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Anti-Serum Against Black Widow Spider Venom.

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The most important, if not the only poisonous spider found in the United States is the so-called Black Widow *(Latrodectus mactans)*, which is widely distributed and by no means uncommon. Some experimental work concerning the properties of the venom have appeared but to our knowledge no one has presented clear-cut evidence of having obtained anti-serum of high potency. There has also been considerable doubt as to whether the venom is different from the arachnolysin present in all spiders and which reaches its highest concentration in the eggs.

The authors have studied the black widow spider from the standpoint of its natural history and the chemical, physiological, pharmacological and immunological properties of its venom. Approximately one thousand spiders and several hundred rats have been used. The results of this investigation will be published elsewhere, we wish to report here only on the questions raised in the preceding paragraph.

Much of the previous work published was done on the effects of the spider bite. This is open to the criticism that the amount of venom introduced would vary with the size and anger of the spider and the amount and speed of absorption would vary with the depth to which the fangs had penetrated. Our method was to dissect the pair of venom glands from each of a large number of spiders (20 to 100 were used in each batch), and macerate the glands in saline. Injections were made intraperitoneally. A toxicity curve was plotted, 10 rats being used for each dosage, and the average lethal dose determined. The eggs were macerated in saline and the average lethal dose determined. We found that one-fourth the venom in one spider would kill 5 rats out of 10, while one-half of the venom would kill 9 out of 10. For the eggs, one egg would kill 4 out of 10, while 2 eggs would kill 10 of 10 rats. For the venom, therefore, one-fourth spider is considered the average lethal dose, and for the eggs, one and one-fourth eggs is considered the average lethal dose.

A group of rats was injected every other day for 2 months with sub-lethal amounts of venom and another group with sub-lethal amounts of eggs for the same period. At the end of that time

the immunity and cross-immunity was tested. The results follow.

Immunity. 8 rats immunized with venom were given venom in double the amount necessary to kill control animals. No symptoms appeared and all animals survived.

Three rats were given 8 A.L.D. each of venom which had stood overnight mixed with 1 cc. of serum from immunized rats. No symptoms appeared and all animals recovered. Venom treated with normal serum was not altered in potency.

Four rats were given 8 A.L.D. each of venom followed immediately by 0.5 cc. of serum from immunized rats. No symptoms appeared and all animals recovered.

Four rats were given 8 A.L.D. of venom followed one hour later by 1 cc. of serum. Symptoms had already appeared. Recovery was prompt and all animals recovered completely.

Four rats immunized against eggs were given 4 A.L.D. of egg extract. No symptoms appeared. All survived.

Two rats were given 4 A.L.D. of eggs after standing overnight mixed with 1 cc. serum from egg-immunized rats. All survived without symptoms. Normal serum did not affect the potency of the egg poison, the rats dying within a few hours.

The above results represent the largest amounts of venom and egg poison used. Probably the potency of the serum is higher than indicated by these figures. This work is being continued.

Cross-Immunization. 3 rats given 2 A.L.D. of venom which had stood overnight with serum from egg-immunized rats died within 6 hours.

Three rats given 2 A.L.D. of eggs which had stood overnight mixed with serum-immunized rats died within 4 hours.

Immunity against eggs appeared more rapidly than against the venom. In the latter group little immunity could be demonstrated as the result of injections for the first month.

Summary. Anti-sera of considerable potency against both the venom and the eggs of *Latrodectus mactans* have been prepared. Cross-immunization experiments indicate that the 2 poisons are not identical.