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**Allergic Reactions to an Antigen from the Chigger
(*Trombiculum irritans*).**

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As it is common knowledge that through the summer months certain individuals are annoyed far more than others by the bite of the chigger, it was thought that the irritation might be an allergic response. With this in mind the following preliminary experiments were done.

Methods. Trombicula larvae which had not had access to man were collected, brought into the laboratory while still alive and ground in 0.2 cc of distilled water. The material was then diluted with distilled water so that each cc represented antigen from 100 chiggers. After allowing this solution to stand about 30 minutes, it was centrifuged at high speed for 20 minutes. The clear supernatant fluid was pipetted off and sterilized by autoclaving.

A second antigen was prepared and sterilized without the use of heat by passing the infusion of ground chiggers through a Seitz filter.

Results. The first antigen when injected intradermally gave a sharp stinging sensation as it went into the skin. There was produced an immediate wheal with surrounding area of erythema. The maximum wheal was developed in from 20 to 30 minutes, subsiding rather rapidly and disappearing within 2 to 3 hours. The size of the wheal varied with different individuals. One-tenth of a cubic centimeter in the skin of one subject gave a wheal (with pseudopods) 155 sq mm in area, and an area of erythema measuring 1658 sq mm, while a control of distilled water gave a wheal (with no pseudopods) measuring 38 sq mm and an erythematous area of 84 sq mm.

The injection of the second or filtered antigen, in addition to giving the sharp stinging sensation, resulted in a pronounced itching not felt with the autoclaved material. The wheal produced by 0.1 cc of this antigen in the skin of the same subject mentioned above was larger, measuring 212 sq mm and the erythematous area measured 1839 sq mm.

A passive transfer experiment was done, in which 0.1 cc of serum from each of 3 donors (respectively very sensitive, moderately sensitive and relatively insensitive to chigger bites) was injected intradermally at 9 areas on the back of an individual not sensitive to bites

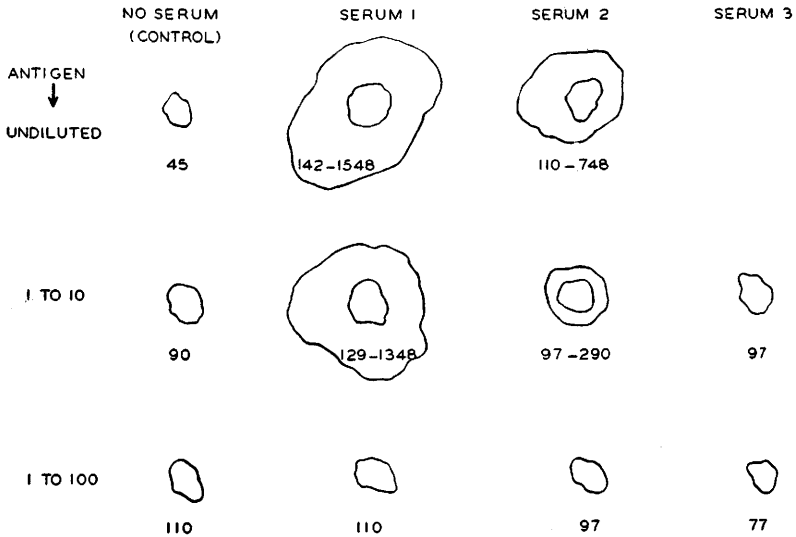


Fig. 1.

Reactions obtained with passive transfer. Measurements given in mm^2 —first number is area of wheal, the second is area of erythema. \times approximately $\frac{1}{2}$.

of the larvae and 24 hours later the antigen was injected into the same areas. Full strength antigen and dilutions of 1 to 10 and 1 to 100 were used. Controls were run by injecting the antigen and the dilutions into the normal skin of the recipient. As is shown in Fig. 1, the response with the wheal and erythema varied with the different sera. There was a definite correlation between the response and the apparent sensitivity of the donor. Individual injections of the antigen into the skin of these same donors gave a corresponding gradation in size of wheal and erythema produced.

Discussion. As there is a definite difference in reaction to the autoclaved and the filtered antigen, it is reasonable to suspect that a part of the secretion of the chigger injected at the time of the bite is destroyed by heating.

It seems from the difference in the reactivity of the sera in the passive transfer that there is a marked variation in sensitivity in different individuals. Whether this response can be directly correlated with the reactivity to antigen injected directly in the individual's skin, and whether either or both can be correlated with the degree of irritation caused by the chigger bite must await further experimentation. The present study suggests that the extreme irritation produced by the bite of the chigger is due to previous sensitization of man to some substance introduced into the skin. If this

can be proven, it is reasonable to look forward to the possible reduction of the irritation by desensitization with a suitable antigen.

Summary. An antigen has been prepared by grinding chiggers and extracting with distilled water. Certain individuals gave a positive skin reaction to this antigen. Heat seems to destroy a portion of the antigen so that it becomes less irritating and induces less reaction. A passive transfer was done with positive results.

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Pathology of Irradiation Sickness: A New Method for Inducing Shock.

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It is well known that exposure of the abdominal region to massive Roentgen therapy produces severe illness. Nausea, vomiting, oliguria, bloody diarrhea, rapid feeble pulse, low blood pressure and profound prostration follow. The metabolism is low, the blood sugar and N.P.N. are increased, the blood chlorides and the alkaline reserve decline. These clinical features are identical in character with those of shock. Illness does not develop immediately, but after an interval of 2 or 3 days. Death occurs about 4 days after exposure.

Irradiation sickness was produced in dogs in order to make observations on hemoconcentration and on the visceral changes. From 1400 to 2800 Roentgen units were given in divided doses over different parts of the abdomen. Severe illness developed after an interval of 60 to 72 hours and hemoconcentration, ranging from 15 to 50%, appeared. The urination was decreased and traces of blood were seen in the urine, feces and vomitus. This blood apparently came from capillary hemorrhages in the mucosae. It was not of sufficient amount to affect significantly the total blood volume. The illness progressed rapidly, and death by circulatory failure occurred within 24 hours.

The gross and microscopic findings were those characteristic of shock.^{1, 2} These included capillo-venous congestion of the viscera, petechial hemorrhages in mucous and serous surfaces, edema of

¹ Moon, V. H., *Shock and Related Capillary Phenomena*, Oxford University Press, New York, 1938.

² Moon, V. H., *Arch. Path.*, 1937, **24**, 642, 794.