7.69 (1H, m), 7.83-7.86 (2H, m).

[0431]

Reference Example 618

Synthesis of 3-(difluoro-methoxy)-5-([1,3]dioxolan-2-yl)-phenol

To a solution of 2-(3-difluoromethoxy-5-[1,3]dioxolan-2-yl-phenyl)-5,5-dimethyl-[1,3,2]dioxaborinane (3.84 g, 11.7 mmol) in THF (40 ml) were added 3N NaOH (11.7 ml, 35.1 mmol) and 30% H₂O₂ (11.7 ml) at 0°C. After the reaction mixture was stirred at 0°C for 30 min, it was warmed to room temperature and stirring was continued for 1 hr. The reaction mixture was acidified with 5N HCl, and extracted twice with AcOEt. The organic layer was washed with brine, dried over MgSO₄, and concentrated *in vacuo* to give the crude product of the title compound (3.73 g). This product was used in the next step without purification.

[0432]

Reference Example 643

Synthesis of 3-(tetrahydro-pyran-2-yloxy)-adamantane-1-carboxylic acid ethyl ester

To a solution of 3-hydroxy-adamantane-1-carboxylic acid (1.0 g, 5.10 mmol) in DMF (10 ml) were added K₂CO₃ (1.0 g, 6.25 mmol) and iodoethane (0.6 ml, 6.58 mmol). After being stirred at room temperature for 3 days and at 60 °C for 1 hr, the reaction mixture was cooled and filtrated. The filtrate was

concentrated *in vacuo* to give a colorless oil. To a solution of the oil in CH₂Cl₂ (20 ml) were added 3,4-dihydro-2H-pyran (0.6 ml, 6.58 mmol) and pyridinium *p*-toluensulfonate (catalytic amount). After the reaction mixture was stirred at
5 room temperature for 5 hr, Et₃N (0.1 ml) was added to the reaction mixture. The reaction mixture was concentrated *in vacuo*. The obtained residue was purified by silica gel column chromatography (AcOEt/hexane = 1/20) to give the title compound (1.26 g, 80%) as a colorless oil.

10 ¹H-NMR (CDCl₃) δ: 1.24 (3H, t, J = 7.1 Hz), 1.45-2.04 (18H, m), 2.21-2.28 (2H, m), 3.38-3.51 (1H, m), 3.89-4.01 (1H, m), 4.11 (2H, q, J = 7.1 Hz), 4.82-4.93 (1H, m).

[0433]

Reference Example 742

15 Synthesis of 2-phenyl-4-(phenylmethoxy-methyl)-pyrimidine

A mixture of 4-(benzyloxymethyl)-6-chloro-2-phenylpyrimidine (1.61 g, 5.18 mmol), AcONa (0.85 g, 10.36 mmol) and 10% Pd on carbon (160 mg) in DMF (20 ml) under hydrogen was stirred at room temperature for 45 min. The
20 reaction mixture was filtered through a celite pad. To the filtrate was added water and the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The obtained residue was triturated with hexane/EtOH to
25 give the title compound (0.91g, 64%) as a pale yellow powder.

¹H-NMR (CDCl₃) δ: 4.71 (2H, s), 4.73 (2H, s), 7.30-7.45 (6H, m), 7.46-7.53 (3H, m), 8.39-8.45 (2H, m), 8.79 (1H, d, J = 5.1 Hz).

[0434]

Reference Example 750

30 Synthesis of (2-phenyl-pyrimidin-4-yl)-methanol

To a solution of 2-phenyl-4-(phenylmethoxy-methyl)-pyrimidine (0.90 g, 3.26 mmol) in CH₂Cl₂ (18 ml) at -10°C was added BBr₃ (1.0M CH₂Cl₂ solution, 3.91 ml, 3.91 mmol). The reaction mixture was stirred at -10°C for 0.5 hr. The reaction
35 was quenched by addition of saturated aqueous NaHCO₃ solution

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and the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, and dried over Na₂SO₄. The solution was purified by silica gel column chromatography (MeOH/CH₂Cl₂ = 0% to 5%) to give the
5 title compound (0.38 g, 63%) as a yellow powder.

¹H-NMR (CDCl₃) δ: 3.72 (1H, t, J = 5.1 Hz), 4.82 (2H, d, J = 5.1 Hz), 7.18 (1H, dd, J = 0.7, 5.1 Hz), 7.49-7.53 (3H, m), 8.43-8.49 (2H, m), 8.76 (1H, d, J = 5.1 Hz).

[0435]

10 Reference Example 760

Synthesis of 6-(phenylmethoxy-methyl)-2-[4-(trifluoromethyl)-phenyl]-3H-pyrimidin-4-one

A mixture of 4-(trifluoromethyl)benzamidinium hydrochloride (1.20 g, 4.60 mmol), ethyl 4-(benzyloxy)-3-oxobutanoate (1.09
15 g, 4.60 mmol) and 28% sodium methoxide (1.83 ml, 9.21 mmol) in MeOH (10 ml) was heated under reflux for 18 hr. After cooling to room temperature, the reaction mixture was concentrated in vacuo. To the residue was added water, and then the mixture was acidified with AcOH (pH = 4). The resulting precipitate
20 was filtered, and washed with water. The solid was triturated with isopropyl ether to give the title compound (1.21 g, 73%) as a beige powder.

¹H-NMR (CDCl₃) δ: 4.54 (2H, d, J = 1.2 Hz), 4.72 (2H, s), 6.75 (1H, t, J = 1.2 Hz), 7.31-7.45 (5H, m), 7.80-7.82 (2H, m),
25 8.33-8.36 (2H, m), 13.24 (1H, brs).

[0436]

Reference Example 825

Synthesis of 3-[(E)-2-(2,2-difluoro-1,3-benzodioxol-5-yl)-vinyl]-benzaldehyde

30 To a solution of 3-vinyl-benzaldehyde (0.35 g, 2.65 mmol) in NMP (5.3 ml) were added 5-bromo-2,2-difluoro-1,3-benzodioxole (0.63 g, 2.65 mmol), Pd(OAc)₂ (30 mg, 0.133 mmol), K₂CO₃ (0.73 g, 5.30 mmol) and N, N-dimethylglycine (14 mg, 0.133 mmol). After the reaction mixture was stirred at 100°C
35 overnight under argon, it was quenched by the addition of

water and extracted with AcOEt. The organic layer was washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane/AcOEt = 10:0-9:1) to give the title
5 compound (563 mg, 74%).

¹H-NMR (CDCl₃) δ: 7.05 (1H, t, J = 8.1 Hz), 7.13-7.22 (3H, m), 7.28 (1H, s), 7.54 (1H, t, J = 7.6 Hz), 7.73-7.80 (2H, m), 8.02 (1H, s), 10.06 (1H, s).

[0437]

10 Reference Example 831

Synthesis of 4-chloro-6-(phenylmethoxy-methyl)-2-[4-(trifluoromethyl)-phenyl]-pyrimidine

A mixture of 6-(phenylmethoxy-methyl)-2-[4-(trifluoromethyl)-phenyl]-3H-pyrimidin-4-one (0.90 g, 2.50
15 mmol) and POCl₃ (0.70 ml, 7.49 mmol) in CH₃CN (18 ml) was stirred at 80°C for 3 hr. After cooling to room temperature, the reaction mixture was poured into water, and extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo* to give the
20 title compound (0.79 g, 84%) as a yellow oil.

¹H-NMR (CDCl₃) δ: 4.68-4.72 (4H, m), 7.09-7.23 (2H, m), 7.29-7.43 (3H, m), 7.53-7.54 (1H, m), 7.71-7.76 (2H, m), 8.52-8.59 (2H, m).

[0438]

25 Reference Example 916

Synthesis of methyl 4-[bis(tert-butoxycarbonyl)amino]-3-bromobenzoate

To a solution of methyl 4-amino-3-bromobenzoate (1.00 g, 4.35 mmol) in THF (20 ml) were added di-tert-butyl dicarbonate
30 (7.27 ml, 31.3 mmol) and N,N-dimethyl-4-aminopyridine (0.053 g, 0.435 mmol). After being stirred at room temperature for 8 hr, the reaction mixture was concentrated *in vacuo*. The residue was purified by flash column chromatography (AcOEt/hexane = 20% to 50%) to give a white solid. The suspension of the
35 obtained residue in hexane was filtrated to give the title

compound (1.45 g, 78%) as a white powder.

¹H-NMR (CDCl₃) δ: 1.39 (18H, s), 3.94 (3H, s), 7.29 (1H, d, J = 8.2 Hz), 7.99 (1H, dd, J = 1.9, 8.2 Hz), 8.29 (1H, d, J = 1.9 Hz).

5 [0439]

Reference Example 924

Synthesis of 3-bromo-4-(tert-butoxycarbonylamino)-benzoic acid

To a solution of methyl 4-(bis(tert-butoxycarbonyl)amino)-3-bromobenzoate (1.451 g, 3.37 mmol) in
10 MeOH (30 ml) was added 1N NaOH (10.12 ml, 10.12 mmol). The reaction mixture was stirred at room temperature overnight, then at 50°C for 1 hr. After acidified with 1N HCl, the reaction mixture was extracted with AcOEt. The organic layer was washed with brine, dried over anhydrous MgSO₄ and then
15 concentrated *in vacuo* to give the title compound (927 mg, 87%) as a pale yellow solid.

¹H-NMR (DMSO-d₆) δ: 1.48 (9H, s), 7.78 (1H, d, J = 8.5 Hz), 7.89 (1H, dd, J = 1.9, 8.5 Hz), 8.08 (1H, d, J = 1.9 Hz), 8.66 (1H, s), 13.14 (1H, brs).

20 [0440]

Reference Example 934

Synthesis of (2-bromo-4-hydroxymethyl-phenyl)-carbamic acid tert-butyl ester

To a solution of
25 3-bromo-4-(tert-butoxycarbonylamino)benzoic acid (927 mg, 2.93 mmol) in THF (20 ml) were added Et₃N (0.49 ml, 3.52 mmol) and ethyl chlorocarbonate (0.308 ml, 3.23 mmol) at 0°C. After being stirred at 0°C for 30 min, the precipitate was filtrated off. To the filtrate was added a solution of NaBH₄ (333 mg,
30 8.80 mmol) in H₂O (4 ml) at 0°C. After being stirred at 0°C for 1 hr, the reaction mixture was concentrated *in vacuo*. Water was added to the reaction mixture. The reaction mixture was extracted with AcOEt. The organic layer was washed with brine, dried over anhydrous MgSO₄, and then concentrated *in vacuo* to
35 give the title compound (937 mg, quant.) as a pale yellow oil.

¹H-NMR (CDCl₃) δ: 1.53 (9H, s), 1.53-1.56 (1H, m), 4.62 (2H, s), 6.99 (1H, brs), 7.24-7.28 (1H, m), 7.55 (1H, d, J = 2.0 Hz), 8.13 (1H, d, J = 8.5 Hz).

[0441]

5 Reference Example 935

Synthesis of N-[4-formyl-2-[3-(trifluoromethyl)phenyl]-phenyl]-N-methyl-acetamide

To a solution of 6-(methylamino)-3'-(trifluoromethyl)biphenyl-3-carbaldehyde (46 mg, 0.165 mmol) in CH₂Cl₂ (4 ml) were added pyridine (0.054 ml, 0.658 mmol) and acetyl chloride (0.128 ml, 1.79 mmol) at room temperature overnight. Water was added to the reaction mixture. The reaction mixture was extracted with CH₂Cl₂. The organic layer was washed with 1N HCl and brine, dried over anhydrous MgSO₄, and then concentrated *in vacuo*. The residue was purified by flash column chromatography (AcOEt/hexane = 40% to 75%) to give the title compound (21 mg, 39%) as a colorless oil.

¹H-NMR (CDCl₃) δ: 1.82 (3H, s), 3.04 (3H, s), 7.49-8.01 (7H, m), 10.11 (1H, s).

20 [0442]

Reference Example 1014

Synthesis of 1-(3,4-difluoro-phenyl)-2,3-dihydro-1H-indole-4-carboxylic acid methyl ester

To a solution of 1-(3,4-difluoro-phenyl)-1H-indole-4-carboxylic acid methyl ester (0.20 g, 0.696 mmol) in TFA (2 ml) was added triethylsilane (0.1 ml, 0.63 mmol). The reaction mixture was stirred at room temperature for 3 days. To a reaction mixture was added triethylsilane (0.2 ml). After being stirred for 3 hr at 50°C, the reaction mixture was cooled, washed with water and saturated aqueous NaHCO₃ solution, dried over anhydrous Na₂SO₄, and then concentrated *in vacuo*. The obtained residue was purified by crystallization (hexane) to give the title compound (176 mg, 88%) as a white solid.

¹H-NMR (CDCl₃) δ: 3.51 (2H, t, J = 8.5 Hz), 3.91 (3H, s), 3.94 (2H, t, J = 8.5 Hz), 6.87-6.96 (1H, m), 7.05 (1H, ddd, J = 2.8,

6.8, 12.4 Hz), 7.09-7.12 (3H, m), 7.40 (1H, dd, $J = 2.2, 6.8$ Hz).

[0443]

Reference Example 1123

5 Synthesis of 2-(4-chlorophenyl)-4-(trifluoromethyl)-thiazole-5-carboxylic acid ethyl ester

To a solution of ethyl 2-chloro-3-keto-4,4,4-trifluorobutyrate (200 mg, 0.915 mmol) in EtOH (4 ml) was added 4-chlorothiobenzamide (157 mg, 0.915 mmol). After being
10 stirred at reflux temperature for 8 hr, the reaction mixture was concentrated *in vacuo*. The residue was purified by flash column chromatography (AcOEt/hexane = 10% to 33%). To the obtained residue in EtOH (4 ml) was added *p*-toluenesulfonic acid monohydrate (17 mg, 0.092 mmol). After being stirred at
15 reflux temperature for 16 hr, the reaction mixture was concentrated *in vacuo*. The residue was purified by flash column chromatography (AcOEt/hexane = 10% to 33%) to give the title compound (101 mg, 33%) as a white powder.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.41 (3H, t, $J = 7.1$ Hz), 4.42 (2H, q, $J =$
20 7.2 Hz), 7.44-7.49 (2H, m), 7.91-7.96 (2H, m).

[0444]

Reference Example 1173

Synthesis of 2-(morpholin-4-yl)-thiazole-4-carboxylic acid ethyl ester

25 To a solution of ethyl 2-bromothiazole-4-carboxylate (200 mg, 0.847 mmol) in DMF (3 ml) was added morpholine (369 mg, 4.24 mmol). After the reaction mixture was stirred at 100°C for 4 hr, water was added thereto. The reaction mixture was extracted with AcOEt. The organic layer was washed with brine,
30 dried over anhydrous MgSO_4 , and then concentrated *in vacuo* to give the title compound (186 mg, 91%) as a pale yellow solid.

$^1\text{H-NMR}$ (CDCl_3) δ : 1.37 (3H, t, $J = 7.1$ Hz), 3.51-3.54 (4H, m), 3.79-3.83 (4H, m), 4.36 (2H, q, $J = 7.1$ Hz), 7.48 (1H, s).

[0445]

35 Reference Example 1319

Synthesis of 5-fluoro-2-iodo-3-methyl-benzo[b]thiophene

To a solution of 5-fluoro-3-methylbenzo[b]thiophene (942 mg, 5.67 mmol) in THF (35 ml) was added *n*-butyllithium (3.97 ml, 6.23 mmol, 1.57 M in *n*-hexane) at -78°C under argon. After 5 the solution was stirred at -78°C for 2 hr, iodine (1582 mg, 6.23 mmol) in THF (10 ml) was added to the reaction mixture. The resulting solution was stirred at 0°C for 1h. The reaction mixture was quenched with saturated aqueous solution of Na₂S₂O₄ and extracted with AcOEt. The organic layer was washed with 10 saturated aqueous solution of Na₂S₂O₄ and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The crude product was purified by silica gel chromatography (hexane/AcOEt = 100:0-95:5) to give the title compound (1.41 g, 85%).

¹H-NMR (CDCl₃) δ: 2.37 (3H, s), 7.03-7.10 (1H, m), 7.33 (1H, dd, 15 J = 2.5, 9.6 Hz), 7.67 (1H, dd, J = 4.9, 8.8 Hz).

[0446]

Reference Example 1377

Synthesis of 2-[4-(trifluoromethyl)-phenyl]-imidazo[1,2-a]pyridine-7-carboxylic acid methyl ester

20 4-Trifluoromethylphenacyl bromide (801 mg, 3 mmol), methyl 2-aminopyridine-4-carboxylate (456 mg, 3.00 mmol) and 2-butanone (7 mL) were charged into a reaction tube equipped with a condenser, and the mixture was heated to reflux and stirred for 14 hr. The formed precipitate was collected by 25 filtration. The solid was then dissolved in saturated aqueous NaHCO₃ solution. The aqueous solution was extracted with AcOEt and the combined organic layers were dried over Na₂SO₄, filtered and concentrated *in vacuo* to give the title compound (504 mg, 52%) as a pale purple solid.

30 ¹H-NMR (CDCl₃) δ: 3.98 (3H, s), 7.43 (1H, dd, J = 1.8, 7.2 Hz), 7.72 (2H, d, J = 8.1 Hz), 8.04 (1H, s), 8.10 (2H, d, J = 8.1 Hz), 8.17-8.20 (1H, m), 8.39 (1H, s).

[0447]

Reference Example 1415

35 Synthesis of 7-(trifluoromethyl)-benzo[b]thiophene-2-

carboxylic acid ethyl ester

To a solution of 2-fluoro-3-trifluoromethyl benzaldehyde (3.53 g, 18.37 mmol) in DMSO (35 ml) were added Et₃N (7.64 ml, 55.1 mmol) and ethyl mercaptoacetate (2.208 ml, 20.21 mmol).

5 After the resulting solution was stirred at 80°C for 2 hr, it was quenched with water, and extracted twice with AcOEt. The organic layer was washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The crude product was purified by silica gel column chromatography (hexane/AcOEt =
10 100:0-75:25) to give the title compound (4.58 g, 91%).

¹H-NMR (CDCl₃) δ: 1.43 (3H, t, J = 7.1 Hz), 4.43 (2H, q, J = 7.1 Hz), 7.47-7.55 (1H, m), 7.76 (1H, d, J = 7.5 Hz), 8.05 (1H, d, J = 8.0 Hz), 8.12 (1H, s).

[0448]

15 Reference Example 1477

Synthesis of 3-chloro-4-fluoro-thiobenzamide

To a solution of 3-chloro-4-fluorobenzonitrile (3.00 g, 19.3 mmol) in DMF (30 ml) was added 22% ammonium sulfide solution (11.95 g, 38.6 mmol). After the reaction mixture was
20 stirred at 60-65°C for 2 hr, and water was added thereto. After being filtered the precipitate, the obtained precipitate was dissolved in AcOEt. The solution was washed with water and brine, dried over anhydrous MgSO₄, and then concentrated *in vacuo* to give the title compound (2.24 g, 61%) as a pale
25 yellow solid.

¹H-NMR (CDCl₃) δ: 7.01-7.24 (1H, br), 7.18 (1H, t, J = 8.5 Hz), 7.54-7.88 (1H, br), 7.74-7.79 (1H, m), 7.98 (1H, dd, J = 2.4, 6.9 Hz).

[0449]

30 Reference Example 1494

Synthesis of 2-bromo-5-methyl-3H-imidazole-4-carboxylic acid ethyl ester

To a solution of ethyl 4-methyl-5-imidazolecarboxylate (1 g, 6.49 mmol) in CHCl₃ (10 ml) and CH₃CN (10 ml) was added NBS
35 (1.27 g, 7.14 mmol). The reaction mixture was stirred at room

temperature for 19 hr. The reaction was quenched by addition of water and the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The obtained
5 residue was purified by silica gel column chromatography (CH₂Cl₂/MeOH = 10/1) to give an orange powder. The powder was triturated with isopropyl ether/AcOEt to afford the title compound (0.47 g, 31%) as a pale orange powder.

¹H-NMR (CDCl₃) δ: 1.36 (3H, t, J = 7.1 Hz), 2.51 (3H, brs),
10 4.35 (2H, q, J = 7.1 Hz), 10.29-10.87 (1H, br).

[0450]

Reference Example 1497

Synthesis of 6-[1-[[4-(trifluoromethyl)-phenyl]-methoxy]-ethyl]-pyridine-2-carboxylic acid ethyl ester

15 The mixture of 6-(1-(4-(trifluoromethyl)benzyloxy)ethyl)picolinonitrile (480 mg, 1.57 mmol) and 1N HCl/EtOH (6 ml, 6.00 mmol) was stirred under reflux for 18 hr. The reaction was quenched by addition of saturated aqueous NaHCO₃ solution and extracted with AcOEt.
20 The combined organic layers were washed with water and brine, and concentrated *in vacuo* to give the title compound (420 mg, 76%) as a brown oil.

¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 6.9 Hz), 1.57 (3H, d, J = 6.6 Hz), 4.45-4.54 (4H, m), 4.81 (1H, q, J = 6.6 Hz), 7.45 (2H,
25 d, J = 8.3 Hz), 7.59 (2H, d, J = 8.3 Hz), 7.70-7.73 (1H, m), 7.87 (1H, t, J = 7.8 Hz), 8.02-8.05 (1H, m).

[0451]

Reference Example 1643

Synthesis of 5-bromo-[1,3,4]oxadiazole-2-carboxylic acid ethyl
30 ester

The mixture of ethyl 5-amino-1,3,4-oxadiazole-2-carboxylate (1.00 g, 6.36 mmol) and cupric bromide (2.13 g, 9.55 mmol) in CH₃CN (20 ml) was stirred at room temperature for 15 min. To the reaction mixture was added tert-butyl nitrite
35 (1.51 ml, 12.73 mmol) and the mixture was stirred at room

temperature for 2 hr and at 50°C for 0.5 hr. After concentration *in vacuo*, the reaction was quenched by addition of water and AcOEt. The resulting suspension was filtered. The filtrate was extracted with AcOEt. The combined organic
5 layers were washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The obtained residue was purified by silica gel column chromatography (hexane/AcOEt = 4/1 to 1/1) to give the title compound (0.66 g, 47%) as a colorless oil.
¹H-NMR (CDCl₃) δ: 1.46 (3H, t, J = 7.1 Hz), 4.53 (2H, q, J =
10 7.1 Hz).

[0452]

Reference Example 1666

Synthesis of acetic acid [2-(4-chlorophenyl)-5-[(4-chlorophenyl)-methyl]-thiazol-4-yl]-methyl ester

15 To a solution of (2-(4-chlorophenyl)thiazol-4-yl)methyl acetate (200 mg, 0.747 mmol) in toluene (2 ml) were added p-chlorobenzyl chloride (0.191 ml, 1.494 mmol), palladium acetate (8 mg, 0.037 mmol), 2-(diphenylphosphino)-2'-(N,N-dimethylamino)biphenyl (28 mg, 0.075 mmol), Cs₂CO₃ (365 mg, 1.12
20 mmol) and pivalic acid (0.017 ml, 0.149 mmol). After the reaction mixture was stirred at 110°C for 8 hr under nitrogen, water was added thereto. The reaction mixture was extracted with AcOEt. The organic layer was washed with brine, dried over anhydrous MgSO₄, and then concentrated *in vacuo*. The
25 residue was purified by flash column chromatography (AcOEt/hexane = 0% to 30%) to give the title compound (162 mg, 55%) as a white powder.

¹H-NMR (CDCl₃) δ: 2.08 (3H, s), 4.21 (2H, s), 5.22 (2H, s), 7.15-7.18 (2H, m), 7.27-7.31 (2H, m), 7.36-7.40 (2H, m), 7.79-
30 7.82 (2H, m).

[0453]

Reference Example 1668

Synthesis of 4-formyl-piperidine-1-carboxylic acid phenyl ester

35 To a solution of 4-piperidinemethanol (173 mg, 1.5 mmol)

in saturated aqueous NaHCO_3 solution (5 ml) and CH_2Cl_2 (5 ml) was added phenyl chloroformate (0.188 ml, 1.500 mmol) by portions at 0 °C for 10 min. The reaction mixture was stirred at 0°C for 1 hr. 2,2,6,6-Tetramethylpiperidine 1-oxyl (10 mg, 0.064 mmol), KBr (15 mg, 0.126 mmol) and tetrabutylammonium bromide (20 mg, 0.062 mmol) were added to the reaction mixture, and then sodium hypochlorite (5% for Cl) (4 ml) were added dropwise thereto at 0°C for 0.5 hr. After the reaction mixture was stirred for 10 min, the reaction was quenched by $\text{Na}_2\text{S}_2\text{O}_3$. The organic layer was separated, washed with water, dried over anhydrous Na_2SO_4 , and then concentrated *in vacuo*. The obtained residue was purified by flash column chromatography (AcOEt/hexane = 30% to 70%) to give the title compound (218 mg, 52%) as a pale yellow oil.

^1H -NMR (CDCl_3) δ : 1.61-1.79 (2H, m), 1.94-2.08 (2H, m), 2.46-2.58 (1H, m), 3.02-3.30 (2H, m), 4.05-4.25 (2H, m), 7.06-7.14 (2H, m), 7.16-7.27 (1H, m), 7.32-7.40 (2H, m), 9.72 (1H, s).
[0454]

Reference Example 1729

Synthesis of [[4-(trifluoromethyl)-benzoyl]amino]-carbamoyl]-formic acid ethyl ester

To a solution of 4-(trifluoromethyl)benzoic acid hydrazide (1.50 g, 7.35 mmol) in CH_2Cl_2 (30 ml) at 0°C were added ethyl oxalyl chloride (0.90 ml, 8.08 mmol) and Et_3N (1.23 ml, 8.82 mmol). The reaction mixture was stirred at room temperature for 17 hr. The reaction was quenched by addition of water and the reaction mixture was extracted with AcOEt. The combined organic layers were washed with water and brine, dried over Na_2SO_4 , and concentrated *in vacuo*. The obtained residue was triturated with isopropyl ether to give the title compound (1.85 g, 83%) as a white powder.

^1H -NMR (CDCl_3) δ : 1.41 (3H, t, J = 7.2 Hz), 4.42 (2H, q, J = 7.2 Hz), 7.71 (2H, d, J = 8.2 Hz), 7.96 (2H, d, J = 8.2 Hz), 9.70 (2H, brs).

[0455]

Reference Example 1730

Synthesis of 5-[4-(trifluoromethyl)-phenyl]-[1,3,4]oxadiazole-2-carboxylic acid ethyl ester

To a solution of ethyl [[4-(trifluoromethyl)-benzoyl]amino]-carbamoyl]-formic acid ethyl ester (1.60 g, 5.26 mmol) in CH₂Cl₂ (48 ml) were added a solution of 2-chloro-1,3-dimethylimidazolinium chloride (0.89 g, 5.26 mmol) in CH₂Cl₂ and Et₃N (1.47 ml, 10.52 mmol). The reaction mixture was stirred at room temperature for 22 hr. The reaction was quenched by addition of 0.5N HCl and the reaction mixture was extracted with CH₂Cl₂. The combined organic layers were washed with saturated aqueous NaHCO₃ solution and brine, dried over MgSO₄, and concentrated *in vacuo*. The obtained residue was purified by silica gel column chromatography (hexane/AcOEt = 3/1) to give the title compound (0.78 g, 52%) as a white powder.

¹H-NMR (CDCl₃) δ: 1.50 (3H, t, J = 7.2 Hz), 4.58 (2H, q, J = 7.2 Hz), 7.83 (2H, d, J = 8.3 Hz), 8.31 (2H, d, J = 8.3 Hz).
[0456]

20 Reference Example 1737

Synthesis of 1-(3,5-dibromo-phenyl)-3-methyl-butan-1-ol

To a stirred solution of 3,5-dibromobenzaldehyde (2.20 g, 8.34 mmol) in THF (44 ml) was added isobutyl magnesium bromide (10.0 ml, 10.0 mmol, 1M THF solution) at 0°C. The reaction mixture was gradually warmed to room temperature and stirred overnight. The reaction mixture was poured into saturated aqueous NH₄Cl solution and extracted twice with AcOEt. The organic layer was washed with brine, dried over Na₂SO₄ and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane:AcOEt = 100:0-75:25) to give the title compound (711 mg, 26%).

¹H-NMR (CDCl₃) δ: 0.95-0.98 (6H, m), 1.41-1.47 (1H, m), 1.64-1.78 (2H, m), 1.81 (1H, d, J = 3.6 Hz), 4.67-4.72 (1H, m), 7.43-7.44 (2H, m), 7.56 (1H, s).

35 [0457]

Reference Example 1752

Synthesis of 1,3-dibromo-5-(3-methyl-butyl)-benzene

To a solution of 1-(3,5-dibromophenyl)-3-methylbutan-1-one (1.24 g, 3.87 mmol) in diethylene glycol (15 ml) were
5 added hydrazine hydrate (0.752 ml, 15.50 mmol) and potassium hydroxide (0.522 g, 9.30 mmol). After the reaction mixture was stirred at 150°C for 5 hr, it was neutralized with 6N HCl and extracted twice with AcOEt. The organic layer was washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*.
10 The residue was purified by silica gel column chromatography (hexane:AcOEt = 100:0–85:15) to give the title compound (917 mg, 77%).
¹H-NMR (CDCl₃) δ: 0.93 (6H, d, J = 6.7 Hz), 1.45–1.51 (2H, m), 1.56–1.61 (1H, m), 2.53–2.57 (2H, m), 2.61 (2H, s), 7.46–7.49
15 (1H, m).

[0458]

Reference Example 1863

Synthesis of 2-(4-chlorophenyl)-4-cyclopropyl-thiazole-5-carboxylic acid methyl ester

20 A solution of bromine (0.168 ml, 3.26 mmol) in CCl₄ (3 ml) was added dropwise to a suspension of methyl 3-cyclopropyl-3-oxopropionate (0.463 g, 3.26 mmol) and NaHCO₃ (0.821 g, 9.77 mmol) in CCl₄ (7 ml) at -10 °C for 1 hr. After being stirred for 20 min, to the reaction mixture were added
25 4-chloro-benzenecarbothiamide (0.559 g, 3.26 mmol) and EtOH (20 ml). The reaction mixture was stirred at room temperature for 0.5 h and then under reflux for 5 hr. After being cooled, the reaction mixture was filtrated. The obtained filtrate was concentrated *in vacuo*. The residue was purified by flash
30 column chromatography (AcOEt/hexane = 0% to 10%) to give the title compound (218 mg, 52%) as a pale yellow solid.
¹H-NMR (CDCl₃) δ: 1.09–1.14 (2H, m), 1.18–1.24 (2H, m), 3.02–3.08 (1H, m), 3.90 (3H, s), 7.38–7.42 (2H, m), 7.84–7.87 (2H, m).

35 [0459]

Reference Example 1891

Synthesis of 2-amino-3-cyclopropyl-3-oxo-propionic acid methyl ester HCl

To a solution of methyl 3-cyclopropyl-3-oxopropanoate
5 (1.0 g, 7.03 mmol) in AcOH (1 ml) was added slowly sodium
nitrite (0.485 g, 7.03 mmol) in water (1.5 ml) at 0°C. After
the reaction mixture was stirred at room temperature overnight,
water was added thereto, and the mixture was extracted with
AcOEt. The combined organic layers were washed with water,
10 saturated aqueous NaHCO₃ solution, and brine, dried over Na₂SO₄,
and concentrated *in vacuo* to give the crude product of 3-
cyclopropyl-2-[(Z)-hydroxyimino]-3-oxo-propionic acid methyl
ester (1.15 g). This product was used in the next step without
purification.

15 The crude product of 3-cyclopropyl-2-[(Z)-hydroxyimino]-
3-oxo-propionic acid methyl ester (1.15 g) was dissolved in
EtOH (10 ml) and 4N HCl (AcOEt solution) (5.0 ml) was added
thereto. The reaction mixture was stirred at room temperature
for 10 hr under hydrogen (balloon) in the presence of 10% Pd-C
20 (wet). The reaction mixture was filtered through a pad of
Celite and the filtrate was concentrated *in vacuo* to give the
title compound (1.17 g, 90%).

¹H-NMR (CDCl₃) δ: 0.96-1.09 (2H, m), 1.12-1.19 (2H, m), 2.42-
2.47 (1H, m), 3.85 (3H, s), 5.60 (1H, s), 8.68 (3H, brs).

25 [0460]

Reference Example 1892

Synthesis of 3-cyclopropyl-2-[(3,4-difluoro-benzoyl)amino]-3-oxo-propionic acid methyl ester

To a solution of 2-amino-3-cyclopropyl-3-oxo-propionic
30 acid methyl ester HCl (480 mg, 2.479 mmol) in CH₂Cl₂ (15 ml)
were added DIPEA (705 mg, 5.45 mmol) and 3,4-difluorobenzoyl
chloride (0.348 ml, 2.97 mmol) at 0°C. After the reaction
mixture was stirred at room temperature overnight, it was
quenched by water and extracted with AcOEt. The organic layer
35 was washed with brine, dried over Na₂SO₄ and concentrated *in*

vacuo. The residue was purified by silica gel chromatography (hexane/AcOEt = 100:0-75:25) to give the title compound (514 mg, 69%).

¹H-NMR (CDCl₃) δ: 1.07-1.30 (4H, m), 2.39-2.45 (1H, m), 3.87
5 (3H, s), 5.58 (1H, d, J = 6.3 Hz), 7.22-7.33 (1H, m), 7.58-
7.64 (1H, m), 7.69-7.75 (1H, m).

[0461]

Reference Example 1899

Synthesis of 5-cyclopropyl-2-(3,4-difluoro-phenyl)-oxazole-4-
10 carboxylic acid methyl ester

To a solution of triphenylphosphine (907 mg, 3.46 mmol) and iodine (878 mg, 3.46 mmol) in CH₂Cl₂ (10 ml) were added Et₃N (0.964 ml, 6.92 mmol) and 3-cyclopropyl-2-(3,4-difluoro-benzoylamino)-3-oxo-propionic acid methyl ester (514 mg, 1.729
15 mmol) in CH₂Cl₂ (10 ml). After the reaction mixture was stirred at room temperature overnight, it was quenched by saturated aqueous solution of Na₂S₂O₃ and extracted with CH₂Cl₂. The organic layer was washed with brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue was purified by silica gel
20 column chromatography (hexane/AcOEt = 100:0-75:25) to give the title compound (478 mg, 99%).

¹H-NMR (CDCl₃) δ: 1.16-1.25 (4H, m), 2.80-2.86 (1H, m), 3.97 (3H, s), 7.21-7.25 (1H, m), 7.73-7.78 (1H, m), 7.79-7.84 (1H, m).

25 [0462]

Reference Example 2069

Synthesis of 3-[4-(trifluoromethoxy)-phenyl]-isothiazole-5-carboxylic acid ethyl ester

To a solution of 5-(4-trifluoromethoxy-phenyl)-
30 [1,3,4]oxathiazol-2-one (500 mg, 1.900 mmol) in xylene (7.5ml) was added ethyl propiolate (0.578 ml, 5.70 mmol). After the reaction mixture was stirred at 120°C for 3 days, it was concentrated *in vacuo*. The residue was purified by silica gel chromatography (hexane/AcOEt = 100:0-75:25) to give the title
35 compound (132 mg, 21%) and 3-[4-(trifluoromethoxy)-phenyl]-

isothiazole-4-carboxylic acid ethyl ester (136 mg, 22%).

¹H-NMR (CDCl₃) δ: 1.27 (3H, t, J = 7.1 Hz), 4.28 (2H, q, J = 7.1 Hz), 7.28 (2H, d, J = 8.2 Hz), 7.66-7.70 (2H, m), 9.38 (1H, s).

5 [0463]

Reference Example 2079

Synthesis of 2-[(4-chloro-benzoyl)amino]-5-methyl-thiazole-4-carboxylic acid methyl ester

To a suspension of 2-amino-5-methylthiazole-4-carboxylic acid methyl ester (200 mg, 1.161 mmol) in CH₂Cl₂ at room temperature were added Et₃N (0.194 ml, 1.394 mmol) and 4-chlorobenzoyl chloride (0.162 ml, 1.278 mmol). The reaction mixture was stirred for 3 hr. Water and CH₂Cl₂ were added to the reaction mixture. The resulting precipitate was collected by filtration and dried to give the title compound (218 mg, 60%) as a colorless powder.

¹H-NMR (DMSO-d₆) δ: 2.66 (3H, s), 3.81 (3H, s), 7.60-7.64 (2H, m), 8.10-8.14 (2H, m), 12.94 (1H, brs).

[0464]

20 Reference Example 2080

Synthesis of 5-cyclobutyl-2-[5-(trifluoromethyl)-pyridin-3-yl]-oxazole-4-carboxylic acid ethyl ester

To a solution of 5-cyclobutyl-oxazole-4-carboxylic acid ethyl ester (214 mg, 1.096 mmol) in diethylcarbonate (5 ml) were added 3-bromo-5-trifluoromethylpyridine (322 mg, 1.425 mmol), tri-*o*-tolylphosphine (66.7 mg, 0.219 mmol), cesium carbonate (714 mg, 2.192 mmol) and Pd(OAc)₂ (24.61 mg, 0.110 mmol). After the resulting suspension was stirred at 110°C for 24 hr, it was filtered through a pad of Celite. The filtrate was concentrated *in vacuo* and the residue was purified by silica gel column chromatography (hexane/AcOEt = 100:0-85:15) to give the title compound (165 mg, 44%).

¹H-NMR (CDCl₃) δ: 1.44 (3H, t, J = 7.1 Hz), 1.99-2.07 (1H, m), 2.09-2.20 (1H, m), 2.40-2.52 (4H, m), 4.31-4.38 (1H, m), 4.44 (2H, q, J = 7.1 Hz), 8.63 (1H, s), 8.97 (1H, s), 9.49 (1H, d,

J = 1.8 Hz).

[0465]

Reference Example 2083

Synthesis of 5-Methyl-2-(4-trifluoromethyl-benzylamino)-
5 thiazole-4-carboxylic acid methyl ester

To a suspension of 2-amino-5-methylthiazole-4-carboxylic acid methyl ester (200 mg, 1.161 mmol) in CH₂Cl₂ were added alpha,alpha,alpha-trifluoro-p-tolualdehyde (0.174 ml, 1.278 mmol) and AcOH (6.65 µl, 0.116 mmol) and the reaction mixture
10 was stirred for 1 hr. After sodium triacetoxyborohydride (492 mg, 2.323 mmol) was added thereto, the reaction mixture was stirred for 3 days. The reaction was quenched by addition of saturated aqueous NaHCO₃ solution and organic layer was washed with water and brine, and concentrated. The obtained residue
15 was purified by silica gel column chromatography (hexane/AcOEt = 1/1) to give the title compound (87 mg, 22%) as a colorless powder.

¹H-NMR (CDCl₃) δ: 2.60 (3H, s), 3.88 (3H, s), 4.52 (2H, d, J = 5.7 Hz), 5.66 (1H, brs), 7.47 (2H, d, J = 8.0 Hz), 7.61 (2H, J
20 = 8.0 Hz).

[0466]

Reference Example 2094

Synthesis of 2-amino-5-[4-(trifluoromethyl)-phenyl]-thiazole-4-carboxylic acid methyl ester

To a solution of alpha,alpha,alpha-trifluoro-p-tolualdehyde (2.87 ml, 20.98 mmol) and methyl dichloroacetate (2.17 ml, 20.98 mmol) in Et₂O was dropwise added sodium methoxide (3.88 ml, 19.51 mmol) for 20 min at 0°C, and the reaction mixture was stirred for 1 hr. The reaction was
30 quenched by addition of brine and water. The organic layer was concentrated. To the obtained residue were added MeOH and thiourea (1.60 g, 20.98 mmol), the reaction mixture was refluxed overnight. The reaction mixture was concentrated. The residue was dissolved with AcOEt and washed with water and
35 brine, and concentrated. The obtained solid was washed with

EtOH and dried to give the title compound (4.74 g, 74%) as a pale brown powder.

¹H-NMR (DMSO-d₆) δ: 3.65 (3H, s), 7.42 (2H, s), 7.61 (2H, d, J = 8.2 Hz), 7.73 (2H, d, J = 8.2 Hz).

5 [0467]

Reference Example 2143

Synthesis of 2-(2,2-difluoro-1,3-benzodioxol-5-yl)-oxazole-4-carboxylic acid ethyl ester

To a solution of ethyl oxazole-4-carboxylate (0.297 ml, 10 2.480 mmol) in dioxane (5 ml) were added 5-bromo-2,2-difluorobenzodioxole (588 mg, 2.480 mmol), 2-(dicyclohexylphosphino)biphenyl (87 mg, 0.248 mmol), cesium carbonate (1616 mg, 4.96 mmol) and Pd(OAc)₂ (27.8 mg, 0.124 mmol). After the resulting suspension was stirred at 110°C for 15 12 hr, it was filtered through a pad of Celite. The filtrate was concentrated *in vacuo* and the residue was purified by silica gel column chromatography (hexane/AcOEt = 100:0-85:15) to give the title compound (350 mg, 47%).

¹H-NMR (CDCl₃) δ: 1.41 (3H, t, J = 7.1 Hz), 4.44 (2H, q, J = 20 7.1 Hz), 7.17 (1H, d, J = 8.3 Hz), 7.83 (1H, d, J = 1.5 Hz), 7.91 (1H, dd, J = 1.5, 8.3 Hz), 8.27 (1H, s).

[0468]

Reference Example 2160

Synthesis of [6-[4-(trifluoromethyl)-phenyl]-benzothiazol-2-yl]-amine 25

4'-Trifluoromethyl-biphenyl-4-ylamine (3.46 g, 14.57 mmol) and potassium thiocyanate (4.96 g, 51.0 mmol) were dissolved in acetic acid. To this solution was dropwise added a solution of bromine (0.826 ml, 16.03 mmol) in acetic acid, 30 maintaining a reaction temperature below 25°C. After being stirred overnight, the reaction mixture was neutralized with 25% NH₄OH aq., and extracted with AcOEt. The combined organic layers were washed with brine and concentrated. The obtained residue was purified by silica gel column chromatography 35 (hexane/AcOEt = 3/2) to give the title compound (3.65 g, 85%)

as a pale yellow powder.

^1H -NMR (DMSO- d_6) δ : 7.43 (1H, d, J = 8.4 Hz), 7.60 (1H, dd, J = 2.0, 8.4 Hz), 7.63 (2H, s), 7.78 (2H, d, J = 8.2 Hz), 7.89 (2H, d, J = 8.2 Hz), 8.09 (1H, d, J = 2.0 Hz).

5 [0469]

Reference Example 2161

Synthesis of 6-phenoxy-benzothiazole

6-Phenoxy-benzothiazol-2-ylamine (2.90 g, 11.97 mmol) was dissolved in hot 85% H_3PO_4 , and the solution was cooled to -8°C .

10 A solution of sodium nitrate (4.95 g, 71.8 mmol) in water was added slowly below -4°C . Then 50% hypophosphorous acid (29 ml) was added slowly thereto and the reaction mixture was stirred overnight. After cold water was added thereto, the reaction mixture was neutralized with 25% NH_4OH aq. and extracted with
15 AcOEt. The combined organic layers were washed with brine and concentrated. The obtained residue was purified by silica gel column chromatography (hexane/AcOEt = 6/1) was to give the title compound (1.03 g, 37%) as a red oil.

^1H -NMR (CDCl_3) δ : 7.04-7.07 (2H, m), 7.13-7.17 (1H, m), 7.24
20 (1H, dd, J = 2.4, 8.8 Hz), 7.35-7.40 (2H, m), 7.51 (1H, d, J = 2.4 Hz), 8.08 (1H, d, J = 8.8 Hz), 8.91 (1H, s).

[0470]

Reference Example 2162

Synthesis of 6-phenoxy-benzothiazole-2-carboxylic acid methyl
25 ester

A solution of 6-phenoxy-benzothiazole (1.03 g, 4.53 mmol) and Cs_2CO_3 (1.77 g, 5.44 mmol) in DMF was degassed and flushed with CO_2 twice. The reaction mixture was stirred for 21 hr at 125°C under CO_2 gas. Then the reaction mixture was cooled to
30 room temperature. Methyl iodide (0.850 ml, 13.60 mmol) was added to the mixture and stirred at 50°C for 3 hr. Water was added to the reaction mixture and extracted with AcOEt. The combined organic layers were washed with water and brine and concentrated. The obtained residue was purified by silica gel
35 column chromatography (hexane/AcOEt = 4/1) to give the title

compound (0.74 g, 57%) as a yellow powder.

¹H-NMR (CDCl₃) δ: 4.08 (3H, s), 7.08-7.11 (2H, m), 7.19-7.23 (1H, m), 7.30 (1H, dd, J = 2.4, 9.0 Hz), 7.39-7.43 (3H, m), 8.17 (1H, d, J = 9.0 Hz).

5 [0471]

Reference Example 2192

Synthesis of 5-[4-(chloromethyl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile

To a solution of 5-[4-(hydroxymethyl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile (98.7 mg, 0.493 mmol) and
10 pyridine (0.077 ml, 0.952 mmol) in CH₂Cl₂ (2 ml) was added thionyl chloride (0.072 ml, 0.986 mmol) at 0°C. After being stirred at room temperature, the reaction mixture was diluted with AcOEt, washed with HCl aq. and water, dried over
15 anhydrous Na₂SO₄, and then concentrated *in vacuo*. The obtained residue was purified by flash column chromatography (AcOEt/hexane = 0% to 30%) to give the title compound (65 mg, 63%) as a pale yellow solid.

¹H-NMR (CDCl₃) δ: 4.65 (2H, s), 7.56 (2H, d, J = 8.3 Hz), 8.00
20 (2H, d, J = 8.3 Hz), 12.06 (1H, br.).

[0472]

Reference Example 2213

Synthesis of 2-(3-chlorophenyl)-4-([1,3]dioxolan-2-yl)-5-iodo-thiazole

To a solution of 2-(3-chloro-phenyl)-4-[1,3]dioxolan-2-yl-thiazole (317 mg, 1.184 mmol) in THF (9 ml) was added *n*-BuLi (0.814 ml, 1.302 mmol, 1.6 M in *n*-hexane). After the reaction mixture was stirred for 1 hr, iodine (601 mg, 2.368 mmol) was added thereto, and stirring was continued for 3 hr.
30 The reaction mixture was quenched with saturated aqueous solution of Na₂S₂O₄, and extracted twice with AcOEt. The organic layer was washed with water and brine, dried over Na₂SO₄ and concentrated *in vacuo*. The crude product was purified by silica gel column chromatography (hexane:AcOEt =
35 100:0-75:25) to give the title compound (287 mg, 62%).

¹H-NMR (CDCl₃) δ: 4.07-4.15 (2H, m), 4.34-4.42 (2H, m), 6.11 (1H, s), 7.36 (1H, t, J = 7.7 Hz), 7.38-7.42 (1H, m), 7.71-7.74 (1H, m), 7.91-7.92 (1H, m).

[0473]

5 Reference Example 2214

Synthesis of 2-(3-chlorophenyl)-4-([1,3]dioxolan-2-yl)-5-(trifluoromethyl)-thiazole

To a solution of 2-(3-chloro-phenyl)-4-[1,3]dioxolan-2-yl-5-iodo-thiazole (287 mg, 0.729 mmol) in DMF (4 ml) were
10 added slowly methyl 2,2-difluoro-2-(fluorosulfonyl)acetate (0.650 ml, 5.10 mmol) and copper(I) iodide (167 mg, 0.875 mmol). The resulting suspension was stirred at 100°C for 5 hr. After water was added to the reaction mixture, the resulting insoluble material was filtered through a pad of Celite. The
15 filtrate was extracted with AcOEt. The organic layer was washed with water and brine, dried over Na₂SO₄, and concentrated *in vacuo*. The residue was purified by silica gel column chromatography (hexane:AcOEt = 100:0-75:25) to give the title compound (223 mg, 91%).

20 ¹H-NMR (CDCl₃) δ: 4.09-4.16 (2H, m), 4.32-4.39 (2H, m), 6.23 (1H, s), 7.40 (1H, t, J = 7.9 Hz), 7.46-7.48 (1H, m), 7.78-7.80 (1H, m), 7.98 (1H, t, J = 1.8 Hz).

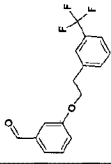
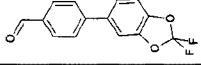
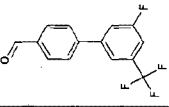
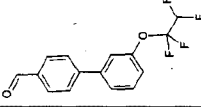
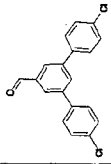
[0474]

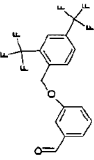
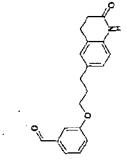
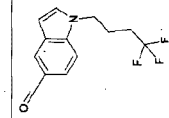
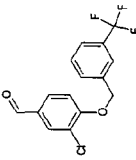
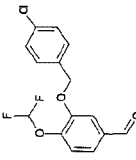
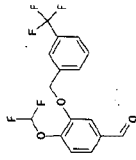
The following compounds were synthesized in the same
25 manner as in the above-mentioned Reference Examples or the below-mentioned Examples. The structures and ¹H-NMR data thereof are shown in the following Table 2. The "ref." in Table 2 means "Reference Example No." or "Example No." which the compound was synthesized in reference to.

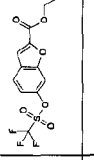
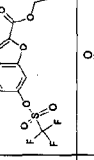
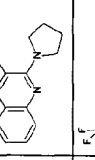
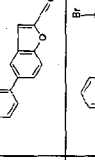
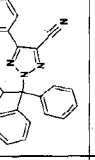
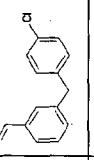
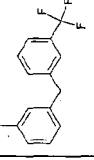
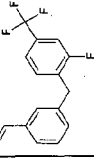
30 [0475]

Table 2

[0476]

Ref. Ex. No.	STR	¹ H-NMR	ref.
270		¹ H-NMR (CDCl ₃) δ: 3.18 (d, t, J = 6.6 Hz), 4.25 (d, t, J = 7.15 Hz), 7.18 (H, m), 7.37 (H, s), 7.43-7.56 (H, m), 9.98 (H, s).	Ref. Ex. 80
271		¹ H-NMR (CDCl ₃) δ: 7.17 (H, d, J = 8.2 Hz), 7.37 (H, m), 7.68 (H, d, J = 8.2 Hz), 7.95-7.97 (H, m), 10.07 (H, s).	Ref. Ex. 75
273		¹ H-NMR (CDCl ₃) δ: 7.39-7.39 (H, m), 7.51-7.53 (H, m), 7.68 (H, s), 7.74-7.76 (H, m), 7.98-8.02 (H, m), 10.09 (H, s).	Ref. Ex. 75
274		¹ H-NMR (CDCl ₃) δ: 5.84-6.06 (H, m), 7.27-7.29 (H, m), 7.47-7.56 (H, m), 7.74-7.75 (H, m), 7.96-7.98 (H, m), 10.06 (H, s).	Ref. Ex. 75
275		¹ H-NMR (CDCl ₃) δ: 7.59-7.60 (H, m), 7.91-7.93 (H, m), 8.20 (H, s), 8.27 (H, s), 10.17 (H, s).	Ref. Ex. 75

Ref. Ex. No.	STR	¹ H-NMR	ref.
283		¹ H-NMR (CDCl ₃) δ: 5.38 (H, s), 7.24-7.28 (H, m), 7.26-7.25 (H, m), 7.65-7.67 (H, m), 9.96 (H, s).	Ref. Ex. 82
284		¹ H-NMR (DMSO-d ₆) δ: 2.01 (H, t, J = 8.2 Hz), 2.40-2.43 (H, m), 2.67 (H, t, J = 7.5 Hz), 2.82 (H, t, J = 7.5 Hz), 4.04 (H, t, J = 6.2 Hz), 6.78 (H, d, J = 8.2 Hz), 6.99 (H, d, J = 8.2 Hz), 7.03 (H, s), 7.28 (H, d, J = 7.5 Hz), 7.41 (H, s), 7.50-7.53 (H, m), 9.97 (H, s), 9.98 (H, s).	Ref. Ex. 82
285		¹ H-NMR (CDCl ₃) δ: 2.00-2.22 (H, m), 4.26 (H, t, J = 6.6 Hz), 6.70 (H, d, J = 3.2 Hz), 7.18 (H, d, J = 3.2 Hz), 7.40 (H, d, J = 8.6 Hz), 7.80 (H, d, J = 1.5, 8.6 Hz), 8.16 (H, d, J = 1.4 Hz), 10.04 (H, s).	Ref. Ex. 184
286		¹ H-NMR (CDCl ₃) δ: 5.29 (H, s), 7.09 (H, d, J = 8.5 Hz), 7.54-7.56 (H, m), 7.98 (H, s), 9.97 (H, s).	Ref. Ex. 82
287		¹ H-NMR (CDCl ₃) δ: 5.17 (H, s), 6.66 (H, t, J = 74.0 Hz), 7.35 (H, d, J = 8.1 Hz), 7.38 (H, s), 7.48-7.54 (H, m), 7.55 (H, s), 9.93 (H, s).	Ref. Ex. 82
288		¹ H-NMR (CDCl ₃) δ: 5.25 (H, s), 6.66 (H, t, J = 73.7 Hz), 7.37 (H, d, J = 8.2 Hz), 7.50-7.55 (H, m), 7.73 (H, s), 9.94 (H, s).	Ref. Ex. 82

Ref. Ex. No.	STR	¹ H-NMR	ref.
255		¹ H-NMR (DMSO-d ₆) δ: 1.44 (H, t, J = 7.1 Hz), 4.48 (H, q, J = 7.1 Hz), 7.25-7.28 (H, m), 7.55-7.57 (H, m), 7.75 (H, d, J = 8.7 Hz).	Ref. Ex. 125
256		¹ H-NMR (DMSO-d ₆) δ: 1.45 (H, t, J = 7.1 Hz), 2.00 (H, s), 4.47 (H, q, J = 7.1 Hz), 7.24-7.28 (H, m), 7.51 (H, d, J = 2.1 Hz), 7.70 (H, d, J = 8.6 Hz).	Ref. Ex. 125
257		¹ H-NMR (CDCl ₃) δ: 1.95-2.01 (H, m), 3.61-3.68 (H, m), 7.21-7.25 (H, m), 7.64-7.65 (H, m), 7.71-7.73 (H, m), 8.40 (H, s), 10.21 (H, s).	Ref. Ex. 1173
258		¹ H-NMR (CDCl ₃) δ: 7.63 (H, s), 7.69-7.76 (H, m), 7.95-7.96 (H, m), 9.92 (H, s).	Ref. Ex. 112
259		¹ H-NMR (CDCl ₃) δ: 7.04-7.10 (H, m), 7.38-7.41 (H, m), 7.54 (H, t, J = 7.9 Hz), 7.74-7.76 (H, m), 7.81 (H, d, J = 7.9 Hz), 7.92 (H, s).	Ref. Ex. 184
260		¹ H-NMR (CDCl ₃) δ: 4.03 (H, s), 7.12 (H, d, J = 8.2 Hz), 7.29-7.28 (H, m), 7.43-7.48 (H, m), 7.69 (H, s), 7.74 (H, d, J = 7.2 Hz), 9.98 (H, s).	Ref. Ex. 38
261		¹ H-NMR (CDCl ₃) δ: 4.12 (H, s), 7.35-7.52 (H, m), 7.71-7.77 (H, m), 10.0 (H, s).	Ref. Ex. 38
262		¹ H-NMR (CDCl ₃) δ: 4.12 (H, s), 7.28-7.37 (H, m), 7.48-7.49 (H, m), 7.73 (H, s), 7.75-7.77 (H, m), 9.98 (H, s).	Ref. Ex. 38

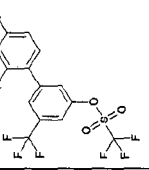
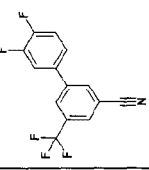
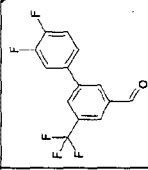
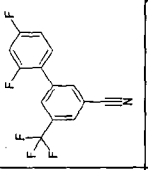
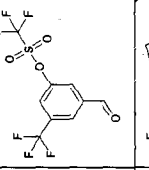
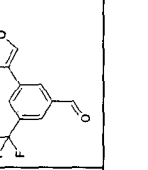
[0477]

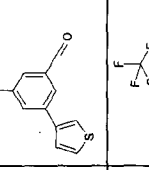
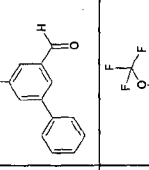
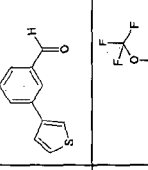
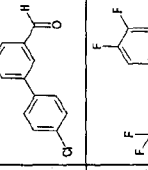
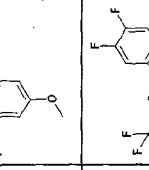
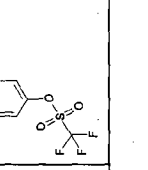
Ref. Ex. No.	STR	¹ H-NMR	ref.
286		¹ H-NMR (CDCl ₃) δ: 2.40-2.43 (2H, m), 2.69-2.72 (2H, m), 5.71 (1H, d, J = 8.1 Hz), 6.81 (1H, d, J = 8.1 Hz), 7.05-7.07 (2H, m), 7.24 (1H, t, J = 8.1 Hz), 7.89-7.92 (2H, m), 9.91 (1H, s), 10.26 (1H, s).	Ref. Ex. 189
287		¹ H-NMR (CDCl ₃) δ: 2.67-2.70 (2H, m), 2.80-2.86 (2H, m), 3.40 (2H, s), 6.91-7.06 (5H, m), 7.84-7.86 (2H, m), 9.93 (1H, s).	Ref. Ex. 12
288		¹ H-NMR (CDCl ₃) δ: 2.59-2.62 (2H, m), 2.81-2.84 (2H, m), 3.40 (2H, s), 6.78 (1H, d, J = 8.1 Hz), 6.90 (1H, d, J = 8.1 Hz), 6.96-7.01 (2H, m), 7.25-7.32 (1H, m), 7.84-7.86 (2H, m), 9.92 (1H, s).	Ref. Ex. 12
289		¹ H-NMR (CDCl ₃) δ: 7.27-7.33 (1H, m), 7.82-8.02 (5H, m), 10.15 (1H, s).	Ref. Ex. 75
290		¹ H-NMR (CDCl ₃) δ: 7.37 (1H, d, J = 8.2 Hz), 7.52 (1H, d, J = 8.2 Hz), 7.65-7.69 (2H, m), 7.85-7.87 (1H, m), 7.94-7.96 (1H, m), 8.10 (1H, s), 10.12 (1H, s).	Ref. Ex. 75
291		¹ H-NMR (CDCl ₃) δ: 4.19 (2H, s), 7.45 (1H, d, J = 7.8 Hz), 7.53 (1H, t, J = 7.6 Hz), 7.63 (2H, s), 7.76 (1H, s), 7.79 (1H, s), 7.80 (1H, d, J = 7.6 Hz), 10.01 (1H, s).	Ref. Ex. 75

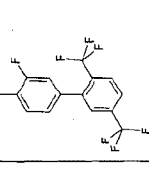
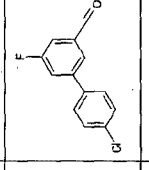
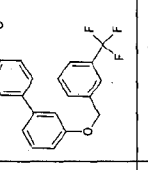
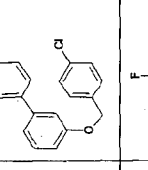
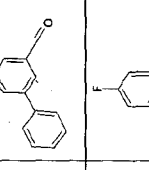
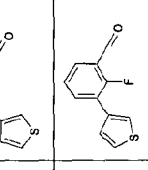
Ref. Ex. No.	STR	¹ H-NMR	ref.
281		¹ H-NMR (CDCl ₃) δ: 7.60-7.65 (2H, m), 7.80 (1H, d, J = 8.3 Hz), 7.85 (1H, s), 7.94-7.96 (2H, m), 10.08 (1H, s).	Ref. Ex. 75
282		¹ H-NMR (CDCl ₃) δ: 7.77-7.87 (1H, m), 7.86-8.10 (4H, m), 10.10 (1H, s).	Ref. Ex. 75
283		¹ H-NMR (CDCl ₃) δ: 4.19 (2H, s), 7.35 (2H, d, J = 8.0 Hz), 7.62 (2H, s), 7.77 (1H, s), 7.87 (2H, d, J = 8.0 Hz), 10.01 (1H, s).	Ref. Ex. 75
284		¹ H-NMR (CDCl ₃) δ: 4.32 (2H, s), 7.28-7.31 (2H, m), 7.44 (1H, s), 7.63-7.66 (1H, m), 7.83-7.86 (3H, m), 10.01 (1H, s).	Ref. Ex. 75
285		¹ H-NMR (CDCl ₃) δ: 7.30-7.33 (2H, m), 7.47-7.51 (3H, m), 7.59 (2H, d, J = 8.4 Hz), 10.06 (1H, s).	Ref. Ex. 75

Ref. Ex. No.	STR	¹ H-NMR	ref.
276		¹ H-NMR (CDCl ₃) δ: 7.38-7.51 (4H, m), 7.75-7.76 (2H, m), 7.93-8.02 (2H, m), 10.10 (1H, s).	Ref. Ex. 75
277		¹ H-NMR (CDCl ₃) δ: 7.39 (1H, d, J = 5.4 Hz), 7.52 (1H, d, J = 5.4 Hz), 7.64-7.66 (1H, m), 7.84-8.15 (3H, m), 8.15 (1H, s), 10.07 (1H, s).	Ref. Ex. 75
278		¹ H-NMR (CDCl ₃) δ: 7.53 (2H, d, J = 8.1 Hz), 7.51 (1H, s), 7.61 (1H, d, J = 8.1 Hz), 7.91-8.01 (3H, m), 10.10 (1H, s).	Ref. Ex. 75
279		¹ H-NMR (CDCl ₃) δ: 7.38 (1H, t, J = 7.7 Hz), 7.66-7.73 (4H, m), 7.96-8.01 (2H, m), 10.06 (1H, s).	Ref. Ex. 75
280		¹ H-NMR (DMSO-d ₆) δ: 7.51 (2H, d, J = 6.5 Hz), 7.50 (1H, d, J = 4.0 Hz), 7.64 (2H, s), 7.75 (2H, d, J = 8.5 Hz), 8.02 (1H, d, J = 4.0 Hz), 9.90 (1H, s).	Ref. Ex. 75

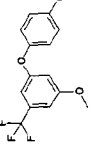
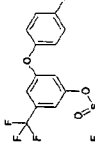
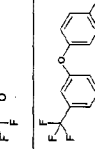
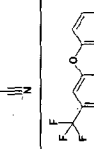
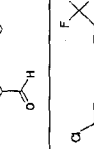
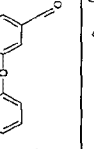
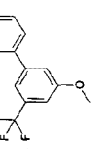
[0478]

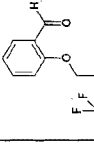
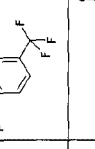
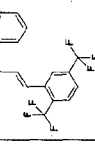
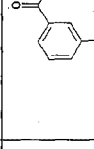
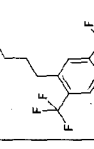
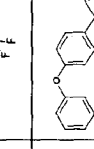
Ref. Ex. No.	STR	¹ H-NMR	ref.
305		¹ H-NMR (CDCl ₃) δ: 6.94-7.05 (H, m), 7.40-7.46 (1H, m), 7.55 (1H, s), 7.63 (1H, s), 7.80 (1H, s).	Ref. Ex. 75, Ref. Ex. 750, Ref. Ex. 125
306		¹ H-NMR (CDCl ₃) δ: 7.31-7.44 (H, m), 7.52 (1H, s), 7.98 (2H, s).	Ref. Ex. 89
307		¹ H-NMR (CDCl ₃) δ: 7.30-7.47 (H, m), 8.02 (1H, s), 8.13 (1H, s), 8.22 (1H, s), 10.14 (1H, s).	Ref. Ex. 93
308		¹ H-NMR (CDCl ₃) δ: 6.95-7.05 (H, m), 7.26-7.45 (1H, m), 7.52 (1H, s), 7.99 (2H, s).	Ref. Ex. 89
309		¹ H-NMR (CDCl ₃) δ: 7.79 (1H, s), 8.00 (1H, s), 8.20 (1H, s), 10.09 (1H, s).	Ref. Ex. 125
310		¹ H-NMR (CDCl ₃) δ: 6.80-6.81 (1H, m), 7.35-7.36 (1H, m), 7.91 (1H, s), 7.96 (1H, s), 8.04 (1H, s), 8.18 (1H, s), 10.13 (1H, s).	Ref. Ex. 75

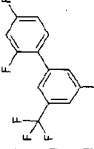
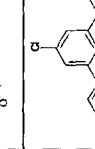
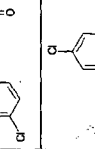
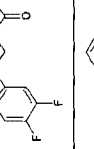
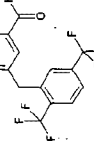
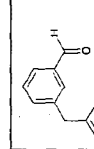
Ref. Ex. No.	STR	¹ H-NMR	ref.
299		¹ H-NMR (CDCl ₃) δ: 7.41-7.42 (1H, m), 7.45-7.46 (1H, m), 7.58 (1H, s), 7.78 (1H, s), 7.82 (1H, s), 7.97 (1H, s), 10.02 (1H, s).	Ref. Ex. 75
300		¹ H-NMR (CDCl ₃) δ: 7.45-7.52 (H, m), 7.61-7.71 (4H, m), 8.04 (1H, s), 10.08 (1H, s).	Ref. Ex. 75
301		¹ H-NMR (CDCl ₃) δ: 7.42-7.43 (1H, m), 7.46-7.48 (1H, m), 7.58 (1H, s), 7.64 (1H, s), 7.67 (1H, s), 8.03 (1H, s), 10.06 (1H, s).	Ref. Ex. 75
302		¹ H-NMR (CDCl ₃) δ: 7.47-7.48 (2H, m), 7.54-7.56 (2H, m), 7.55 (1H, s), 7.72 (1H, s), 8.00 (1H, s), 10.08 (1H, s).	Ref. Ex. 75
303		¹ H-NMR (CDCl ₃) δ: 3.91 (H, s), 7.12-7.21 (2H, m), 7.24-7.33 (4H, m).	Ref. Ex. 75
304		¹ H-NMR (CDCl ₃) δ: 7.31-7.35 (2H, m), 7.35-7.42 (1H, m), 7.54 (1H, s), 7.82 (1H, s), 7.81 (1H, s).	Ref. Ex. 125

Ref. Ex. No.	STR	¹ H-NMR	ref.
292		¹ H-NMR (CDCl ₃) δ: 7.18-7.25 (2H, m), 7.61 (1H, s), 7.82-7.84 (1H, m), 7.92-7.98 (2H, m), 10.43 (1H, s).	Ref. Ex. 75
293		¹ H-NMR (CDCl ₃) δ: 7.45-7.87 (6H, m), 7.87 (1H, s), 10.06 (1H, s).	Ref. Ex. 75
294		¹ H-NMR (CDCl ₃) δ: 5.19 (2H, s), 7.02-7.04 (1H, m), 7.26-7.27 (2H, m), 7.42 (1H, s), 7.51 (1H, s), 7.57 (4H, m), 7.74 (2H, s), 7.80 (4H, s), 7.96 (2H, s), 8.0 (1H, s), 10.06 (1H, s).	Ref. Ex. 82
295		¹ H-NMR (CDCl ₃) δ: 5.11 (2H, s), 7.00-7.02 (1H, m), 7.22-7.26 (1H, m), 7.37-7.42 (6H, m), 7.73 (2H, s), 7.84-7.96 (2H, m), 10.06 (1H, s).	Ref. Ex. 82
296		¹ H-NMR (CDCl ₃) δ: 7.43-7.63 (7H, m), 7.91 (1H, s), 10.06 (1H, s).	Ref. Ex. 75
297		¹ H-NMR (CDCl ₃) δ: 7.40-7.58 (5H, m), 7.90 (1H, s), 10.03 (1H, s).	Ref. Ex. 75
298		¹ H-NMR (CDCl ₃) δ: 7.30-7.50 (1H, m), 7.61-7.63 (2H, m), 7.68-7.67 (1H, m), 7.90-7.85 (2H, m), 10.46 (1H, s).	Ref. Ex. 75

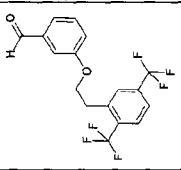
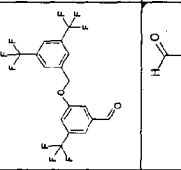
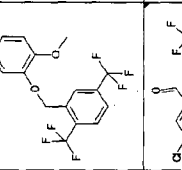
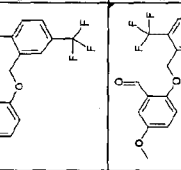
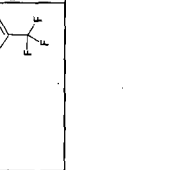
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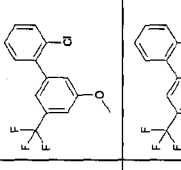
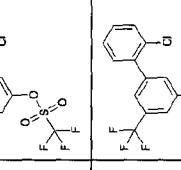
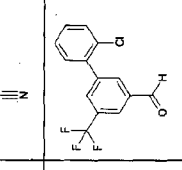
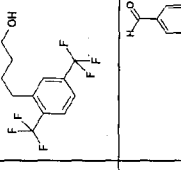
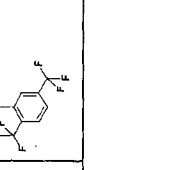
Ref. Ex. No.	STR	¹ H-NMR	ref.
325		¹ H-NMR (CDCl ₃) δ: 3.82 (CH, m), 6.86-6.88 (1H, m), 6.80 (1H, s), 6.88 (1H, s), 6.94-7.01 (2H, m), 7.30-7.37 (2H, m).	Ref. Ex. 85
326		¹ H-NMR (CDCl ₃) δ: 7.00-7.04 (2H, m), 7.05 (1H, t, J = 2.2 Hz), 7.22 (1H, s), 7.28 (1H, s), 7.39-7.43 (2H, m).	Ref. Ex. 87
327		¹ H-NMR (CDCl ₃) δ: 7.00-7.04 (2H, m), 7.35 (1H, s), 7.40-7.44 (3H, m), 7.81 (1H, s).	Ref. Ex. 89
328		¹ H-NMR (CDCl ₃) δ: 7.00-7.04 (2H, m), 7.37-7.41 (2H, m), 7.50 (1H, s), 7.59 (1H, s), 7.85 (1H, s), 10.00 (1H, s).	Ref. Ex. 226
329		¹ H-NMR (CDCl ₃) δ: 6.95 (1H, dd, J = 2.2, 8.5 Hz), 7.07-7.09 (1H, m), 7.21-7.24 (1H, m), 7.32-7.35 (1H, m), 7.47 (1H, s), 7.62 (1H, s), 7.89 (1H, s), 10.01 (1H, s).	Ref. Ex. 229
330		¹ H-NMR (CDCl ₃) δ: 3.90 (CH, s), 7.12 (1H, s), 7.23 (1H, s), 7.36 (1H, s), 7.41-7.45 (2H, m), 7.49-7.53 (2H, m).	Ref. Ex. 75
331		¹ H-NMR (CDCl ₃) δ: 3.87 (CH, s), 7.11 (1H, s), 7.15 (1H, s), 7.24 (1H, s), 7.27 (1H, d, J = 8.4 Hz), 7.33 (1H, dd, J = 2.0, 8.4 Hz), 7.51 (1H, d, J = 2.0 Hz).	Ref. Ex. 75

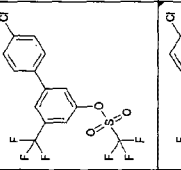
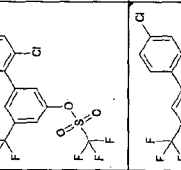
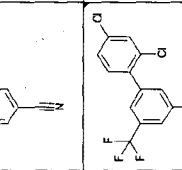
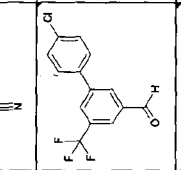
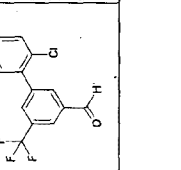
Ref. Ex. No.	STR	¹ H-NMR	ref.
317		¹ H-NMR (CDCl ₃) δ: 5.42 (CH, s), 7.05-7.15 (2H, m), 7.55-7.60 (1H, m), 7.75-7.77 (1H, m), 7.86-7.92 (2H, m), 8.11 (1H, s), 10.55 (1H, s).	Ref. Ex. 82
319		¹ H-NMR (CDCl ₃) δ: 4.89-4.84 (2H, m), 6.46-6.51 (1H, m), 7.15-7.16 (1H, m), 7.24-7.28 (1H, m), 7.45-7.52 (2H, m), 7.65 (1H, d, J = 8.2 Hz), 7.78 (1H, d, J = 8.2 Hz), 7.80 (1H, s), 9.99 (1H, s).	Ref. Ex. 80
320		¹ H-NMR (CDCl ₃) δ: 2.14-2.20 (2H, m), 3.05-3.09 (2H, m), 4.17 (2H, s), 7.18-7.22 (1H, m), 7.39 (1H, s), 7.45-7.49 (2H, m), 7.59 (1H, d, J = 8.2 Hz), 7.64 (1H, s), 7.78 (1H, d, J = 8.2 Hz), 9.98 (1H, s).	Ref. Ex. 80
321		¹ H-NMR (CDCl ₃) δ: 2.24 (CH, s), 6.87 (1H, dd, J = 2.5, 8.3 Hz), 6.92 (1H, d, J = 2.5 Hz), 7.05-7.08 (2H, m), 7.69-7.73 (1H, m), 7.18 (1H, d, J = 8.3 Hz), 7.30-7.43 (1H, m).	Ref. Ex. 75
322		¹ H-NMR (CDCl ₃) δ: 7.02 (1H, d, J = 5.0 Hz), 7.40-7.43 (2H, m), 7.45-7.48 (2H, m), 7.75 (1H, dd, J = 1.2, 5.0 Hz), 9.86 (1H, d, J = 1.2 Hz).	Ref. Ex. 75
324		¹ H-NMR (CDCl ₃) δ: 7.41-7.45 (1H, m), 7.46-7.51 (2H, m), 7.58-7.61 (2H, m), 7.67-7.69 (2H, m), 8.02 (1H, t, J = 1.5 Hz), 10.03 (1H, s).	Ref. Ex. 75

Ref. Ex. No.	STR	¹ H-NMR	ref.
311		¹ H-NMR (CDCl ₃) δ: 6.98-7.06 (2H, m), 7.44-7.49 (1H, m), 8.01 (1H, s), 8.15 (1H, s), 8.20 (1H, s), 10.13 (1H, s).	Ref. Ex. 93
312		¹ H-NMR (CDCl ₃) δ: 7.45-7.48 (2H, m), 7.53-7.56 (2H, m), 7.79 (1H, s), 7.84 (1H, s), 7.94 (1H, s), 10.03 (1H, s).	Ref. Ex. 75
313		¹ H-NMR (CDCl ₃) δ: 7.27-7.34 (2H, m), 7.40-7.44 (1H, m), 7.76 (1H, s), 7.85 (1H, s), 7.91 (1H, s), 10.04 (1H, s).	Ref. Ex. 75
314		¹ H-NMR (CDCl ₃) δ: 4.34 (CH, s), 7.40-7.43 (2H, m), 7.51-7.57 (1H, m), 7.84-7.87 (2H, m), 7.79-7.87 (2H, m), 10.01 (1H, s).	Ref. Ex. 75
315		¹ H-NMR (CDCl ₃) δ: 4.02 (CH, s), 6.95-7.11 (3H, m), 7.42-7.51 (2H, m), 7.69-7.77 (2H, m), 9.89 (1H, s).	Ref. Ex. 75
316		¹ H-NMR (CDCl ₃) δ: 1.36 (CH, t, J = 7.2 Hz), 4.30 (CH, q, J = 7.2 Hz), 6.48 (1H, d, J = 15.8 Hz), 7.74 (1H, d, J = 8.2 Hz), 7.94 (1H, d, J = 8.2 Hz), 7.94 (1H, s), 8.04 (1H, dd, J = 2.1, 15.8 Hz).	Ref. Ex. 186

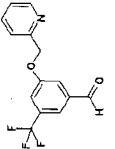
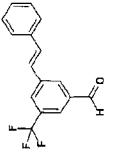
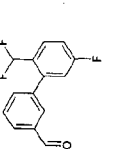
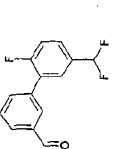
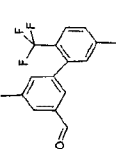
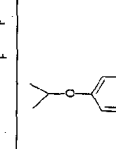
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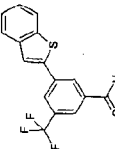
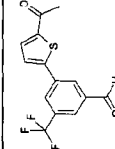
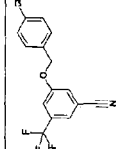
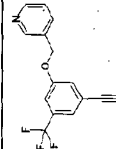
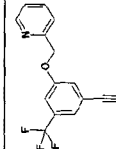
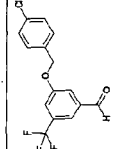
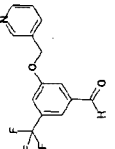
Ref. Ex. No.	STR	¹ H-NMR	ref.
345		¹ H-NMR (CDCl ₃) δ: 3.38 (d, 1, J = 6.5 Hz), 4.27 (d, 1, J = 6.5 Hz), 7.15-7.17 (1H, m), 7.36 (1H, s), 7.43-7.48 (2H, m), 7.63 (1H, d, J = 8.2 Hz), 7.78 (1H, s), 7.80 (1H, d, J = 8.2 Hz), 9.97 (1H, s).	Ref. Ex. 80
346		¹ H-NMR (CDCl ₃) δ: 5.25 (d, s), 7.53 (1H, s), 7.66 (1H, s), 7.80 (1H, s), 7.81-7.84 (3H, m), 10.04 (1H, s).	Ref. Ex. 82, Ref. Ex. 93
347		¹ H-NMR (CDCl ₃) δ: 4.00 (d, s), 5.39 (2H, s), 7.05 (1H, d, J = 8.3 Hz), 7.47 (1H, s), 7.54-7.58 (1H, m), 7.71 (1H, d, J = 8.3 Hz), 7.84 (1H, d, J = 8.3 Hz), 8.18 (1H, s), 9.85 (1H, s).	Ref. Ex. 82
348		¹ H-NMR (CDCl ₃) δ: 5.39 (d, s), 6.98-6.99 (1H, m), 7.51-7.54 (1H, m), 7.76-7.80 (2H, m), 8.05 (1H, s), 10.47 (1H, s).	Ref. Ex. 82
349		¹ H-NMR (CDCl ₃) δ: 3.83 (d, s), 5.37 (d, s), 6.95-6.99 (1H, m), 7.13-7.16 (1H, m), 7.39 (1H, s), 7.75 (1H, d, J = 8.2 Hz), 7.87 (1H, d, J = 8.2 Hz), 8.07 (1H, s), 10.52 (1H, s).	Ref. Ex. 82

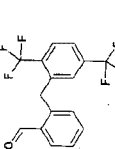
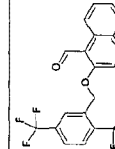
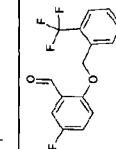
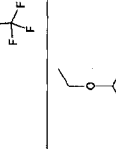
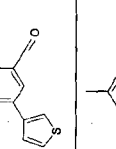
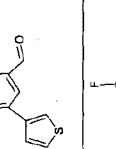
Ref. Ex. No.	STR	¹ H-NMR	ref.
338		¹ H-NMR (CDCl ₃) δ: 3.89 (d, s), 7.15 (2H, s), 7.28 (1H, s), 7.32-7.35 (2H, m), 7.48-7.49 (1H, m).	Ref. Ex. 75
339		¹ H-NMR (CDCl ₃) δ: 7.34-7.41 (3H, m), 7.51-7.56 (2H, m), 7.69 (1H, s), 7.75 (1H, s).	Ref. Ex. 87
340		¹ H-NMR (CDCl ₃) δ: 7.32-7.53 (3H, m), 7.53-7.56 (1H, m), 7.94 (3H, s).	Ref. Ex. 89
341		¹ H-NMR (CDCl ₃) δ: 7.35-7.41 (3H, m), 7.52-7.56 (1H, m), 7.98 (1H, s), 8.15-8.18 (2H, m), 10.13 (1H, s).	Ref. Ex. 229
343		¹ H-NMR (CDCl ₃) δ: 1.23-1.26 (1H, m), 1.83-1.76 (4H, m), 2.85-2.89 (2H, m), 3.89-3.75 (2H, m), 7.55 (1H, d, J = 8.2 Hz), 7.61 (1H, s), 7.75 (1H, d, J = 8.2 Hz).	Ref. Ex. 33
344		¹ H-NMR (CDCl ₃) δ: 1.84-1.95 (4H, m), 2.92-2.95 (2H, m), 4.05-4.11 (2H, m), 7.15-7.19 (1H, m), 7.36 (1H, s), 7.43-7.47 (2H, m), 7.56 (1H, d, J = 8.3 Hz), 7.63 (1H, s), 7.78 (1H, d, J = 8.3 Hz), 9.98 (1H, s).	Ref. Ex. 80

Ref. Ex. No.	STR	¹ H-NMR	ref.
332		¹ H-NMR (CDCl ₃) δ: 7.47-7.53 (6H, m), 7.63 (1H, s), 7.83 (1H, s).	Ref. Ex. 87
333		¹ H-NMR (CDCl ₃) δ: 7.29 (1H, d, J = 8.2 Hz), 7.39 (1H, dd, J = 2.1, 8.2 Hz), 7.56-7.57 (3H, m), 7.71 (1H, s).	Ref. Ex. 87
334		¹ H-NMR (CDCl ₃) δ: 7.46-7.54 (4H, m), 7.90 (1H, s), 8.01 (2H, s).	Ref. Ex. 88
335		¹ H-NMR (CDCl ₃) δ: 7.27 (1H, d, J = 8.3 Hz), 7.39 (1H, dd, J = 2.0, 8.3 Hz), 7.56 (1H, d, J = 2.0 Hz), 7.91 (2H, s), 7.95 (1H, s).	Ref. Ex. 88
336		¹ H-NMR (CDCl ₃) δ: 7.47-7.51 (2H, m), 7.57-7.60 (2H, m), 8.05 (1H, s), 8.12 (1H, s), 8.25 (1H, s), 10.14 (1H, s).	Ref. Ex. 229
337		¹ H-NMR (CDCl ₃) δ: 7.33 (1H, d, J = 8.2 Hz), 7.36 (1H, dd, J = 2.1, 8.2 Hz), 7.56 (1H, d, J = 2.1 Hz), 7.84 (1H, s), 8.12 (1H, s), 8.17 (1H, s), 10.12 (1H, s).	Ref. Ex. 229

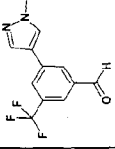
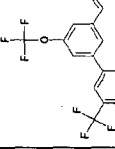
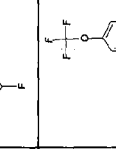
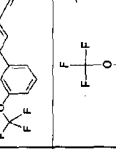
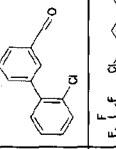
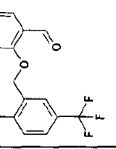
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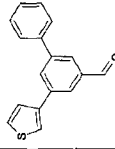
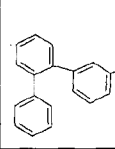
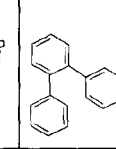
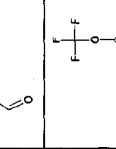
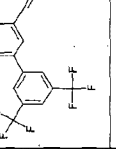
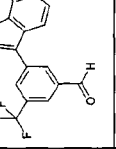
Ref. Ex. No.	STR	¹ H-NMR	ref.
363		¹ H-NMR (CDCl ₃) δ: 5.30 (q, s), 7.24-7.27 (1H, m), 7.46-7.53 (2H, m), 7.67 (1H, s), 7.73-7.76 (2H, m), 8.63-8.65 (1H, m), 10.01 (1H, s)	Ref. Ex. 93
364		¹ H-NMR (CDCl ₃) δ: 7.14-7.19 (1H, m), 7.31-7.44 (4H, m), 7.54-7.57 (2H, m), 7.68 (1H, s), 8.00 (1H, s), 8.19 (1H, s), 10.10 (1H, s)	Ref. Ex. 112
365		¹ H-NMR (CDCl ₃) δ: 6.44 (1H, t, J = 54.7 Hz), 7.05-7.07 (1H, m), 7.23-7.28 (1H, m), 7.63-7.66 (2H, m), 7.79-7.80 (1H, m), 7.87 (1H, s), 7.97-7.99 (1H, m), 10.09 (1H, s)	Ref. Ex. 75
366		¹ H-NMR (CDCl ₃) δ: 6.70 (1H, t, J = 59.3 Hz), 7.26-7.31 (1H, m), 7.54 (1H, m), 7.63-7.67 (2H, m), 7.83-7.84 (1H, m), 7.93-7.95 (1H, m), 8.07 (1H, s), 10.10 (1H, s)	Ref. Ex. 75
367		¹ H-NMR (CDCl ₃) δ: 2.50 (2H, s), 7.41 (1H, s), 7.81 (1H, s), 7.85 (1H, s), 7.78 (1H, s), 7.79 (1H, d, J = 8.3 Hz), 7.92 (1H, d, J = 8.3 Hz), 10.04 (1H, s)	Ref. Ex. 75
368		¹ H-NMR (CDCl ₃) δ: 1.39-1.40 (6H, m), 4.65-4.71 (1H, m), 7.31 (1H, s), 7.38 (1H, s), 7.40-7.43 (2H, m), 7.53 (1H, s), 7.66 (1H, s), 10.01 (1H, s)	Ref. Ex. 75

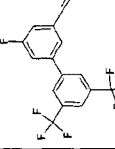
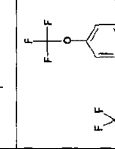
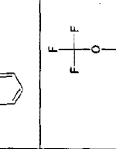
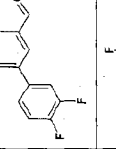
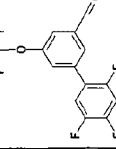
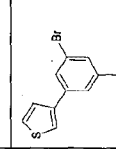
Ref. Ex. No.	STR	¹ H-NMR	ref.
369		¹ H-NMR (CDCl ₃) δ: 7.35-7.43 (2H, m), 7.73 (1H, s), 7.85-7.89 (2H, m), 8.09 (1H, s), 8.18 (1H, s), 8.37 (1H, s), 10.14 (1H, s)	Ref. Ex. 75
367		¹ H-NMR (CDCl ₃) δ: 1.56 (3H, s), 7.48-7.49 (1H, m), 7.71-7.72 (1H, m), 8.12 (2H, s), 8.31 (1H, s), 10.12 (1H, s)	Ref. Ex. 75
368		¹ H-NMR (CDCl ₃) δ: 5.10 (2H, s), 7.32-7.42 (8H, m), 7.52 (1H, s)	Ref. Ex. 82
369		¹ H-NMR (CDCl ₃) δ: 5.15 (2H, s), 7.37-7.41 (2H, m), 7.45 (1H, s), 7.54 (1H, s), 7.76-7.79 (1H, s), 8.64-8.70 (2H, m)	Ref. Ex. 82
360		¹ H-NMR (CDCl ₃) δ: 5.27 (2H, s), 7.28-7.27 (1H, m), 7.42-7.51 (4H, m), 7.73-7.76 (1H, m), 8.62-8.64 (1H, s)	Ref. Ex. 82
361		¹ H-NMR (CDCl ₃) δ: 5.14 (2H, s), 7.38-7.39 (4H, m), 7.48 (1H, s), 7.62 (1H, s), 7.74 (1H, s), 10.01 (1H, s)	Ref. Ex. 93
362		¹ H-NMR (CDCl ₃) δ: 5.19 (2H, s), 7.38-7.39 (1H, m), 7.49 (1H, s), 7.66 (1H, s), 7.76-7.78 (2H, m), 8.63-8.65 (1H, m), 8.72 (1H, s), 10.02 (1H, s)	Ref. Ex. 93

Ref. Ex. No.	STR	¹ H-NMR	ref.
350		¹ H-NMR (CDCl ₃) δ: 4.72 (2H, s), 7.05 (1H, d, J = 7.3 Hz), 7.16 (1H, s), 7.50-7.61 (3H, m), 7.84-7.91 (2H, m), 10.15 (1H, s)	Ref. Ex. 75
351		¹ H-NMR (CDCl ₃) δ: 5.55 (2H, s), 7.28-7.34 (1H, m), 7.46-7.49 (1H, m), 7.65-7.70 (1H, m), 7.77-7.89 (3H, m), 8.08-8.10 (2H, m), 9.20 (1H, d, J = 8.7 Hz), 11.00 (1H, s)	Ref. Ex. 82
352		¹ H-NMR (CDCl ₃) δ: 5.39 (2H, s), 6.99-7.05 (1H, m), 7.27-7.31 (1H, m), 7.57-7.59 (1H, m), 7.76-7.78 (1H, m), 7.88-7.90 (1H, m), 8.05 (1H, s), 10.49 (1H, s)	Ref. Ex. 82
353		¹ H-NMR (CDCl ₃) δ: 1.45-1.50 (2H, s), 4.12-4.17 (2H, m), 7.31 (1H, s), 7.39-7.44 (3H, m), 7.54 (1H, s), 7.88 (1H, s), 10.04 (1H, s)	Ref. Ex. 75
354		¹ H-NMR (CDCl ₃) δ: 2.48 (2H, s), 7.39-7.69 (5H, m), 7.90 (1H, s), 10.03 (1H, s)	Ref. Ex. 75
355		¹ H-NMR (CDCl ₃) δ: 3.62 (3H, s), 7.42-7.49 (4H, m), 7.68 (1H, s), 10.42 (1H, s)	Ref. Ex. 75

[0482]

Ref. Ex. No.	STR	¹ H-NMR	ref.
381		¹ H-NMR (CDCl ₃) δ: 4.01 (q, s), 7.78 (H, s), 7.88 (H, s), 7.95 (H, s), 7.98 (H, s), 8.15 (H, s), 10.10 (H, s).	Ref. Ex. 75
382		¹ H-NMR (CDCl ₃) δ: 7.41-7.52 (2H, m), 7.67 (2H, d, J = 7.5 Hz), 7.79 (H, s), 8.04 (H, s), 10.13 (H, s).	Ref. Ex. 75
383		¹ H-NMR (CDCl ₃) δ: 7.31-7.32 (1H, m), 7.46 (H, s), 7.54-7.55 (2H, m), 7.67 (H, s), 7.75 (H, s), 8.02 (H, s), 10.08 (H, s).	Ref. Ex. 75
384		¹ H-NMR (CDCl ₃) δ: 7.37-7.38 (2H, m), 7.52-7.54 (H, m), 7.60 (H, s), 7.76 (H, s), 7.90 (H, s), 10.06 (H, s).	Ref. Ex. 75
385		¹ H-NMR (CDCl ₃) δ: 5.34 (2H, s), 7.61 (H, s), 7.70-7.87 (2H, m), 8.25 (H, s), 10.18 (H, s).	Ref. Ex. 82
386		¹ H-NMR (CDCl ₃) δ: 5.49 (2H, s), 7.20-7.23 (H, m), 7.35-7.44 (H, m), 7.65-7.68 (H, m), 7.76 (H, d, J = 8.2 Hz), 7.86 (H, d, J = 8.2 Hz), 8.18 (H, s), 10.33 (H, s).	Ref. Ex. 82

Ref. Ex. No.	STR	¹ H-NMR	ref.
375		¹ H-NMR (CDCl ₃) δ: 7.41-7.45 (1H, m), 7.46 (H, d, J = 2.9, 5.0 Hz), 7.48-7.53 (2H, m), 7.61 (H, d, J = 1.4, 2.9 Hz), 7.65-7.69 (2H, m), 8.01 (H, t, J = 1.6 Hz), 8.06 (H, t, J = 1.7 Hz), 8.08 (H, t, J = 1.6 Hz), 10.14 (H, s).	Ref. Ex. 75
376		¹ H-NMR (CDCl ₃) δ: 7.11-7.13 (2H, m), 7.19-7.23 (2H, m), 7.35-7.36 (2H, m), 7.44-7.48 (4H, m), 7.69-7.73 (2H, m), 9.90 (H, s).	Ref. Ex. 75
377		¹ H-NMR (CDCl ₃) δ: 7.10-7.15 (2H, m), 7.20-7.24 (2H, m), 7.31 (2H, d, J = 8.1 Hz), 7.42-7.49 (4H, m), 7.73 (2H, d, J = 8.1 Hz), 9.97 (H, s).	Ref. Ex. 75
378		¹ H-NMR (CDCl ₃) δ: 7.70 (H, s), 7.83 (H, s), 7.97 (H, s), 8.04 (2H, s), 8.07 (H, s), 10.12 (H, s).	Ref. Ex. 75
379		¹ H-NMR (CDCl ₃) δ: 7.42-7.48 (2H, m), 7.57 (H, s), 7.80-7.86 (H, m), 7.94-7.99 (H, m), 8.10 (H, s), 8.17 (H, s), 8.28 (H, s), 10.15 (H, s).	Ref. Ex. 75
380		¹ H-NMR (CDCl ₃) δ: 7.17 (H, d, J = 3.7, 5.1 Hz), 7.44 (H, d, J = 1.1, 5.1 Hz), 7.49 (H, d, J = 1.1, 3.7 Hz), 8.04 (H, s), 8.09 (H, s), 8.28 (H, s), 10.12 (H, s).	Ref. Ex. 112

Ref. Ex. No.	STR	¹ H-NMR	ref.
369		¹ H-NMR (CDCl ₃) δ: 7.59 (H, d, J = 8.8 Hz), 7.65-7.68 (H, m), 7.83-7.85 (2H, m), 8.04 (2H, s), 10.09 (H, s).	Ref. Ex. 75
370		¹ H-NMR (CDCl ₃) δ: 7.63-7.81 (5H, m), 7.85 (H, s), 8.05 (H, s), 10.10 (H, s).	Ref. Ex. 75
371		¹ H-NMR (CDCl ₃) δ: 7.28-7.35 (2H, m), 7.41-7.45 (H, m), 7.61 (H, s), 7.73 (H, s), 7.98 (H, s), 10.08 (H, s).	Ref. Ex. 75
372		¹ H-NMR (CDCl ₃) δ: 7.05-7.15 (H, m), 7.28-7.35 (H, m), 7.62 (H, s), 7.77 (H, s), 7.95 (H, s), 10.07 (H, s).	Ref. Ex. 75
373		¹ H-NMR (CDCl ₃) δ: 7.41 (H, d, J = 1.3, 5.0 Hz), 7.45 (H, d, J = 2.9, 5.0 Hz), 7.57 (H, d, J = 1.3, 3.9 Hz), 7.92 (H, t, J = 1.6 Hz), 7.98 (H, t, J = 1.7 Hz), 8.01 (H, t, J = 1.5 Hz), 10.00 (H, s).	Ref. Ex. 75
374		¹ H-NMR (CDCl ₃) δ: 7.45-7.48 (4H, m), 7.59-7.61 (2H, m), 8.01 (2H, d, J = 1.7 Hz), 8.06 (H, t, J = 1.7 Hz), 10.12 (H, s).	Ref. Ex. 75

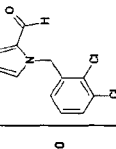
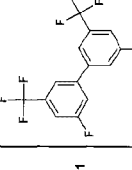
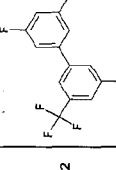
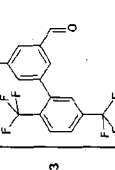
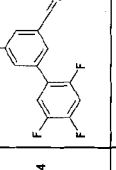
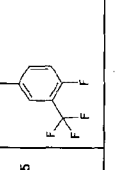
[0483]

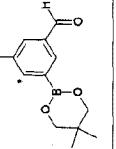
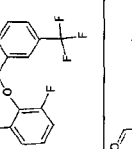
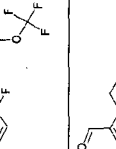
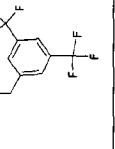
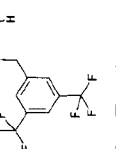
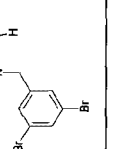
Ref. Ex. No.	STR	¹ H-NMR	ref.
400		¹ H-NMR (CDCl ₃) δ: 7.59-7.71 (2H, m), 7.73 (1H, s), 7.82-7.84 (1H, m), 7.91-7.96 (2H, m), 10.03 (1H, s).	Ref. Ex. 75
401		¹ H-NMR (CDCl ₃) δ: 3.86 (2H, s), 6.89-6.98 (2H, m), 7.09-7.14 (1H, m), 7.40 (1H, s), 7.58 (1H, s), 7.72 (1H, s), 9.94 (1H, s).	Ref. Ex. 75
402		¹ H-NMR (CDCl ₃) δ: 7.61-7.63 (1H, m), 7.87 (2H, s), 7.98-8.00 (1H, m), 8.05 (1H, s), 8.36 (1H, s), 9.99 (1H, s).	Ref. Ex. 75
403		¹ H-NMR (CDCl ₃) δ: 7.23 (1H, dd, J = 14, 5.0 Hz), 7.39 (1H, dd, J = 14, 3.0 Hz), 7.53 (1H, dd, J = 3.0, 5.0 Hz), 7.62-7.66 (1H, m), 7.85-7.89 (1H, m), 8.26 (1H, s), 10.15 (1H, s).	Ref. Ex. 112
404		¹ H-NMR (CDCl ₃) δ: 6.63 (1H, s), 7.61-7.63 (2H, m), 7.85-7.89 (1H, m), 8.28 (1H, s), 10.10 (1H, s).	Ref. Ex. 112
405		¹ H-NMR (CDCl ₃) δ: 7.11-7.16 (4H, m), 7.19-7.24 (1H, m), 7.34-7.45 (4H, m), 7.62 (1H, d, J = 8.1 Hz), 7.87-7.91 (1H, m), 8.31 (1H, s), 10.06 (1H, s).	Ref. Ex. 112
406		¹ H-NMR (DMSO-d ₆) δ: 5.33 (2H, s), 7.36-7.38 (1H, m), 7.71-7.84 (4H, m), 10.19 (1H, s).	Ref. Ex. 82

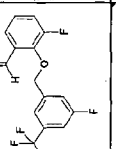
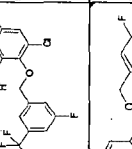
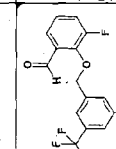
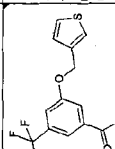
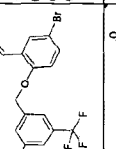
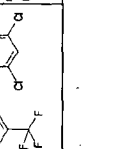
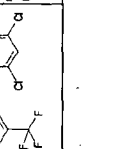
Ref. Ex. No.	STR	¹ H-NMR	ref.
394		¹ H-NMR (CDCl ₃) δ: 7.34-7.37 (2H, m), 7.51-8.00 (2H, m), 7.86-7.92 (1H, m), 8.32 (1H, s), 10.05 (1H, s).	Ref. Ex. 75
395		¹ H-NMR (CDCl ₃) δ: 3.91 (2H, s), 7.04-7.08 (2H, m), 7.32-7.37 (2H, m), 7.95-7.97 (1H, m), 7.86-7.88 (1H, m), 8.28 (1H, s), 10.05 (1H, s).	Ref. Ex. 75
396		¹ H-NMR (CDCl ₃) δ: 7.40-7.41 (1H, m), 7.50-7.51 (1H, m), 7.65 (1H, s), 7.82 (1H, s), 7.91 (1H, s), 7.97 (1H, s), 10.06 (1H, s).	Ref. Ex. 75
397		¹ H-NMR (CDCl ₃) δ: 7.36-7.40 (1H, m), 7.65-7.70 (2H, m), 7.88 (1H, s), 7.91-7.95 (2H, m), 10.04 (1H, s).	Ref. Ex. 75
398		¹ H-NMR (CDCl ₃) δ: 5.84 (2H, s), 6.40 (1H, dd, J = 2.6, 4.1 Hz), 6.73 (1H, s), 6.97 (1H, s), 7.09 (1H, dd, J = 1.7, 4.1 Hz), 7.62 (1H, d, J = 8.2 Hz), 7.83 (1H, d, J = 8.2 Hz), 9.58 (1H, s).	Ref. Ex. 184
399		¹ H-NMR (CDCl ₃) δ: 5.79 (2H, s), 7.02 (2H, d, J = 8.3 Hz), 7.18-7.23 (2H, m), 7.34-7.42 (2H, m), 7.76-7.78 (1H, m), 9.89 (1H, s).	Ref. Ex. 113

Ref. Ex. No.	STR	¹ H-NMR	ref.
387		¹ H-NMR (CDCl ₃) δ: 5.17 (2H, s), 7.27-7.28 (1H, m), 7.31 (1H, d, J = 8.5 Hz), 7.38 (1H, d, J = 8.5 Hz), 7.47-7.54 (4H, m), 10.00 (1H, s).	Ref. Ex. 80
388		¹ H-NMR (CDCl ₃) δ: 5.22 (2H, s), 6.96 (1H, d, J = 8.9 Hz), 7.34-7.38 (2H, m), 7.50-7.52 (2H, m), 7.85 (1H, s), 10.48 (1H, s).	Ref. Ex. 82
389		¹ H-NMR (CDCl ₃) δ: 5.22 (2H, s), 6.97-6.98 (1H, m), 7.27-7.28 (1H, m), 7.33-7.38 (2H, m), 7.49 (1H, s), 7.56-7.58 (1H, m), 10.50 (1H, s).	Ref. Ex. 82
390		¹ H-NMR (CDCl ₃) δ: 2.27 (2H, s), 6.95-7.04 (2H, m), 7.16-7.21 (1H, m), 7.42 (1H, s), 7.72 (1H, s), 7.75 (1H, s), 10.05 (1H, s).	Ref. Ex. 75
391		¹ H-NMR (CDCl ₃) δ: 6.07 (2H, s), 6.61 (1H, s), 7.17-7.20 (1H, m), 7.22-7.25 (1H, m), 7.37-7.42 (1H, m), 7.45-7.47 (1H, m), 7.60 (1H, d, J = 8.1 Hz), 7.83 (1H, d, J = 8.1 Hz), 7.87 (1H, d, J = 8.2 Hz), 9.83 (1H, s).	Ref. Ex. 113
392		¹ H-NMR (CDCl ₃) δ: 5.88 (2H, s), 7.08 (1H, d, J = 7.7 Hz), 7.19-7.24 (2H, m), 7.33-7.38 (2H, m), 7.38 (1H, m), 7.46 (1H, d, J = 7.7 Hz), 7.79 (1H, d, J = 8.0 Hz), 9.91 (1H, s).	Ref. Ex. 113
393		¹ H-NMR (CDCl ₃) δ: 5.13 (2H, s), 7.19-7.24 (2H, m), 7.27-7.33 (1H, m), 7.49 (1H, s), 7.63 (1H, s), 7.77 (1H, s), 10.04 (1H, s).	Ref. Ex. 82

[0484]

Ref. Ex. No.	STR	¹ H-NMR	ref.
420		¹ H-NMR (CDCl ₃) δ: 5.99 (2H, s), 6.33 (1H, dd, J = 2.5, 4.0 Hz), 6.52-6.55 (1H, m), 6.96 (1H, s), 7.03 (1H, dd, J = 1.5, 4.0 Hz), 7.09 (1H, t, J = 7.9 Hz), 7.39-7.39 (1H, m), 9.57 (1H, s).	Ref. Ex. 184
421		¹ H-NMR (CDCl ₃) δ: 7.44-7.47 (1H, m), 7.54-7.56 (1H, m), 7.71 (1H, s), 8.09 (1H, s), 8.22 (1H, s), 8.30 (1H, s), 10.19 (1H, s).	Ref. Ex. 81, Ref. Ex. 75
422		¹ H-NMR (CDCl ₃) δ: 7.40-7.41 (1H, m), 7.50-7.51 (2H, m), 7.62-7.66 (2H, m), 7.90 (1H, s), 10.07 (1H, s).	Ref. Ex. 75
423		¹ H-NMR (CDCl ₃) δ: 7.34 (1H, d, J = 8.5 Hz), 7.62-7.70 (3H, m), 7.83 (1H, d, J = 8.1 Hz), 7.95 (1H, d, J = 8.1 Hz), 10.04 (1H, s).	Ref. Ex. 75
424		¹ H-NMR (CDCl ₃) δ: 7.08-7.10 (1H, m), 7.26-7.34 (1H, m), 7.48-7.51 (1H, m), 7.60-7.62 (1H, m), 7.81 (1H, s), 10.05 (1H, s).	Ref. Ex. 75
425		¹ H-NMR (CDCl ₃) δ: 3.03 (2H, s), 5.24 (2H, s), 7.24-7.28 (1H, m), 7.82-7.87 (2H, m).	Ref. Ex. 103

Ref. Ex. No.	STR	¹ H-NMR	ref.
414		¹ H-NMR (CDCl ₃) δ: 1.08 (3H, s), 3.80 (4H, s), 7.60-7.62 (1H, m), 7.72-7.74 (1H, m), 8.08 (1H, s), 10.02 (1H, s).	Ref. Ex. 107
415		¹ H-NMR (CDCl ₃) δ: 5.32 (2H, s), 7.13-7.18 (1H, m), 7.36-7.41 (1H, m), 7.51-7.55 (1H, m), 7.61-7.64 (3H, m), 7.69 (1H, s), 10.31 (1H, s).	Ref. Ex. 82
416		¹ H-NMR (CDCl ₃) δ: 5.29 (2H, s), 7.12-7.28 (3H, m), 7.34-7.44 (3H, m), 7.60 (1H, d, J = 7.8 Hz), 10.26 (1H, s).	Ref. Ex. 82
417		¹ H-NMR (CDCl ₃) δ: 2.73-2.77 (2H, m), 3.44-3.47 (2H, m), 5.37 (2H, s), 7.28 (1H, d, J = 8.0 Hz), 7.39 (1H, t, J = 8.0 Hz), 7.56 (1H, d, J = 8.0 Hz), 7.92 (2H, s), 8.01 (1H, s), 10.46 (1H, s).	Ref. Ex. 184
418		¹ H-NMR (CDCl ₃) δ: 5.67 (2H, s), 6.37 (1H, dd, J = 2.8, 3.9 Hz), 7.03-7.06 (2H, m), 7.53 (2H, s), 7.78 (1H, s), 9.54 (1H, d, J = 0.8 Hz).	Ref. Ex. 184
419		¹ H-NMR (CDCl ₃) δ: 5.51 (2H, s), 6.33 (1H, dd, J = 2.7, 4.0 Hz), 6.98 (2H, s), 7.01 (1H, d, J = 1.5, 4.0 Hz), 7.17 (1H, d, J = 1.3 Hz), 7.50 (1H, t, J = 1.5 Hz), 9.55 (1H, d, J = 0.8 Hz).	Ref. Ex. 184

Ref. Ex. No.	STR	¹ H-NMR	ref.
407		¹ H-NMR (DMSO-d ₆) δ: 5.37 (2H, s), 7.29-7.34 (1H, m), 7.56 (1H, d, J = 7.8 Hz), 7.66-7.75 (4H, m), 10.23 (1H, s).	Ref. Ex. 82
408		¹ H-NMR (DMSO-d ₆) δ: 5.25 (2H, s), 7.53-7.55 (1H, m), 7.73-7.77 (3H, m), 7.98-7.99 (1H, m), 10.12 (1H, s).	Ref. Ex. 82
409		¹ H-NMR (CDCl ₃) δ: 5.22 (2H, s), 7.13-7.28 (4H, m), 7.35-7.40 (1H, m), 7.60-7.62 (1H, m), 10.26 (1H, s).	Ref. Ex. 82
410		¹ H-NMR (CDCl ₃) δ: 5.37 (2H, s), 7.19-7.23 (1H, m), 7.38-7.43 (1H, m), 7.65-7.66 (1H, m), 7.89 (1H, s), 7.94 (2H, s), 10.35 (1H, s).	Ref. Ex. 82
411		¹ H-NMR (CDCl ₃) δ: 5.21 (2H, s), 7.17-7.19 (1H, m), 7.39-7.42 (2H, m), 7.48 (1H, s), 7.65 (1H, s), 7.75 (1H, s), 10.03 (1H, s).	Ref. Ex. 82
412		¹ H-NMR (CDCl ₃) δ: 5.22 (2H, s), 6.91 (1H, d, J = 8.9 Hz), 7.34-7.38 (2H, m), 7.48 (1H, s), 7.64-7.66 (1H, m), 7.88 (1H, s), 10.46 (1H, s).	Ref. Ex. 82
413		¹ H-NMR (CDCl ₃) δ: 5.15 (2H, s), 7.36 (1H, d, J = 8.2 Hz), 7.43 (1H, d, J = 8.2 Hz), 7.52 (1H, s), 7.70 (1H, s), 7.74 (1H, s), 10.18 (1H, s).	Ref. Ex. 82

[0485]

Ref. Ex. No.	STR	¹ H-NMR	ref.
440		¹ H-NMR (CDCl ₃) δ: 5.56 (d, s), 6.31 (t, d, J = 2.9, 3.7 Hz), 6.85 (t, s), 6.96-7.02 (m), 7.03-7.08 (m), 7.08-7.14 (m), 7.33 (t, J = 8.0 Hz), 9.55 (t, d, J = 0.8 Hz).	Ref. Ex. 184
441		¹ H-NMR (CDCl ₃) δ: 5.56 (d, s), 5.88 (t, J = 2.9, 3.3 Hz), 6.30 (t, J = 3.3 Hz), 6.96 (t, s), 6.98 (d, J = 3.5 Hz), 7.02-7.07 (m), 7.09-7.15 (m), 7.32 (t, J = 8.0 Hz), 9.55 (t, s).	Ref. Ex. 184
442		¹ H-NMR (CDCl ₃) δ: 5.66 (d, s), 5.49 (d, s), 6.24 (t, J = 3.3 Hz), 6.98-6.94 (m), 6.95 (d, J = 3.5 Hz), 7.09-7.16 (m), 7.29-7.44 (m), 9.56 (t, s).	Ref. Ex. 184
443		¹ H-NMR (CDCl ₃) δ: 5.61 (d, s), 6.28 (t, d, J = 2.5, 4.0 Hz), 6.99 (t, d, J = 1.7, 4.0 Hz), 7.01-7.04 (m), 7.20-7.28 (m), 7.30-7.37 (m), 7.38-7.46 (m), 7.51-7.58 (m), 9.58 (t, d, J = 1.0 Hz).	Ref. Ex. 184
444		¹ H-NMR (CDCl ₃) δ: 7.38 (t, d, J = 16.9 Hz), 7.85-7.72 (m), 7.84-7.91 (m), 8.12-8.21 (m), 10.34 (t, s).	Ref. Ex. 112
445		¹ H-NMR (CDCl ₃) δ: 4.12 (d, s), 7.12-7.16 (m), 7.29-7.35 (m), 7.71 (t, s), 7.88 (t, s), 8.02 (t, s), 10.05 (t, s).	Ref. Ex. 81, Ref. Ex. 75
446		¹ H-NMR (CDCl ₃) δ: 7.35 (d, J = 8.0 Hz), 7.63-7.66 (m), 7.73 (t, s), 8.02 (t, s), 10.06 (t, s).	Ref. Ex. 75

Ref. Ex. No.	STR	¹ H-NMR	ref.
433		¹ H-NMR (CDCl ₃) δ: 4.28 (d, s), 7.06 (d, s), 7.73 (t, s), 7.82 (t, s), 7.90 (t, s), 8.08 (t, s), 10.07 (t, s).	Ref. Ex. 75
434		¹ H-NMR (CDCl ₃) δ: 7.69-7.79 (m), 8.05 (t, s), 10.10 (t, s).	Ref. Ex. 75
435		¹ H-NMR (CDCl ₃) δ: 4.08 (d, s), 7.17-7.34 (m), 7.57 (t, s), 7.64 (t, s), 9.96 (t, s).	Ref. Ex. 75
436		¹ H-NMR (CDCl ₃) δ: 6.58 (t, J = 73.4 Hz), 7.24-7.27 (m), 7.59-7.72 (m), 8.01 (t, s), 10.10 (t, s).	Ref. Ex. 75
437		¹ H-NMR (CDCl ₃) δ: 2.89 (d, s), 5.25 (d, s), 7.25-7.28 (m), 7.38 (t, d, J = 7.8 Hz), 7.46 (t, J = 7.9 Hz).	Ref. Ex. 106
438		¹ H-NMR (CDCl ₃) δ: 2.87 (d, s), 5.25 (d, s), 5.92 (t, J = 2.8, 53.0 Hz), 7.24-7.28 (m), 7.34 (t, d, J = 7.7 Hz), 7.44 (t, J = 7.7 Hz).	Ref. Ex. 106
439		¹ H-NMR (CDCl ₃) δ: 5.82 (d, s), 7.04-7.07 (m), 7.20-7.28 (m), 7.31-7.32 (m), 7.74 (t, J = 1.3 Hz), 9.91 (t, s).	Ref. Ex. 113

Ref. Ex. No.	STR	¹ H-NMR	ref.
426		¹ H-NMR (CDCl ₃) δ: 5.17 (d, s), 6.89-7.01 (m), 7.25-7.28 (m), 7.59-7.57 (m), 7.63-7.65 (m), 7.68-7.69 (m), 10.46 (t, s).	Ref. Ex. 82
427		¹ H-NMR (CDCl ₃) δ: 5.40 (d, s), 7.22-7.31 (m), 7.38 (t, J = 8.0 Hz), 7.62-7.63 (m), 7.75 (t, d, J = 8.0 Hz), 7.87 (t, d, J = 8.0 Hz), 8.28 (t, s), 10.57 (t, s).	Ref. Ex. 82
428		¹ H-NMR (CDCl ₃) δ: 5.77-6.13 (m), 7.39-7.45 (m), 7.51-7.60 (m), 7.89 (t, s), 10.08 (t, s).	Ref. Ex. 75
429		¹ H-NMR (CDCl ₃) δ: 4.32 (d, s), 7.05-7.09 (m), 7.45-7.48 (m), 7.60-7.68 (m), 9.96 (t, s).	Ref. Ex. 75
430		¹ H-NMR (CDCl ₃) δ: 5.13 (d, s), 6.92-7.05 (m), 7.23-7.40 (m), 7.47-7.52 (m), 9.99 (t, s).	Ref. Ex. 82
431		¹ H-NMR (CDCl ₃) δ: 5.15 (d, s), 7.16-7.25 (m), 7.47-7.61 (m), 10.00 (t, s).	Ref. Ex. 82
432		¹ H-NMR (CDCl ₃) δ: 5.27 (d, s), 6.90-7.01 (m), 7.16-7.18 (m), 7.35-7.39 (m), 7.69-7.63 (m), 10.28 (t, s).	Ref. Ex. 82

[0486]

Ref. Ex. No.	STR	¹ H-NMR	ref.
457		¹ H-NMR (CDCl ₃) δ: 7.85 (1H, s), 7.94-8.03 (3H, m), 10.08 (1H, s).	Ref. Ex. 91
458		¹ H-NMR (DMSO-d ₆) δ: 5.39 (2H, s), 7.16 (2H, d, J = 6.8 Hz), 7.66 (1H, d, J = 4.0 Hz), 7.79 (2H, d, J = 8.8 Hz), 8.01 (1H, d, J = 4.0 Hz), 8.11 (1H, s), 8.20 (2H, s), 9.88 (1H, s).	Ref. Ex. 82
459		¹ H-NMR (DMSO-d ₆) δ: 5.17 (2H, s), 7.12 (2H, d, J = 8.8 Hz), 7.30 (2H, d, J = 8.8 Hz), 7.64 (1H, d, J = 4.0 Hz), 7.75 (2H, d, J = 8.8 Hz), 8.01 (1H, d, J = 4.0 Hz), 9.88 (1H, s).	Ref. Ex. 82
460		¹ H-NMR (DMSO-d ₆) δ: 5.40 (2H, s), 7.16 (2H, d, J = 8.7 Hz), 7.66 (1H, d, J = 4.0 Hz), 7.79 (2H, d, J = 8.7 Hz), 7.93-8.10 (3H, m), 8.19 (1H, s), 9.88 (1H, s).	Ref. Ex. 82
461		¹ H-NMR (DMSO-d ₆) δ: 5.42 (2H, s), 7.12-7.15 (1H, m), 7.43-7.48 (3H, m), 7.80 (1H, d, J = 4.0 Hz), 8.02-8.10 (3H, m), 8.22 (1H, s), 9.92 (1H, s).	Ref. Ex. 82

Ref. Ex. No.	STR	¹ H-NMR	ref.
452		¹ H-NMR (CDCl ₃) δ: 1.04 (6H, s), 3.60 (4H, s), 6.58 (1H, t, J = 73.4 Hz), 7.66 (1H, s), 7.79 (1H, s), 8.14 (1H, s), 10.03 (1H, s).	Ref. Ex. 107
453		¹ H-NMR (CDCl ₃) δ: 6.63 (1H, t, J = 72.8 Hz), 7.45-7.63 (6H, m), 7.93 (1H, s), 10.03 (1H, s).	Ref. Ex. 91
454		¹ H-NMR (CDCl ₃) δ: 6.67 (1H, t, J = 72.4 Hz), 7.63 (1H, s), 7.73 (1H, s), 7.98-8.10 (4H, m), 10.10 (1H, s).	Ref. Ex. 91
455		¹ H-NMR (CDCl ₃) δ: 6.66 (1H, t, J = 72.5 Hz), 7.40-7.43 (4H, m), 7.52-7.59 (4H, m), 7.80 (1H, s), 7.85 (1H, s), 7.70 (1H, s), 7.95 (1H, s), 10.09 (1H, s).	Ref. Ex. 91
456		¹ H-NMR (CDCl ₃) δ: 6.63 (1H, t, J = 72.6 Hz), 7.36 (1H, s), 7.63-7.73 (3H, m), 7.82-7.98 (2H, m), 10.05 (1H, s).	Ref. Ex. 91

Ref. Ex. No.	STR	¹ H-NMR	ref.
447		¹ H-NMR (CDCl ₃) δ: 1.24 (6H, t, J = 7.1 Hz), 3.51-3.65 (4H, m), 5.10 (2H, s), 5.52 (1H, s), 6.83-6.95 (2H, m), 7.03 (1H, s), 7.38-7.48 (3H, m), 7.53 (1H, s).	Ref. Ex. 82
448		¹ H-NMR (CDCl ₃) δ: 5.16 (2H, s), 6.64-6.89 (1H, m), 6.97 (1H, d, J = 7.8 Hz), 7.05 (1H, s), 7.60 (1H, t, J = 7.6 Hz), 7.70 (1H, d, J = 7.6 Hz), 7.89 (1H, d, J = 7.6 Hz), 7.96 (1H, s), 10.06 (1H, s).	Ref. Ex. 151
449		¹ H-NMR (CDCl ₃) δ: 6.65 (1H, t, J = 72.6 Hz), 7.61-7.72 (4H, m), 7.79-7.87 (2H, m), 7.97 (1H, s), 10.09 (1H, s).	Ref. Ex. 91
450		¹ H-NMR (CDCl ₃) δ: 6.64 (1H, t, J = 72.7 Hz), 7.11-7.31 (2H, m), 7.45-7.65 (4H, m), 7.94 (1H, s), 10.08 (1H, s).	Ref. Ex. 91
451		¹ H-NMR (CDCl ₃) δ: 6.64 (1H, t, J = 72.8 Hz), 7.33-7.38 (2H, m), 7.58-7.68 (4H, m), 7.93 (1H, s), 10.07 (1H, s).	Ref. Ex. 91

[0487]

Ref. Ex. No.	STR	¹ H-NMR	ref.
475		¹ H-NMR (CDCl ₃) δ: 5.44 (2H, s), 7.53 (1H, s), 7.66 (1H, s), 7.82 (1H, s), 7.90-7.87 (2H, m), 8.02 (1H, s), 10.06 (1H, s).	Ref. Ex. 82
476		¹ H-NMR (CDCl ₃) δ: 2.36 (3H, s), 5.14 (2H, s), 7.19-7.31 (2H, m), 7.40 (1H, d, J = 7.3 Hz), 7.49 (1H, s), 7.58 (1H, s), 7.74 (1H, s), 10.02 (1H, s).	Ref. Ex. 82
477		¹ H-NMR (CDCl ₃) δ: 5.42 (2H, s), 7.31-7.36 (1H, m), 7.41-7.44 (2H, m), 7.53 (1H, s), 7.73 (1H, s), 7.79 (1H, s), 10.08 (1H, s).	Ref. Ex. 82
478		¹ H-NMR (DMSO-d ₆) δ: 5.41 (2H, s), 7.18-7.24 (2H, m), 7.33 (1H, s), 7.42-7.49 (2H, m), 8.11 (1H, s), 8.17-8.20 (2H, m), 9.80 (1H, s).	Ref. Ex. 82
479		¹ H-NMR (DMSO-d ₆) δ: 5.32 (2H, s), 7.16-7.23 (2H, m), 7.30 (1H, s), 7.43-7.46 (2H, m), 7.67-7.72 (2H, m), 8.17 (1H, s), 9.79 (1H, s).	Ref. Ex. 82
480		¹ H-NMR (CDCl ₃) δ: 5.28 (2H, s), 7.28-7.30 (1H, m), 7.48-7.53 (2H, m), 7.68 (1H, s), 7.80 (1H, s), 10.06 (1H, s).	Ref. Ex. 175

Ref. Ex. No.	STR	¹ H-NMR	ref.
468		¹ H-NMR (DMSO-d ₆) δ: 4.04 (2H, s), 7.16-7.21 (4H, m), 7.42 (1H, s), 7.58 (1H, s), 7.72 (1H, s), 9.94 (1H, s).	Ref. Ex. 112
469		¹ H-NMR (CDCl ₃) δ: 6.57 (1H, t, J = 73.5 Hz), 7.23-7.24 (2H, m), 7.59-7.63 (2H, m), 7.79-7.84 (2H, m), 7.94 (1H, s), 10.04 (1H, s).	Ref. Ex. 91
470		¹ H-NMR (CDCl ₃) δ: 4.39 (2H, s), 7.45 (1H, s), 7.65-7.70 (2H, m), 7.80 (1H, s), 7.88 (1H, d, J = 8.2 Hz), 8.04 (1H, s), 10.3 (1H, s).	Ref. Ex. 81, Ref. Ex. 75
471		¹ H-NMR (CDCl ₃) δ: 4.33 (2H, s), 7.19 (1H, d, J = 7.8 Hz), 7.44 (1H, t, J = 7.8 Hz), 7.51 (1H, t, J = 7.56 Hz), 7.66 (1H, s), 7.72 (1H, d, J = 7.6 Hz), 7.81 (1H, s), 8.01 (1H, s), 10.02 (1H, s).	Ref. Ex. 81, Ref. Ex. 75
472		¹ H-NMR (CDCl ₃) δ: 5.22 (2H, s), 7.51-7.55 (2H, m), 7.65-7.66 (2H, m), 7.73 (1H, s), 7.78 (1H, s), 10.02 (1H, s).	Ref. Ex. 82
473		¹ H-NMR (CDCl ₃) δ: 5.25 (2H, s), 7.23-7.28 (1H, m), 7.52 (1H, s), 7.64-7.68 (2H, m), 7.78 (1H, s), 7.83-7.85 (1H, m), 10.04 (1H, s).	Ref. Ex. 82
474		¹ H-NMR (CDCl ₃) δ: 5.21 (2H, s), 7.33-7.36 (2H, m), 7.51 (2H, s), 7.64 (1H, s), 7.78 (1H, s), 10.03 (1H, s).	Ref. Ex. 82

Ref. Ex. No.	STR	¹ H-NMR	ref.
462		¹ H-NMR (DMSO-d ₆) δ: 5.41 (2H, s), 7.13-7.17 (1H, m), 7.41-7.51 (2H, m), 7.79 (1H, d, J = 4.0 Hz), 8.06 (1H, d, J = 4.0 Hz), 8.11 (1H, s), 8.22 (2H, s), 9.92 (1H, s).	Ref. Ex. 82
463		¹ H-NMR (CDCl ₃) δ: 2.28 (3H, s), 7.10-7.15 (2H, m), 7.24-7.26 (1H, m), 7.53 (1H, s), 7.70 (1H, s), 7.87 (1H, s), 10.02 (1H, s).	Ref. Ex. 91
464		¹ H-NMR (CDCl ₃) δ: 7.37-7.48 (2H, m), 7.78 (1H, s), 7.88 (1H, s), 7.93 (1H, s), 10.04 (1H, s).	Ref. Ex. 91
465		¹ H-NMR (DMSO-d ₆) δ: 7.86 (1H, d, J = 8.4 Hz), 7.96 (1H, s), 8.11-8.19 (1H, m), 8.22-8.25 (2H, m), 8.29 (1H, s), 10.36 (1H, s).	Ref. Ex. 91
466		¹ H-NMR (CDCl ₃) δ: 5.76-6.13 (1H, m), 7.32-7.35 (2H, m), 7.60-7.64 (2H, m), 7.80-7.85 (2H, m), 7.95 (1H, s), 10.04 (1H, s).	Ref. Ex. 91
467		¹ H-NMR (CDCl ₃) δ: 7.31-7.37 (1H, m), 7.78-7.83 (2H, m), 7.88 (1H, s), 7.94 (1H, s), 10.05 (1H, s).	Ref. Ex. 91

DEMANDE OU BREVET VOLUMINEUX

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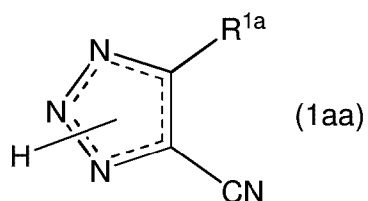
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CLAIMS

1. A cyanotriazole compound represented by the formula (1aa):



5 wherein

R^{1a} is one of the following (1-1) to (1-13):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of the following (1-1-1) to (1-1-36):

- 10 (1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-1-2) a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-1-3) a C₁₋₆ alkoxy C₁₋₆ alkyl group,
15 (1-1-4) a cycloalkyl group,
(1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl C₁₋₆ alkyl group,
(1-1-7) a cycloalkyl C₁₋₆ alkoxy group,
(1-1-8) a cycloalkyl C₁₋₆ alkoxy C₁₋₆ alkyl group,
20 (1-1-9) a halogen atom,
(1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted
25 with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl
30 group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group optionally

substituted with one or more halogen atoms; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,

(1-1-14) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-15) a phenoxy C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkoxy group; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

- (1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- 5 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with
- 10 one or more halogen atoms,
- (1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-27) a piperidyl group optionally substituted with one
- 15 or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
- (1-1-29) a benzofuryl group,
- 20 (1-1-30) a benzofuryl C₁₋₆ alkoxy group,
- (1-1-31) a thienyl group,
- (1-1-32) a benzothienyl group,
- (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
- 25 (1-1-34) an indolinyl C₁₋₆ alkyl group,
- (1-1-35) a benzothienylvinyl group, and
- (1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,
- 30 (1-2) a thiazolyl group substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):
- (1-2-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- 35 (1-2-2) a C₁₋₆ alkoxy group,
- (1-2-3) a cycloalkyl group,
- (1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-2-6) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-2-10) an N-C₁₋₆ alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
 (1-3-1) a C₁₋₆ alkyl group,
 (1-3-2) a cycloalkyl group, and
 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted

with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms, (1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):

(1-4-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-4-4) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-4-5) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following (1-5-1) to (1-5-2):

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):

(1-6-1) a C₁₋₆ alkyl group,

(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-6-3) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups

5 optionally substituted with one or more halogen atoms,

(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-3):

(1-7-1) a benzyloxy C₁₋₆ alkyl group optionally substituted

10 on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-7-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

15 (1-7-3) a benzofuryl group,

(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or

20 more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or

25 more members selected from the group consisting of the following (1-9-1) to (1-9-2):

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-9-2) a phenyl group optionally substituted with one or

30 more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-10-1) to (1-10-2):

(1-10-1) a halogen atom, and

35 (1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,

(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the
5 phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):

(1-12-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

10 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the
15 following (1-13-1) to (1-13-3):

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

(1-13-3) a piperidyl group;

provided that

20 5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;

25 5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;

30 5-{4-[2-(thiophen-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(benzofuran-2-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;

4-(4-methylphenyl)-5-cyano-1,2,3-triazole;

35 4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;

4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
 5 4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 10 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile;
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 4-(2-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dimethoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,6-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 15 4-(3-bromo-6-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2-chloro-6-fluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-methoxy-biphenyl-4-yl)-1H-1,2,3-triazole-5-
 carbonitrile;
 4-(4-trifluoromethoxyphenyl)-1H-1,2,3-triazole-5-
 20 carbonitrile;
 4-(4'-chlorobiphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(3-trifluoromethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4,6-trimethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 25 4-(2,6-difluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-(trifluoromethyl)biphenyl-4-yl)-1H-1,2,3-triazole-5-
 carbonitrile;
 4-(3,5-di-tert-butyl-2-methoxyphenyl)-1H-1,2,3-triazole-5-
 carbonitrile;
 30 4-(4'-methylbiphenyl-2-yl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4-ethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4-tert-butylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;
 5-(piperidin-1-yl)-1H-1,2,3-triazole-4-carbonitrile; and
 35 5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;
 are excluded,
 or a salt thereof.

2. The compound or salt according to claim 1, wherein R^{1a} is the following (1-1):

(1-1) a phenyl group substituted with one or more members
5 selected from the group consisting of the following (1-1-1) to (1-1-36):

- (1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- 10 (1-1-2) a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-3) a C₁₋₆ alkoxy C₁₋₆ alkyl group,
- (1-1-4) a cycloalkyl group,
- (1-1-5) a cycloalkoxy group,
- (1-1-6) a cycloalkyl C₁₋₆ alkyl group,
- 15 (1-1-7) a cycloalkyl C₁₋₆ alkoxy group,
- (1-1-8) a cycloalkyl C₁₋₆ alkoxy C₁₋₆ alkyl group,
- (1-1-9) a halogen atom,
- (1-1-10) a cyano group,
- (1-1-11) a phenyl group optionally substituted with one or
20 more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted
25 on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- (1-1-13) a styryl group optionally substituted on the
30 phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,
- 35 (1-1-14) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-15) a phenoxy C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkoxy group; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,

(1-1-18) a benzylthio C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkoxy groups optionally substituted with one or more halogen atoms,

(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-22) a pyridyl C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

- (1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted
5 on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-27) a piperidyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
10 (1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl C₁₋₆ alkoxy group,
(1-1-31) a thienyl group,
15 (1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,
(1-1-34) an indolinyl C₁₋₆ alkyl group,
(1-1-35) a benzothienylvinyl group, and
20 (1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms;

provided that

- 5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
25 5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
30 5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-carbonitrile;
4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
35 4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;

4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
 5 4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 10 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile;
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;
 4-(2-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dimethoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,6-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 15 4-(3-bromo-6-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2-chloro-6-fluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-methoxy-biphenyl-4-yl)-1H-1,2,3-triazole-5-
 carbonitrile;
 4-(4-trifluoromethoxyphenyl)-1H-1,2,3-triazole-5-
 20 carbonitrile;
 4-(4'-chlorobiphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(3-trifluoromethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(2,4,6-trimethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 25 4-(2,6-difluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4'-(trifluoromethyl)biphenyl-4-yl)-1H-1,2,3-triazole-5-
 carbonitrile;
 4-(3,5-di-tert-butyl-2-methoxyphenyl)-1H-1,2,3-triazole-5-
 carbonitrile;
 30 4-(4'-methylbiphenyl-2-yl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4-ethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
 4-(4-tert-butylphenyl)-1H-1,2,3-triazole-5-carbonitrile; and
 5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;
 are excluded,
 35 or a salt thereof.

3. The compound or salt or salt according to claim 1, wherein R^{1a} is one of the following (1-2) to (1-13):

(1-2) a thiazolyl group substituted with one or more members selected from the group consisting of the following (1-2-1)

5 to (1-2-11):

(1-2-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-2-2) a C₁₋₆ alkoxy group,

(1-2-3) a cycloalkyl group,

10 (1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group

15 optionally substituted with one or more halogen atoms,

(1-2-6) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a

20 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,

25 (1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

30 (1-2-10) an N-C₁₋₆ alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

35 (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the
5 following (1-3-1) to (1-3-3):
 (1-3-1) a C₁₋₆ alkyl group,
 (1-3-2) a cycloalkyl group, and
 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a
10 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-4) a thienyl group substituted with one or more members selected from the group consisting of the following (1-4-1)
15 to (1-4-5):
 (1-4-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a
20 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
25 (1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
 (1-4-4) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
30 (1-4-5) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of the following
35 (1-5-1) to (1-5-2):
 (1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

(1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

5 (1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the following (1-6-1) to (1-6-3):

(1-6-1) a C₁₋₆ alkyl group,

(1-6-2) a phenyl group optionally substituted with one or

10 more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and

(1-6-3) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups

15 optionally substituted with one or more halogen atoms,

(1-7) a pyridyl group substituted with one or more members selected from the group consisting of the following (1-7-1) to (1-7-3):

(1-7-1) a benzyloxy C₁₋₆ alkyl group optionally substituted

20 on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-7-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

25 (1-7-3) a benzofuryl group,

(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or

30 more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-8-2) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,

(1-9) an indolyl group optionally substituted with one or

35 more members selected from the group consisting of the following (1-9-1) to (1-9-2):

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms, and
(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,
5 (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of the following (1-10-1) to (1-10-2):
(1-10-1) a halogen atom, and
(1-10-2) a phenyl group optionally substituted with one or
10 more halogen atoms,
(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,
(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the
15 phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):
(1-12-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms; and
20 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the
25 following (1-13-1) to (1-13-3):
(1-13-1) a phenyl group,
(1-13-2) a pyrrolidinyl group, and
(1-13-3) a piperidyl group,
provided that
30 5-(piperidin-1-yl)-1H-1,2,3-triazole-4-carbonitrile; and
5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;
are excluded,
or a salt thereof.

35 4. The compound or salt according to claim 1, wherein R^{1a} is one of the following (1-1) to (1-7), (1-9), (1-10), (1-12) and (1-13):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of

- (1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- 5 (1-1-2) a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-9) a halogen atom,
- (1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a
- 10 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
- (1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from
- 15 the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
- (1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the
- 20 group consisting of a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,
- (1-1-14) a phenoxy group,
- 25 (1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- (1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more
- 30 halogen atoms,
- (1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
- 35 (1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

5 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with

10 one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one

15 or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-31) a thienyl group,

(1-1-32) a benzothienyl group,

(1-1-33) a benzo[1,3]dioxolyl group optionally substituted

20 with one or more halogen atoms,

(1-1-35) a benzothienylvinyl group, and

(1-1-36) a benzo[1,3]dioxolylvinyl group optionally substituted on the benzo[1,3]dioxole ring with one or more halogen atoms,

25 (1-2) a thiazolyl group substituted with one or more members selected from the group consisting of

(1-2-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-2-4) a halogen atom,

30 (1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms, and

35 (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a

halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of

5 (1-3-1) a C₁₋₆ alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted

10 with one or more halogen atoms,

(1-4) a thienyl group substituted with one or more members selected from the group consisting of

(1-4-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or

15 more halogen atoms,

(1-5) a furyl group optionally substituted with one or more members selected from the group consisting of

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and

20 (1-5-2) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-6) a pyrrolyl group optionally substituted with one or

25 more members selected from the group consisting of

(1-6-1) a C₁₋₆ alkyl group, and

(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted

30 with one or more halogen atoms,

(1-7) a pyridyl group substituted with one or more members selected from the group consisting of

(1-7-3) a benzofuryl group,

(1-9) an indolyl group optionally substituted with one or

35 more members selected from the group consisting of

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of

(1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

5 (1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

15 (1-13-3) a piperidyl group;

provided that

5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;

is excluded,

or a salt thereof.

20

5. The compound or salt according to claim 1, wherein R^{1a} is the following (1-1):

(1-1) a phenyl group substituted with one or more members selected from the group consisting of

25 (1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-2) a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

(1-1-9) a halogen atom,

30 (1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,

35 (1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl

group optionally substituted with one or more halogen atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a cyano group; and a halogen atom,
(1-1-14) a phenoxy group,
(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-27) a piperidyl group optionally substituted with one
 or more C₁₋₆ alkyl groups optionally substituted with one
 or more halogen atoms,
 (1-1-31) a thienyl group,
 5 (1-1-32) a benzothienyl group,
 (1-1-33) a benzo[1,3]dioxolyl group optionally substituted
 with one or more halogen atoms,
 (1-1-35) a benzothienylvinyl group, and
 (1-1-36) a benzo[1,3]dioxolylvinyl group optionally
 10 substituted on the benzo[1,3]dioxole ring with one or more
 halogen atoms;
 provided that
 5-(4-styrylphenyl)-1,2,3-triazole-4-carbonitrile;
 5-[4-(4-methylstyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 15 5-[4-(4-methoxystyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 5-[4-(3,4,5-trimethoxystyryl)phenyl]-1,2,3-triazole-4-
 carbonitrile;
 5-[4-(4-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 5-[4-(3-chlorostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 20 5-[4-(4-cyanostyryl)phenyl]-1,2,3-triazole-4-carbonitrile;
 5-{4-[2-(pyridin-4-yl)vinyl]phenyl}-1,2,3-triazole-4-
 carbonitrile;
 4-(4-methylphenyl)-5-cyano-1,2,3-triazole;
 4-(4-isopropylphenyl)-5-cyano-1,2,3-triazole;
 25 4-(4-methoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2,3-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4-dimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3,4,5-trimethoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(4-fluorophenyl)-5-cyano-1,2,3-triazole;
 30 4-(4-chlorophenyl)-5-cyano-1,2,3-triazole;
 4-(4-bromophenyl)-5-cyano-1,2,3-triazole;
 4-(4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-fluoro-4-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 35 4-(4-fluoro-3-phenoxyphenyl)-5-cyano-1,2,3-triazole;
 4-(2-fluorophenyl)-1,2,3-triazole-5-carbonitrile;
 4-(4-fluoro-3-methoxyphenyl)-1,2,3-triazole-5-carbonitrile;

4-(2-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(2,4-dimethoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(2,6-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(3-bromo-6-methoxyphenyl)-1H-1,2,3-triazole-5-carbonitrile;
5 4-(2-chloro-6-fluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(4'-methoxy-biphenyl-4-yl)-1H-1,2,3-triazole-5-
carbonitrile;
4-(4-trifluoromethoxyphenyl)-1H-1,2,3-triazole-5-
carbonitrile;
10 4-(4'-chlorobiphenyl-4-yl)-1H-1,2,3-triazole-5-carbonitrile;
4-(3-trifluoromethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(2,4-dichlorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(2,4,6-trimethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(2,6-difluorophenyl)-1H-1,2,3-triazole-5-carbonitrile;
15 4-(4'-(trifluoromethyl)biphenyl-4-yl)-1H-1,2,3-triazole-5-
carbonitrile;
4-(3,5-di-tert-butyl-2-methoxyphenyl)-1H-1,2,3-triazole-5-
carbonitrile;
4-(4'-methylbiphenyl-2-yl)-1H-1,2,3-triazole-5-carbonitrile;
20 4-(4-ethylphenyl)-1H-1,2,3-triazole-5-carbonitrile;
4-(4-tert-butylphenyl)-1H-1,2,3-triazole-5-carbonitrile; and
5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;
are excluded,
or a salt thereof.

25

6. The compound or salt according to claim 1, wherein R^{1a} is one of the following (1-2) to (1-7), (1-9), (1-10), (1-12) and (1-13):

(1-2) a thiazolyl group substituted with one or more members
30 selected from the group consisting of
 (1-2-1) a C₁₋₆ alkyl group optionally substituted with one
 or more halogen atoms,
 (1-2-4) a halogen atom,
 (1-2-5) a phenyl group optionally substituted with one or
35 more members selected from the group consisting of a
 halogen atom; a C₁₋₆ alkyl group optionally substituted

with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms, and (1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a
5 halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of
(1-3-1) a C₁₋₆ alkyl group,
10 (1-3-2) a cycloalkyl group, and
(1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
15 (1-4) a thienyl group substituted with one or more members selected from the group consisting of
(1-4-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
20 (1-5) a furyl group optionally substituted with one or more members selected from the group consisting of
(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
(1-5-2) a styryl group optionally substituted on the
25 phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of
30 (1-6-1) a C₁₋₆ alkyl group, and
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
35 (1-7) a pyridyl group substituted with one or more members selected from the group consisting of
(1-7-3) a benzofuryl group,

(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of

(1-9-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

5 (1-10) a benzofuryl group optionally substituted with one or more members selected from the group consisting of

(1-10-2) a phenyl group optionally substituted with one or more halogen atoms,

(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the
10 phenyl ring with one or more members selected from the group consisting of

(1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

15 (1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of

(1-13-1) a phenyl group,

(1-13-2) a pyrrolidyl group, and

(1-13-3) a piperidyl group,

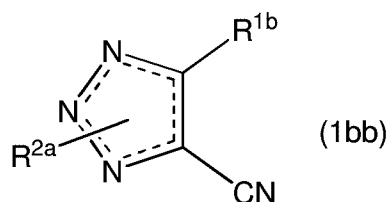
20 provided that

5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;

is excluded,

or a salt thereof.

25 7. A cyanotriazole compound represented by the formula (1bb):



wherein

R^{1b} is one of the following (1-1) to (1-13):

30 (1-1) a phenyl group optionally substituted with one or more members selected from the group consisting of the following

(1-1-1) to (1-1-34):

(1-1-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-1-2) a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-1-3) a C₁₋₆ alkoxy C₁₋₆ alkyl group,
(1-1-4) a cycloalkyl group,
5 (1-1-5) a cycloalkoxy group,
(1-1-6) a cycloalkyl C₁₋₆ alkyl group,
(1-1-7) a cycloalkyl C₁₋₆ alkoxy group,
(1-1-8) a cycloalkyl C₁₋₆ alkoxy C₁₋₆ alkyl group,
(1-1-9) a halogen atom,
10 (1-1-10) a cyano group,
(1-1-11) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group
15 optionally substituted with one or more halogen atoms,
(1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen
20 atoms,
(1-1-13) a styryl group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkoxy group; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; a
25 cyano group; and a halogen atom,
(1-1-14) a phenoxy group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-15) a phenoxy C₁₋₆ alkyl group optionally substituted
30 on the phenyl ring with one or more members selected from the group consisting of a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
35 (1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkoxy

group; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-1-17) a phenylthio group optionally substituted with one or more halogen atoms,
5 (1-1-18) a benzylthio C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkoxy groups optionally substituted with one or more halogen atoms,
(1-1-19) an N-C₁₋₆ alkyl-N-phenyl amino C₁₋₆ alkyl group
10 optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-20) an N-benzyl-N-C₁₋₆ alkyl amino group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen
15 atoms,
(1-1-21) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-22) a pyridyl C₁₋₆ alkyl group optionally substituted
20 on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more
25 halogen atoms,
(1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-25) a pyrimidinyl group optionally substituted with
30 one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
35 (1-1-27) a piperidyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-28) a benzoxazolyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-1-29) a benzofuryl group,
(1-1-30) a benzofuryl C₁₋₆ alkoxy group,
5 (1-1-31) a thienyl group,
(1-1-32) a benzothienyl group,
(1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms, and
(1-1-34) an indolinyl C₁₋₆ alkyl group,
10 (1-2) a thiazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-2-1) to (1-2-11):
(1-2-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
15 (1-2-2) a C₁₋₆ alkoxy group,
(1-2-3) a cycloalkyl group,
(1-2-4) a halogen atom,
(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a
20 halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
(1-2-6) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally
25 substituted with one or more halogen atoms,
(1-2-7) a phenoxy group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group
30 optionally substituted with one or more halogen atoms,
(1-2-8) a benzyloxy group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-2-9) a phenylthio group optionally substituted with one or more members selected from the group consisting of a
35 halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-2-10) an N-C₁₋₆ alkyl-N-phenyl amino group optionally substituted on the phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more
5 halogen atoms, and
(1-2-11) a pyridyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
10 (1-3) an oxazolyl group optionally substituted with one or more members selected from the group consisting of the following (1-3-1) to (1-3-3):
(1-3-1) a C₁₋₆ alkyl group,
(1-3-2) a cycloalkyl group, and
15 (1-3-3) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms,
20 (1-4) a thienyl group optionally substituted with one or more members selected from the group consisting of the following (1-4-1) to (1-4-5):
(1-4-1) a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
25 (1-4-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms; and a benzyloxy group optionally substituted on the phenyl ring with one or more
30 C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-4-3) a benzyl group optionally substituted on the phenyl ring with one or more halogen atoms,
(1-4-4) a phenoxy group optionally substituted with one or
35 more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

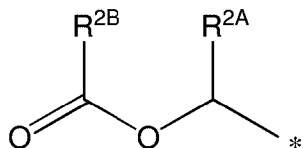
(1-4-5) a styryl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-5) a furyl group optionally substituted with one or more
5 members selected from the group consisting of the following (1-5-1) to (1-5-2):
(1-5-1) a phenyl group optionally substituted with one or more halogen atoms, and
(1-5-2) a styryl group optionally substituted on the
10 phenyl ring with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,
(1-6) a pyrrolyl group optionally substituted with one or more members selected from the group consisting of the
15 following (1-6-1) to (1-6-3):
(1-6-1) a C₁₋₆ alkyl group,
(1-6-2) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted
20 with one or more halogen atoms, and
(1-6-3) a phenyl C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-7) a pyridyl group optionally substituted with one or more
25 members selected from the group consisting of the following (1-7-1) to (1-7-2):
(1-7-1) a benzyloxy C₁₋₆ alkyl group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
30 (1-7-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,
(1-8) a piperidyl group optionally substituted with one or more members selected from the group consisting of the
35 following (1-8-1) to (1-8-2):

(1-8-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
(1-8-2) a benzyl group optionally substituted on the
5 phenyl ring with one or more halogen atoms,
(1-9) an indolyl group optionally substituted with one or more members selected from the group consisting of the following (1-9-1) to (1-9-2):
(1-9-1) a C₁₋₆ alkyl group optionally substituted with one
10 or more halogen atoms, and
(1-9-2) a phenyl group optionally substituted with one or more halogen atoms,
(1-10) a benzofuryl group optionally substituted with one or more phenyl groups optionally substituted with one or more
15 halogen atoms,
(1-11) a benzothienyl group optionally substituted with one or more phenyl groups optionally substituted with one or more halogen atoms,
(1-12) a phenyl C₁₋₆ alkyl group optionally substituted on the
20 phenyl ring with one or more members selected from the group consisting of the following (1-12-1) to (1-12-2):
(1-12-1) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
25 (1-12-2) a benzyloxy group optionally substituted on the phenyl ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and
(1-13) a pyrimidinyl group optionally substituted with one or more members selected from the group consisting of the
30 following (1-13-1) to (1-13-3):
(1-13-1) a phenyl group,
(1-13-2) a pyrrolidyl group, and
(1-13-3) a piperidyl group; and
R^{2a} is one of the following (2-1) to (2-3):
35 (2-1) a C₁₋₆ alkyl group optionally substituted with one or more members selected from the group consisting of a hydroxy group; and a phenyl group optionally substituted with one or

more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(2-2) a 2-oxo-1,3-dioxolanyl group, and

(2-3) a group represented by the formula:



wherein

* is a bonding site;

R^{2A} is one of the following (2A-1) to (2A-2):

(2A-1) a hydrogen atom, and

10 (2A-2) a C₁₋₆ alkyl group; and

R^{2B} is one of the following (2B-1) to (2B-6):

(2B-1) a C₁₋₆ alkoxy group optionally substituted with one or more members selected from the group consisting of a C₁₋₆ alkoxy group; a carboxy group; a C₁₋₆ alkoxy-carbonyl group; a hydroxy group; a phenyl C₁₋₆ alkoxy-carbonyl group; a C₂₋₆ alkenyloxy-carbonyl group; a morpholinyl group; a benzyloxycarbonyl group; and a tetrahydropyran-2-yloxy group,

(2B-2) a C₁₋₆ alkyl group;

20 (2B-3) a C₁₋₆ alkylamino group optionally substituted with one or more C₁₋₆ alkoxy-carbonyl groups;

(2B-4) a cycloalkyl group;

(2B-5) a cycloalkoxy group; and

(2B-6) a phenyl group;

25 provided that

1-methyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;

1-ethyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;

5-phenyl-1-propyl-1H-1,2,3-triazole-4-carbonitrile;

1-pentyl-5-phenyl-1H-1,2,3-triazole-4-carbonitrile;

30 5-(3-benzylphenyl)-1H-1,2,3-triazole-4-carbonitrile;

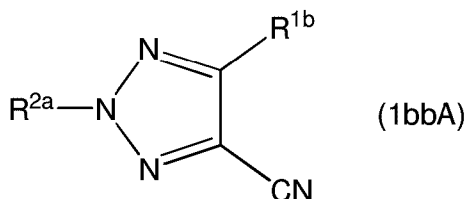
5-(piperidin-1-yl)-1H-1,2,3-triazole-4-carbonitrile;

5-(4-methoxyphenyl)-1-methyl-1H-1,2,3-triazole-4-carbonitrile; and

5-(furan-2-yl)-1H-1,2,3-triazole-4-carbonitrile;

are excluded,
or a salt thereof.

8. The cyanotriazole compound or salt according to claim 7,
5 which is a compound represented by the formula (1bbA):



wherein each symbol is as defined in claim 10,
or a salt thereof.

10 9. The cyanotriazole compound or salt according to claim 7
or 8, wherein

R^{1b} is one of the following (1-1) to (1-5):

(1-1) a phenyl group optionally substituted with one or more
members selected from:

- 15 (1-1-1) a C₁₋₆ alkyl group optionally substituted with one
or more halogen atoms,
(1-1-2) a C₁₋₆ alkoxy group optionally substituted with one
or more halogen atoms,
(1-1-9) a halogen atom,
20 (1-1-11) a phenyl group optionally substituted with one or
more C₁₋₆ alkoxy groups optionally substituted with one or
more halogen atoms,
(1-1-12) a phenyl C₁₋₆ alkyl group optionally substituted
on the phenyl ring with one or more halogen atoms,
25 (1-1-13) a styryl group optionally substituted on the
phenyl ring with one or more C₁₋₆ alkyl groups optionally
substituted with one or more halogen atoms,
(1-1-16) a phenyl C₁₋₆ alkoxy group optionally substituted
on the phenyl ring with one or more C₁₋₆ alkyl groups
30 optionally substituted with one or more halogen atoms,
(1-1-21) a pyridyl group optionally substituted with one
or more C₁₋₆ alkyl groups optionally substituted with one
or more halogen atoms,

(1-1-23) a pyridyloxy C₁₋₆ alkyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

5 (1-1-24) a pyridylvinyl group optionally substituted on the pyridine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-25) a pyrimidinyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with

10 one or more halogen atoms,

(1-1-26) a pyrimidinylvinyl group optionally substituted on the pyrimidine ring with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

(1-1-31) a thienyl group, and

15 (1-1-33) a benzo[1,3]dioxolyl group optionally substituted with one or more halogen atoms,

(1-2) a thiazolyl group optionally substituted with one or more members selected from:

(1-2-1) a C₁₋₆ alkyl group optionally substituted with one

20 or more halogen atoms,

(1-2-4) a halogen atom,

(1-2-5) a phenyl group optionally substituted with one or more members selected from the group consisting of a halogen atom; a C₁₋₆ alkyl group optionally substituted

25 with one or more halogen atoms; and a C₁₋₆ alkoxy group optionally substituted with one or more halogen atoms, and

(1-2-11) a pyridyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms,

30 (1-3) an oxazolyl group optionally substituted with one or more members selected from:

(1-3-1) a C₁₋₆ alkyl group,

(1-3-2) a cycloalkyl group, and

(1-3-3) a phenyl group optionally substituted with one or

35 more members selected from the group consisting of a halogen atom; and a C₁₋₆ alkyl group optionally substituted with one or more halogen atoms,

(1-4) a thienyl group optionally substituted with one or more members selected from:

(1-4-2) a phenyl group optionally substituted with one or more C₁₋₆ alkyl groups optionally substituted with one or more halogen atoms, and

(1-5) a furyl group optionally substituted with one or more members selected from:

(1-5-1) a phenyl group optionally substituted with one or more halogen atoms; and

R^{2a} is one of the following groups:

a 1-(((2-carboxy-2,2-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-carboxy-1,1-dimethylethoxy)carbonyl)oxy)ethyl group;

a 1-(((2-hydroxyethoxy)carbonyl)oxy)ethyl group;

a 1-(butyryloxy)ethyl group;

a 1-(isobutyryloxy)ethyl group;

an acetoxymethyl group; and

a butyryloxymethyl group,

or a salt thereof.

10. The cyanotriazole compound of any one of claims 1 to 9 which is selected from the group consisting of following compounds:

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile,

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,

5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,

5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile,

5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-[1,2,3]triazole-4-carbonitrile,

5-[3-trifluoromethyl-5-(6-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-[1,2,3]triazole-4-carbonitrile,

5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-[1,2,3]triazole-4-carbonitrile,

5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-[3-methyl-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 20 [1,2,3]triazole-4-carbonitrile,
 5-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-4'-trifluoromethoxy-biphenyl-3-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-cyano-phenyl)-vinyl]-phenyl}-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,

5-{3-chloro-5-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(*E*)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5 5-{3-[(*E*)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(5-trifluoromethyl-pyridin-3-yl)-vinyl]-phenyl}-
 10 1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 15 5-{3-[(*E*)-2-(4-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(*E*)-2-(6-trifluoromethyl-pyridin-2-
 yl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(*E*)-2-(6-trifluoromethyl-pyridin-2-
 20 yl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(*E*)-2-(6-trifluoromethyl-pyridin-2-
 yl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 25 5-{3-[(*E*)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(*E*)-2-(4-trifluoromethyl-pyrimidin-2-yl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yloxymethyl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,

5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-phenyl)-thiazol-4-yl]-3H-[1,2,3]triazole-4-
 carbonitrile,
 5-[2-(4-chloro-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazole-4-
 carbonitrile,
 15 5-[2-(4-chloro-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-4-
 carbonitrile,
 5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-3H-[1,2,3]triazole-
 4-carbonitrile,
 5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-2H-[1,2,3]triazole-
 20 4-carbonitrile,
 5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-1H-[1,2,3]triazole-
 4-carbonitrile,
 5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,

5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[5-methyl-2-(4-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-[2-(4-chloro-phenyl)-5-ethyl-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-
 3H-[1,2,3]triazole-4-carbonitrile,
 5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-
 20 2H-[1,2,3]triazole-4-carbonitrile,
 5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-thiazol-4-yl]-
 1H-[1,2,3]triazole-4-carbonitrile,
 5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-
 30 3H-[1,2,3]triazole-4-carbonitrile,
 5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-
 2H-[1,2,3]triazole-4-carbonitrile,
 5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-oxazol-4-yl]-
 1H-[1,2,3]triazole-4-carbonitrile,
 35 5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,

5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-furan-2-yl}-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-[1-(4,4,4-trifluoro-butyl)-1H-indol-6-yl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-3H-[1,2,3]triazole-4-
 carbonitrile,
 5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-2H-[1,2,3]triazole-4-
 20 carbonitrile,
 5-[6-(4-fluoro-phenyl)-benzofuran-2-yl]-1H-[1,2,3]triazole-4-
 carbonitrile,
 5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5'-fluoro-3'-trifluoromethyl-biphenyl-3-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-3',5'-bis-trifluoromethyl-biphenyl-3-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-3H-
 [1,2,3]triazole-4-carbonitrile,

5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(5-chloro-3'-fluoro-4'-trifluoromethoxy-biphenyl-3-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(3'-fluoro-5,4'-bis-trifluoromethoxy-biphenyl-3-yl)-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-[3-(3,4-bis-trifluoromethyl-benzyloxy)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-
 phenyl]-3H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-
 20 phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(2,5-bis-trifluoromethyl-benzyloxy)-5-trifluoromethoxy-
 phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 25 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-2-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-methyl-phenyl)-vinyl]-phenyl}-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,

5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3,5-bis-trifluoromethyl-phenyl)-vinyl]-5-chloro-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 15 5-{3-[(E)-2-(4-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 20 5-{3-trifluoromethyl-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 25 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 30 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-methyl-phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 35 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-phenyl}-3H-[1,2,3]triazole-4-carbonitrile,

5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-5-trifluoromethoxy-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-phenyl)-vinyl]-phenyl}-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 15 5-{3-ethoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-
 20 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-5-trifluoromethyl-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,4-difluoro-phenyl)-vinyl]-phenyl}-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-
 30 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-chloro-5-[(E)-2-(3-trifluoromethoxy-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 35 5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,

5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-methoxy-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(3-fluoro-5-trifluoromethyl-phenyl)-vinyl]-
 10 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 15 5-{3-[(E)-2-(4-fluoro-3-trifluoromethyl-phenyl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-2H-
 20 [1,2,3]triazole-4-carbonitrile,
 5-(3-benzo[b]thiophen-2-yl-5-chloro-phenyl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(4-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-5-(5-trifluoromethyl-pyridin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,

5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-
 phenyl]-3H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-
 phenyl]-2H-[1,2,3]triazole-4-carbonitrile,
 5-[3-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-5-trifluoromethoxy-
 10 phenyl]-1H-[1,2,3]triazole-4-carbonitrile,
 5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-[3-ethoxy-5-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-2H-
 20 [1,2,3]triazole-4-carbonitrile,
 5-[3-methyl-4-(4-trifluoromethyl-pyrimidin-2-yl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[3-((E)-2-benzo[b]thiophen-2-yl-vinyl)-phenyl]-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 30 phenyl}-3H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 phenyl}-2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-vinyl]-
 phenyl}-1H-[1,2,3]triazole-4-carbonitrile,
 35 5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 3H-[1,2,3]triazole-4-carbonitrile,

5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 2H-[1,2,3]triazole-4-carbonitrile,
 5-{3-[(E)-2-(6-trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-
 1H-[1,2,3]triazole-4-carbonitrile,
 5 [5- [2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-[2-(4-chloro-2-fluoro-phenyl)-5-ethyl-thiazol-4-yl]-1H-
 10 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-3H-
 [1,2,3]triazole-4-carbonitrile,
 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-2H-
 [1,2,3]triazole-4-carbonitrile,
 15 5-{5-[(E)-2-(4-fluoro-phenyl)-vinyl]-furan-2-yl}-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-3H-[1,2,3]triazole-4-
 carbonitrile,
 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-2H-[1,2,3]triazole-4-
 20 carbonitrile,
 5-(6-(benzofuran-2-yl)-pyridin-2-yl)-1H-[1,2,3]triazole-4-
 carbonitrile,
 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-3H-
 [1,2,3]triazole-4-carbonitrile,
 25 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(2-phenyl-6-(piperidin-1-yl)-pyrimidin-4-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-3H-
 30 [1,2,3]triazole-4-carbonitrile,
 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-2H-
 [1,2,3]triazole-4-carbonitrile,
 5-(2-phenyl-6-(pyrrolidin-1-yl)-pyrimidin-4-yl)-1H-
 [1,2,3]triazole-4-carbonitrile,
 35 3-(1-{4-[3-(2,5-bis-trifluoromethyl-benzyloxy)-phenyl]-5-
 cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,

3-(1-{4-[3-chloro-5-(2,2-difluoro-benzo[1,3]dioxol-5-yl)-
 phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-
 2,2-dimethyl-propionic acid,
 3-(1-{4-[3-chloro-5-(4-trifluoromethyl-pyrimidin-2-yl)-
 5 phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-
 2,2-dimethyl-propionic acid,
 3-[1-(4-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-vinyl]-
 phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-
 2,2-dimethyl-propionic acid,
 10 3-(1-{4-cyano-5-[3-methoxy-5-(4-trifluoromethyl-pyridin-2-
 yl)-phenyl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 3-[1-(4-cyano-5-{3-trifluoromethyl-5-[(E)-2-(6-
 trifluoromethyl-pyridin-2-yl)-vinyl]-phenyl}-2H-
 15 [1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-2,2-dimethyl-
 propionic acid,
 3-(1-{4-[2-(4-chloro-phenyl)-thiazol-4-yl]-5-cyano-2H-
 [1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-
 propionic acid,
 20 3-[1-(4-cyano-5-{3-[(E)-2-(4-trifluoromethyl-pyridin-2-yl)-
 vinyl]-phenyl]-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-
 2,2-dimethyl-propionic acid,
 3-[1-(4-cyano-5-{3-[(E)-2-(4-trifluoromethyl-pyrimidin-2-yl)-
 vinyl]-phenyl]-2H-[1,2,3]triazol-2-yl)-ethoxycarbonyloxy]-
 25 2,2-dimethyl-propionic acid,
 3-(1-{4-[5-chloro-2-(3-trifluoromethyl-phenyl)-thiazol-4-yl]-
 5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 3-(1-{4-cyano-5-[2-(3-trifluoromethoxy-phenyl)-thiazol-4-yl]-
 30 2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-
 propionic acid,
 3-(1-{4-cyano-5-[2-(3,4-dichloro-phenyl)-thiazol-4-yl]-2H-
 [1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-dimethyl-
 propionic acid,
 35 3-(1-{4-cyano-5-[5-methyl-2-(4-trifluoromethyl-phenyl)-
 thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,

3-(1-{4-[2-(4-chloro-phenyl)-5-isopropyl-oxazol-4-yl]-5-
 cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 3-(1-{4-[2-(3-chloro-4-fluoro-phenyl)-5-methyl-thiazol-4-yl]-
 5 5-cyano-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 3-(1-{4-cyano-5-[5-cyclopropyl-2-(3-trifluoromethyl-phenyl)-
 oxazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 10 3-(1-{4-cyano-5-[3-methyl-5-(6-trifluoromethyl-pyridin-3-yl)-
 phenyl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 dimethyl-propionic acid,
 3-(1-{4-cyano-5-[5-ethyl-2-(5-trifluoromethyl-pyridin-2-yl)-
 thiazol-4-yl]-2H-[1,2,3]triazol-2-yl}-ethoxycarbonyloxy)-2,2-
 15 dimethyl-propionic acid,
 3-(1-{4-[3-(2,5-bis-trifluoromethylbenzyloxy)phenyl]-5-cyano-
 2H-[1,2,3]triazol-2-yl}ethoxycarbonyloxy)-3-methylbutyric
 acid,
 carbonic acid 1-{4-[3-(2,5-bis-trifluoromethylbenzyloxy)
 20 phenyl]-5-cyano-2H-[1,2,3]triazol-2-yl}ethyl ester -2-
 hydroxyethyl ester,
 acetic acid 4-cyano-5-[3-methyl-5-(4-
 trifluoromethylpyrimidin-2-yl)phenyl]-2H-[1,2,3]triazol-2-
 ylmethyl ester,
 25 acetic acid 4-{3-chloro-5-[(E)-2-(3-trifluoromethylphenyl)
 vinyl]phenyl}-5-cyano-2H-[1,2,3]triazol-2-ylmethyl ester, and
 butyric acid 4-{3-chloro-5-[(E)-2-(3-trifluoromethyl-phenyl)-
 vinyl]-phenyl}-5-cyano-2H-[1,2,3]triazol-2-ylmethyl ester,
 or a salt thereof.

30

11. A prophylactic and/or therapeutic agent for a disease or
 a disorder on which citric acid cycle activation and/or
 improvement of hyperglycemia has a prophylactic and/or
 therapeutic effect, comprising, as the active ingredient, the
 35 cyanotriazole compound or salt according to any one of
 claims 1 to 6.

12. The prophylactic and/or therapeutic agent according to claim 11, wherein the disease or disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect is selected from the group consisting of diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, athrosclerosis and cardiovascular disease.
13. The cyanotriazole compound or salt according to any one of claims 1 to 6 for use as a prophylactic and/or therapeutic agent for a disease or a disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect.
14. The cyanotriazole compound or salt for use according to claim 13, wherein the disease or disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect is selected from the group consisting of diabetes, impaired glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, athrosclerosis and cardiovascular disease.
15. Use of the cyanotriazole compound or salt according to any one of claims 1 to 6 for the manufacture of a prophylactic and/or therapeutic agent for a disease or a disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect.
16. Use of claim 15, wherein the disease or disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect is selected from the group consisting of diabetes, impaired glucose tolerance, insulin resistance, diabetic

complications, obesity, dyslipidemia, hepatic steatosis, athrosclerosis and cardiovascular disease.

17. Use, to prevent and/or treat a disease or a disorder in a
5 patient on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect, of an effective amount of the cyanotriazole compound or salt according to any one of claims 1 to 6.

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18. The use of claim 17, wherein the disease or disorder on which citric acid cycle activation and/or improvement of hyperglycemia has a prophylactic and/or therapeutic effect is selected from the group consisting of diabetes, impaired
15 glucose tolerance, insulin resistance, diabetic complications, obesity, dyslipidemia, hepatic steatosis, athrosclerosis and cardiovascular disease.

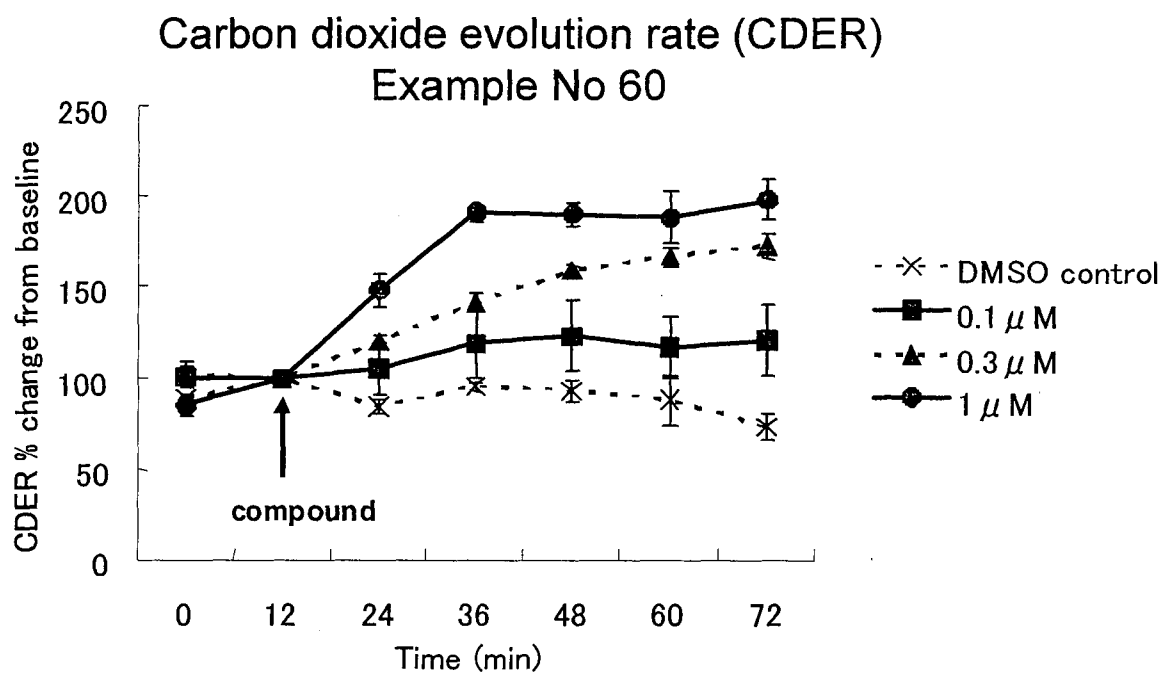
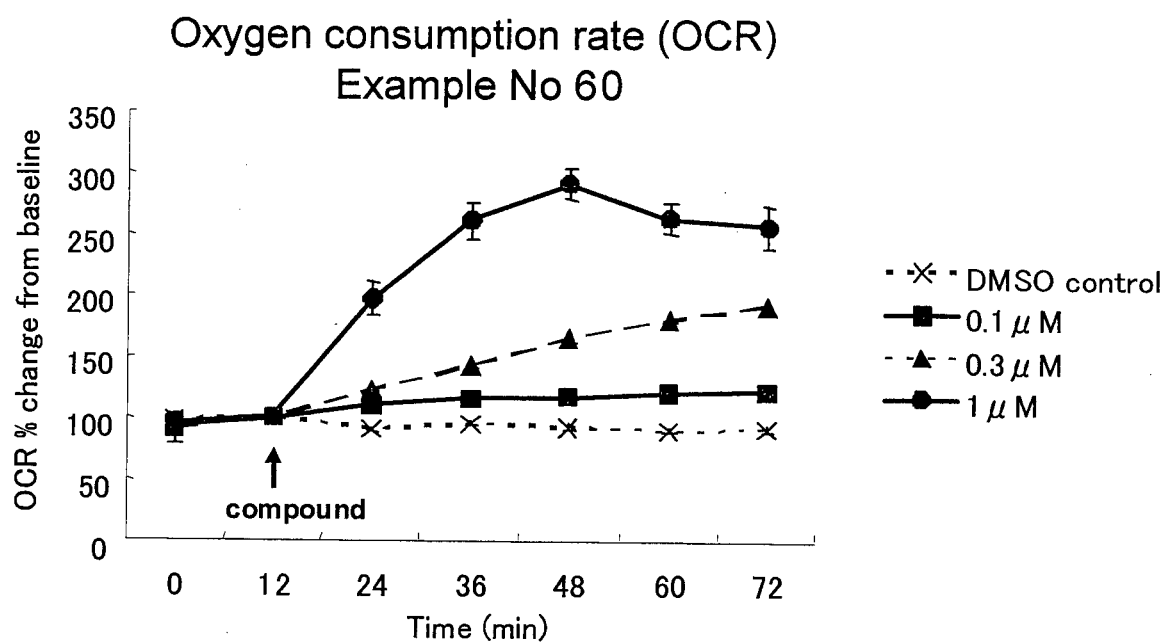
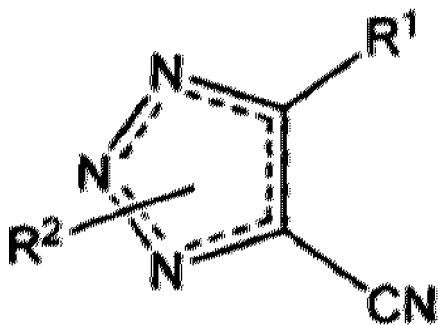
Figure 1

Figure 2



(1)