

Even pregabalin, duloxetine and milnacipran, which have been approved as therapeutic agents for fibromyalgia syndrome, fail to provide clinically satisfactory therapeutic effect against fibromyalgia syndrome and their drug efficacy significantly varies among patients. In the context, it has been strongly desired to develop a novel therapeutic agent for fibromyalgia syndrome having a strong pharmacological activity and exerting a therapeutic effect on a wide variety of patients.

[0010]

Note that, Patent Literature 1 suggests that the substituted piperidines described therein have an efficacy for migraine and Patent Literature 4 discloses that the imidazole derivative described therein has an analgesic action. However, neither disclosure of the compound itself having an analgesic action and found by the present application nor suggestion on the relevancy of an analgesic action to a chemical structure is provided. Patent Literature 2 which describes imidazole derivatives and Patent Literature 3 which describes substituted piperidines neither disclose nor suggest potentiality of analgesic action that these compounds have.

[0011]

In the circumstances, an object of the present invention is to provide a compound having an analgesic action for pain, in particular, neuropathic pain and/or fibromyalgia syndrome.

Solution to Problem

[0012]

The present inventors intensively conducted studies with a view to solving the aforementioned problems. As a result, they found a cyclic amine derivative having a strong analgesic effect against pain, in particular, neuropathic pain and/or fibromyalgia syndrome.

[0013]

More specifically, in one aspect, the present invention provides a cyclic amine derivative represented by the following general formula (I) or a pharmacologically acceptable salt thereof.

[Formula 1]

marked with * is S, in which R¹ is more preferably a methyl group or an ethyl group optionally substituted with a fluorine atom and further preferably a methyl group, an ethyl group, a difluoromethyl group or a 2,2,2-trifluoroethyl group. Analgesic action can be further enhanced by defining as mentioned above.

[0017]

The present disclosure also provides a medicine containing a cyclic amine derivative represented by the above general formula (I), or a pharmacologically acceptable salt thereof as an active ingredient.

[0018]

The medicine is preferably an analgesic agent, and particularly preferably a therapeutic agent for neuropathic pain or a therapeutic agent for fibromyalgia syndrome.

[0018a]

In another aspect, the present invention provides an agent comprising the cyclic amine derivative or a pharmacologically acceptable salt thereof as described herein for use as an analgesic.

[0019]

The present disclosure also provides a pharmaceutical composition containing a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof and e.g., a pharmacologically acceptable excipient.

[0020]

The present disclosure also provides a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof for use as a medicine.

[0021]

The present disclosure also provides a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof for use in pain treatment. The pain is preferably neuropathic pain or fibromyalgia syndrome.

[0022]

The present disclosure also provides use of a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof for treating pain. The pain is preferably neuropathic pain or fibromyalgia syndrome.

[0023]

The present disclosure also provides use of a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof in producing a medicine for treating pain. The pain is preferably neuropathic pain or fibromyalgia syndrome.

[0023a]

In yet another aspect, the present invention provides use of the cyclic amine derivative or a pharmacologically acceptable salt thereof as described herein in the manufacture of a medicament for treating neuropathic pain. In yet another aspect, the present invention provides use of the cyclic amine derivative or a pharmacologically acceptable salt thereof as described herein in the manufacture of a medicament for treating fibromyalgia syndrome.

[0024]

The present disclosure also provides a method for treating pain including administering a therapeutically effective amount of a cyclic amine derivative represented by the above general formula (I) or a pharmacologically acceptable salt thereof to a patient in need thereof. The pain is preferably neuropathic pain or fibromyalgia syndrome.

Advantageous Effects of Invention

[0025]

The cyclic amine derivative of the present invention or a pharmacologically acceptable salt thereof has a strong analgesic effect against pain, in particular, neuropathic pain and fibromyalgia syndrome.

Brief Description of Drawings

[0026]

[Figure 1] Figure 1 is a graph showing the effect of the compound of Example 1 in a mouse partial sciatic nerve ligation model (oral administration).

[Figure 2] Figure 2 is a graph showing the effect of the compound of Example 2 in a mouse partial sciatic nerve ligation model (oral administration).

[Figure 3] Figure 3 is a graph showing the effect of the compound of Example 3 in a mouse partial sciatic nerve ligation model (oral administration).

[Figure 4] Figure 4 is a graph showing the effect of the compound of Example 4 in a mouse partial sciatic nerve ligation model (oral administration).

[Figure 5] Figure 5 is a graph showing the effect of the compound of Example 5 in a mouse partial sciatic nerve ligation model (oral administration).

[Figure 6] Figure 6 is a graph showing the effect of the compound of Example 7 in a mouse partial sciatic nerve ligation model (oral administration).

The cyclic amine derivative or a pharmacologically acceptable salt thereof according to Claim 1, wherein A is a group represented by the general formula (IIa) and the stereochemical configuration of the asymmetric carbon marked with * is S.

[Claim 5]

The cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 4, wherein R¹ represents a methyl group or an ethyl group optionally substituted with a fluorine atom.

[Claim 6]

The cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 4, wherein R¹ is a methyl group, an ethyl group, a difluoromethyl group or a 2,2,2-trifluoroethyl group.

[Claim 7]

A medicine comprising the cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 6 as an active ingredient.

[Claim 8]

An agent comprising the cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 6 for use as an analgesic.

[Claim 9]

Use of the cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 6 in the manufacture of a medicament for treating neuropathic pain.

[Claim 10]

Use of the cyclic amine derivative or a pharmacologically acceptable salt thereof according to any one of Claims 1 to 6 in the manufacture of a medicament for treating fibromyalgia syndrome.