There however still remains a need for effective drugs and methods of treatment for primary as well as recurrent herpes infections.

B-220 was disclosed for the first time in the PCT application published as WO87/04436, which showed the antiviral effect of a number of indoloquinoxalines against herpes simplex virus of both type 1 and 2. The antiviral effect was shown by injecting the test substance in mice receiving also an intracerebral injection of the virus.

The antiviral activity of B-220 against human cytomegalovirus has also been mentioned in the PCT application published as WO07/084073, where B-220 is used as a reference compound in a modified plaque assay.

Summary ~~of the invention~~

It has now been found that primary and recurrent herpes virus infections can be surprisingly effectively treated by topical administration of B-220.

The ~~invention~~present disclosure therefore relates to a pharmaceutical composition for topical administration comprising 2,3-dimethyl-6-(N,N-dimethylaminoethyl)-6H-indolo-(2,3-b)quinoxaline (B-220) or a pharmaceutically acceptable salt thereof in a pharmaceutically acceptable carrier.

The composition of the ~~invention~~present disclosure is useful for topical administration to a mammal subject suffering from a primary or recurrent herpes virus infection, especially of oral-facial type.

In one embodiment, the pharmaceutical composition of the ~~invention~~present disclosure additionally comprises at least one additional therapeutically active ingredient suitable for topical administration.

In an aspect, there is provided the use of the compound 2,3-dimethyl-6-(N,N-dimethylaminoethyl)-6H-indolo-(2,3-b)quinoxaline (B-220) or a pharmaceutically acceptable salt in the manufacture of a medicament for the treatment of herpes virus infections of the skin or mucous membranes in a mammal subject, wherein a therapeutically effective dose of the medicament is to be topically administered to the skin or mucous membrane of the mammal subject.

According to one ~~aspect~~embodiment, the ~~invention~~present disclosure relates to B-220 or a pharmaceutically acceptable salt thereof for use in the treatment of herpes virus infections of the skin or mucous membranes in a mammal subject by topical administration of a therapeutically effective dose thereof to the skin and/or mucous membrane of the mammal subject.

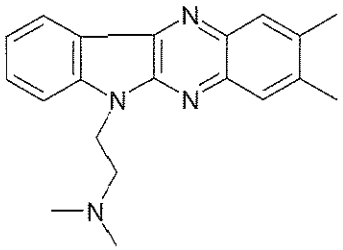
In one embodiment, the ~~invention~~present disclosure relates to B-220 or a pharmaceutically acceptable salt thereof is used in combination with at least one additional pharmaceutically active ingredient suitable for topical administration.

According to another ~~aspect~~embodiment, the ~~invention~~present disclosure relates to a method of prophylactic and/or curative treatment of herpes virus infections of the skin or mucous membranes in a mammal subject comprising topical administration of a therapeutically effective dose of B-220 or a pharmaceutically acceptable salt thereof.

In one embodiment, the method also comprises topical administration, in combination or in sequence, of at least one additional pharmaceutically active ingredient suitable for topical administration, e.g. selected from antiviral agents, antibiotics, anaesthetic agents, analgesic agents, antiphlogistic agents, and anti-inflammatory agents.

Detailed description of the invention

B-220, i.e. 2,3-dimethyl-6-(N,N-dimethylaminoethyl)-6H-indolo-(2,3-b)quinoxaline, has the structural formula



and may be prepared e.g. as described in WO87/04436, the contents of which is incorporated herein by reference.

Pharmaceutically acceptable salts of B-220 may be formed using any organic or inorganic, pharmaceutically acceptable acid, such as are well-known to the person of ordinary skill in the art. Pharmaceutically acceptable acid addition salts according to the invention are salts that are safe and effective for topical use in mammals and that possess the desired biological activity, e.g. hydrochloride, hydrobromide, hydroiodide, nitrate, sulfate, bisulfate, phosphate, acid phosphate, isonicotinate, acetate, lactate, salicylate, citrate, tartrate, pantothenate, bitartrate, ascorbate, succinate, maleate, gentisinate, fumarate, gluconate, glucaronate, saccharate, for-

Claims

1. Use of the compound 2,3-dimethyl-6-(N,N-dimethylaminoethyl)-6H-indolo-(2,3-b)quinoxaline (B-220) or a pharmaceutically acceptable salt in the manufacture of a medicament for the treatment of herpes virus infections of the skin or mucous membranes in a mammal subject, wherein a therapeutically effective dose of the medicament is to be topically administered to the skin or mucous membrane of the mammal subject.

2. The use according to claim 1, wherein the medicament comprises B-220 in an amount of 0.1-10% (w/w).

3. The use according to claim 1, wherein the medicament comprises B-220 in an amount of 0.5-5% (w/w).

4. The use according to any one of the claims 1-3, wherein the medicament comprises at least one additional therapeutically active ingredient.

5. The use according to claim 4, wherein the additional therapeutically active ingredient is selected from antiviral agents, antibiotics, analgesics, anaesthetic agents, antiphlogistic agents and antiinflammatory agents.

6. The use according to claim 5, wherein the additional therapeutically active ingredient is an antiphlogistic agent.

7. The use according to claim 5, wherein the additional therapeutically active ingredient is an antiinflammatory agent.

8. The use according to any one of the claims 4-7, wherein the additional therapeutically active agent is present in an amount of 0.005-5% (w/w).

9. The use according to any one of the claims 1-8, wherein the medicament is for dermal or mucosal treatment.

10. The use according to any one of the claims 1-9, wherein the medicament is in the form of a cream, liquid, lotion, gel, spray, foam or ointment.

11. The use according to any one of the claims 1-10, wherein the medicament is provided in a patch, stick, spray dispenser, tube, or pen.

Claims

1. Use of the compound 2,3-dimethyl-6-(N,N-dimethylaminoethyl)-6H-indolo-(2,3-b)quinoxaline (B-220) or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for the treatment of herpes virus infections of the skin or mucous membranes in a mammal subject, wherein a therapeutically effective dose of the medicament is to be topically administered to the skin or mucous membrane of the mammal subject.

2. The use according to claim 1, wherein the medicament comprises B-220 in an amount of 0.1-10% (w/w).

3. The use according to claim 1, wherein the medicament comprises B-220 in an amount of 0.5-5% (w/w).

4. The use according to any one of claims 1 to 3, comprising at least one additional therapeutically active ingredient.

5. The use according to claim 4, wherein the additional therapeutically active ingredient is selected from antiviral agents, antibiotics, analgesics, anaesthetic agents, antiphlogistic agents and antiinflammatory agents.

6. The use according to claim 5, wherein the additional therapeutically active ingredient is an antiphlogistic agent.

7. The use according to claim 5, wherein the additional therapeutically active ingredient is an antiinflammatory agent.

8. The use according to any one of claims 4 to 7, wherein the additional therapeutically active agent is present in an amount of 0.005-5%) (w/w).

9. The use according to any one of claims 1 to 8, wherein the medicament is for dermal or mucosal treatment.

10. The use according to any one of claims 1 to 10, in the form of a cream, liquid, lotion, gel, spray, foam or ointment.

11. The use according to any one of claims 1 to 10, wherein the medicament is provided in a patch, stick, spray dispenser, tube, or pen.