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Toxicity of Heavy Water.*

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The following experiments were performed in an effort to determine whether or not the newly recognized substance, heavy water (deuterium oxide) possesses toxic properties. Water containing approximately 20% deuterium oxide was prepared electrolytically and its action tested on rabbit leucocytes and bacteria. Experiments are now being done testing heavy water in more concentrated form up to 100%.

Experiment 1—Rabbit leucocytes. One drop of a 24-hour aleurinate broth exudate, freshly removed from the pleural cavity of a rabbit, was added to 2 cc. of a modified Tyrode solution containing 18% heavy water and 1/10,000 neutral red. The Tyrode solution, which was buffered at pH 6.6, had 10% of its salts replaced by NH_4Cl. Two hanging drops and one spread preparation, sealed with vaseline-paraffin mixture, were incubated at 37°C. and observed under the microscope. A control series was prepared with triple distilled water.

The viability of the leucocytes was followed. After one hour an occasional dead cell could be seen. In 8 hours 10% were dead; in 16 hours 50%, and in 24 hours about 75% were dead. There were no significant differences between leucocytes in the heavy water solution and control ordinary water preparations.

Experiment 2—Growth of Staphylococcus. A. A minute amount of an 18-hour broth culture of hemolytic *Staphylococcus aureus* was added to a drop of 20% heavy water. The drop was divided into 3 parts which were sealed on sterile cover slip hanging drops. These were cultured on blood agar plates after 6, 24 and 48 hours respectively. There was no inhibition of growth.

B. A drop of 20% heavy water was placed in the center of a blood agar plate freshly streaked with the organism used in A. No effect was noted during a period of 4 days.

Experiment 3—Motility of B. Typhosus. A shaked loop of an 18-hour ascitic-broth culture of *B. typhosus* was stirred into 2 hang-

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ing drop preparations of heavy water and into 2 controls with distilled water. Over a period of 48 hours no difference in motility could be observed between the heavy water and control ordinary water preparation.

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Depressor Substances in Peritonitis.

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There is little experimental work to substantiate the clinical belief that death from peritonitis is due to vasomotor collapse incident to absorption of toxins from the peritoneum. Zinnser, Parker and Kuttner[1] and Branham[2] both demonstrated that *Escherichia coli* produced a soluble toxic substance. Steinberg and Ecker[3] and Steinberg[4] have emphasized the rôle of bacterial toxins in peritonitis. Steinberg and his co-workers[5] have demonstrated a slight blood pressure fall in early peritonitis. Scott and Wangensteen[6] have showed that the peritoneal exudates from uncomplicated experimental intestinal obstruction were innocuous.

It occurred to us that the vasomotor system of the host might be less sensitive than that of a normal animal to the toxic substances developed in the peritoneal cavity. Peritonitis was induced in 17 dogs by the method of Buchbinder, Heilman and Foster[7] which consists of leaving an open loop of ileum with intact blood supply free in the peritoneal cavity. An end to end or a lateral anastomosis is made around the loop to restore the continuity of the intestinal

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