SUPPRESSION OF EXPERIMENTAL CONTACT DERMATITIS IN GUINEA PIGS WITH SPIRASIDINE

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Spirasidine was found to suppress the development of experimental dermatitis caused by 2,4-dinitrochlorobenzene.

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Because of the increasing frequency of allergic reactions to drugs and other substances of low molecular weight, many studies of the antigenic properties of these simple chemical compounds have recently been undertaken [1-6].

Allergic reactions to drugs are similar in their manifestations to reactions to macromolecular antigens [2].

Sensitization to drugs and to substances with low molecular weight provides an experimental model for studying the mechanism of allergic reactivity of delayed type and the possibility of suppressing these reactions by the use of pharmacological agents.

In this investigation the effect of spirasidine, synthesized in the USSR, on dermatitis caused by 2,4-dinitrochlorobenzene was studied.

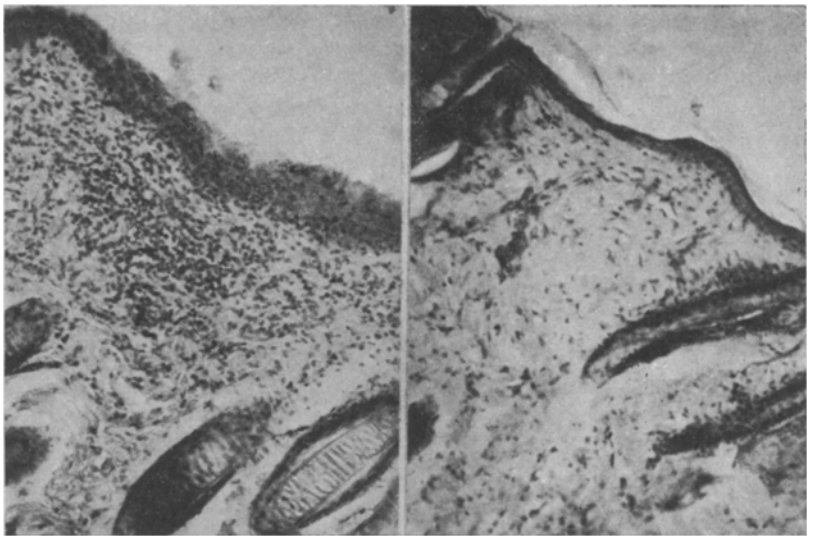

Fig. 1. Section through skin of a guinea pig on 21st day of sensitization. Control. Infiltration of upper layers of skin with mononuclear cells (lymphocytes). Edema of epithelium. Vacuolation. Photomicrograph. Hematoxylin–eosin. 140 ×.

Fig. 2. Section through skin of a guinea pig on 21st day after sensitization. Suppression of development of reaction of mononuclear infiltration by spirasidine. Photomicrograph. Hematoxylin–eosin. 140 ×.

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EXPERIMENTAL METHOD

Chemically pure 2,4-dinitrochlorobenzene was used to sensitize the guinea pigs and to produce experimental contact dermatitis.

Male albino guinea pigs weighing 250-300 g were divided into two groups: the animals of group 1 (60) received spirasidine, and those of group 2 (60) were controls.

Two weeks before the beginning of sensitization, the experimental animals were injected intraperitoneally with 2 ml of 0.1% spirasidine dissolved in bidistilled water every third day. Altogether in a cycle of injections lasting 2 weeks each animal received 10 mg spirasidine. Two weeks after administration of spirasidine to the animals began, they were sensitized with 50% 2,4-dinitrochlorobenzene in acetone, by application of the solution to the shaved skin of the side of the body, close to the neck, twice on alternate days. Control animals were sensitized in the same way.

On the 5th day after the beginning of sensitization the experimental animals received a further injection of 3 mg spirasidine in the form of the solution described above. On the 7th, 14th, and 21st days a drop of the reacting solution of 0.02% 2,4-dinitrochlorobenzene was applied to the skin of the experimental animals. The developing allergic reactions of delayed type (contact dermatitis) began to be recorded 24 h after application of the reacting dose of 0.02% dinitrochlorobenzene to the sensitized area of the animal's skin. The animals were subsequently sacrificed by exsanguination and areas of inflamed skin were excised for preparation of histological sections.

The sections were stained with hematoxylin-eosin in the usual way.

EXPERIMENTAL RESULTS

Microscopic study of the skin sections showed that spirasidine has a striking inhibitory effect on all three stages of the investigation.

In all the control animals a well marked picture of contact dermatitis was observed visually and histologically on the 7th, 14th, and 21st days after the beginning of sensitization. Intensive infiltration with histiocytes and mononuclear cells (monocytes and lymphocytes) was found in the subepidermal layer; desquamation of the epidermis occurred. Microscopic study of the epithelium in affected areas subsequently revealed vacuolation and severe edema, clearly detected in all photomicrographs of the skin of the control animals. The hair follicles were affected only slightly or were completely unaffected by the process.

The study of the skin of the animals receiving spirasidine showed the following picture: infiltration of the subepidermal layer was greatly reduced, and the number of mononuclear cells in the subepidermal layer was so small that, in its external appearance, this part of the skin resembled normal guinea pig skin. The edema of the epithelium subsided substantially and its vacuolation disappeared (Figs. 1 and 2).

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