Anaphylactic Shock in the Pertussis Vaccinated Mouse. (19542)

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The sensitivity of the white mouse to histamine has been referred to as being 1/1000 that of the guinea pig(1). Recently, however, Parfentjev and Goodline(2) reported that the sensitivity to histamine could be increased about 50-fold by a preliminary inoculation with *Hemophilus pertussis* vaccine. This finding has been elaborated and enlarged in subsequent publications(3-9). Similarly, the white mouse is known to be markedly resistant to anaphylactic sensitization and shock. This observation correlated to their refractoriness to histamine has led to the belief(10) that histamine plays no direct or significant role in the mouse as it does in other species(11). In restudying the relationship between histamine and anaphylactic shock in the white mouse a procedure was evolved by which sensitization and fatal shock could be produced uniformly. This technic is the basis of the following preliminary report.

Methods and results. Female, white mice* were inoculated intraperitoneally with 0.5 ml of a mixture containing about 8,750 million phase I organisms of *H. pertussis* vaccine, Lederle, and 0.03 ml horse serum. On the fourth subsequent day a series of animals tested with 0.5 ml of a histamine diphosphate solution in saline given intraperitoneally showed them to be markedly sensitive. Whereas the LD_{50} of histamine diphosphate for a control series of unvaccinated animals was 38 mg for a 20 g mouse, the LD_{50} for the vaccinated group was 0.8 mg. The mortality rate was determined as the number of animals dead within 24 hours/number of animals injected.

Fifteen days after sensitization the vaccinated mice were challenged by the intravenous administration of 0.1 ml of horse serum. The mortality rate of this series was 95/102 as compared to a rate of 3/66 in a control series of animals, sensitized to horse serum as above but not receiving the *H. pertussis* vaccine. With respect to histamine sensitivity after 15 days, the vaccinated mice still showed a mortality of 4/4 when injected with 1 mg and 1/4 with 0.5 mg of histamine diphosphate in solution.

Of several vaccines tested in an identical manner for their enhancement of anaphylactic sensitivity, only *Brucella abortus* vaccine, Sharp and Dohme, 1200 million organisms per mouse, produced any significant increase in mortality rate under comparable conditions, 7/16.

Summary. 1. It has been confirmed that *H. pertussis* vaccination of white mice produces a 50-fold increase in histamine sensitivity. 2. Mice immunized by an intraperitoneal injection of a mixture of *H. pertussis* vaccine and horse serum become markedly anaphylactogenic to a challenging dose of the serum. *Brucella abortus* vaccine has a somewhat similar effect on anaphylaxis.

* The female, white mouse has been found to be more sensitive than the male to histamine both before and after vaccination(12).

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