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A note on anaphylaxis.By **EDWIN J. BANZHAF** and **L. W. FAMULENER.**

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Rosenau and Anderson in their first communication on hypersusceptibility reported their attempts to destroy or remove the toxic substances from horse serum. They treated the serum, which was used for the second injection, by various physical and chemical means, such as, heating the serum to 60° C., filtering through porcelain, drying, freezing, precipitation and dialysis, and by direct addition to the serum for various lengths of time of such chemicals as potassium permanganate, hydrogen peroxide, succinic acid and butyric acid, also various antiseptics, all without success. Continuing their investigations they reported, in their second communication, the influence of ferments, alkaloids, salts and such substances as ox bile, animal charcoal and yeast cells. These gave negative results.

One of us took up the problem from another standpoint, *i. e.*, to treat the sensitized animal with drugs just prior to the second injection. In the preliminary experiments morphin sulphate was used with negative results. Following this, chloral hydrate was employed to produce hypnosis and it was found that sensitized guinea-pigs could be protected with this drug. After our experiments with chloral hydrate were well advanced, Besredka's communication came to our attention, in which he claimed that ether and also calcium chloride exerted a protective action when administered to sensitized guinea-pigs before the second injection of the serum.

We found by injecting a solution of chloral hydrate which was just sufficient to produce hypnosis, that fully 75 per cent. of all serum sensitized guinea-pigs were completely protected from the second injection of serum into the peritoneal cavity, while 90 per cent. of all the controls died. We believe that with improved technique on the dosage of chloral hydrate, we will be able to

protect 90 per cent. of all fully sensitized guinea-pigs. By fully sensitized, we mean, that three weeks or a month should elapse before the second injection of serum into guinea-pigs which have survived the routine testing of antitoxin. For guinea-pigs which have received horse serum alone ($\frac{1}{100}$ to $\frac{1}{500}$ c.c.), at least 7 or 8 weeks should elapse before the second injection. By allowing the above elapse of time, over 90 per cent. of our controls died within an hour, most of them within 20 minutes.

We have found that the dose of the chloral hydrate per gram weight of the animal was more or less variable; no fixed amount can be stated, much depending upon the individual idiosyncrasy of the animal. Approximately 75 milligrams of the drug to a 250 gram guinea-pig and 100 milligrams to a 300 gram guinea-pig produce the degree of hypnosis desired.

We use a fresh 10 per cent. solution of chloral hydrate. We carefully measure out the required amount into a small sterile beaker and add an equal amount of sterile water. This diluted solution is injected into the muscles of the thigh of the animal, half into one leg and half into the other. After an elapse of 20 to 30 minutes the needle is inserted into the peritoneal cavity; muscular twitching and slight movement of the head will be noticed. The injection of 5 c.c. is then given and the animal kept in a warm room. No symptoms appear and the sleep is undisturbed. After an elapse of $1\frac{1}{2}$ to $2\frac{1}{2}$ hours the animal will slowly recover from the effects of the drug. No symptoms or ill effects have been observed in any of the animals. Observations have been followed for over two weeks after treatment. The animal, after the effects of the drug have disappeared, is immune to a third injection of serum, until resensitized, which will be after an elapse of 2 to $2\frac{1}{2}$ months for slight sensitization and 3 to 4 months for full sensitization.

If the dose of chloral hydrate has not been sufficient the insertion of the needle into the peritoneal cavity will cause pronounced muscular movements, the raising of the head and an attempt to regain its feet. Under these conditions if the serum is injected the animal will die of anaphylaxis.

On the other hand, if the animal shows no muscular twitchings the dose of chloral has probably been too large.

We wish to emphasize the fact that great care must be used not to overdose the sensitized guinea-pig with chloral hydrate. A sensitized, as well as a normal guinea-pig, will recover from a large dose — considerably more than the amount mentioned above. But, apparently, the combined effects of the drug and the serum in a sensitized animal produce a deeper hypnosis than the drug when given alone.

Thus far, our experiments have been only with the intraperitoneal injection. Besredka's method of injecting directly into the brain will be taken up later and also the method of injection directly into the vessels according to Gay and Suthard and into the heart according to Lewis.

In a number of experiments with calcium chloride which Besredka claims to have a protective action, we were unable to save the sensitized animals. They died with characteristic symptoms of anaphylaxis.

We have also failed to substantiate Besredka's claims that sensitized guinea-pigs under the influence of ether narcosis are protected from the second injection of $\frac{1}{4}$ c.c. of serum into the brain. Neither does ether narcosis protect them when the injection is made directly into the vessel or directly into the heart. All the animals died with characteristic symptoms of anaphylaxis in from 2 to 6 minutes. Normal control guinea-pigs under the influence of ether narcosis showed no symptoms or ill effects when subjected to injections of physiological saline solution by the above methods.

In conclusion, we wish to add that, other chemical substances belonging to the same group as chloral may show similar action in protecting guinea-pigs against anaphylaxis.

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The relation of plasticity to sex and age in the dancing mouse.

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Plasticity or the modifiability of behavior in the dancer has been studied by measurement of the rate of habit formation. The