Pharmaceuticals 09

Antiallergic effect of rare sugars (suppression of T lymphocyte proliferation)
(Keywords: D-Psicose, D-Allose, Antiallely, Suppression of T lymphocyte proliferation)

Outline of technology

Presently, with changes in our environment and diet, new immunopathological diseases, which are primarily allergic diseases, are increasing. Particularly, atopic dermatitis and nasal allergy in children have shown marked increases. While new agents have been developed one after another to cope with increasing immunopathological disorders, there is as yet no agent satisfactory regarding the efficacy and adverse effects.

This technology aims to provide “agents” and “foods for specified health uses” for immunopathological disorders caused by T lymphocyte abnormalities by evaluating the effects of rare sugars on T lymphocytes biology, which plays an important role of homeostasis in immune-system.

T lymphocytes proliferate primarily through T cell receptors stimulation. Since DNA synthesis occurs in T cell proliferation, we evaluated the effects of rare sugars (D-allose, D-psicose (135 mM)) on proliferation activities of lymphocytes, particularly in T lymphocytes (2×10^6 cells), using the thymidine uptake as a marker of DNA synthesis. As a result, D-allose and D-psicose were found to suppress the activation of T lymphocytes by inhibiting their thymidine uptake and to produce an immunosuppressive effect by acting on CD4+ T lymphocytes, which bear a central role in the immune-system.

Sales points

Since rare sugars have no adverse effects, drugs with different action mechanisms compared with existing immunosuppressants can be provided.

Expected application fields and products

(1) Drugs
(2) Sweeteners
(3) Food additives
(4) Healthy foods and beverages
(5) Feeds
(6) Cosmetics

Comparison with existing products

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immunosuppressive effect</td>
<td>Adverse effects (estimated)</td>
</tr>
<tr>
<td>D-Psicose</td>
<td>Observed</td>
<td>Few</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>None</td>
<td>Few</td>
</tr>
<tr>
<td>Steroids</td>
<td>Observed</td>
<td>Many</td>
</tr>
</tbody>
</table>

References, patents, etc.

Related industrial property rights: Kokai number (2005) 263744

Other matters to note

(Developer’s comment)

Rare sugars (D-allose, D-psicose) clearly exert effects on the kinetics of CD4+ T lymphocytes, which are the center of immune responses. They are considered to not only control their activities but also have other effects such as those on the cytokine production. They are expected to be effective for the modulation of immunological abnormal responses under stress as well as control of allergy.

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