STUDIES ON SMOOTH MUSCLE ACTION

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This investigation was begun in an attempt to determine the effects of three typical allergens—aspirin, a drug; spinach, a vegetable; and wheat, a cereal—on the contractions of the isolated smooth muscle of the frog and the contractions of such muscle *in vivo*. Filtrates were prepared employing these allergens as active agents and 0.7 percent sodium chloride solution or cold-blooded Ringer's solution as the liquid.

The isolated stomach of a frog (*Rana pipiens*) was attached to a heart lever and an L-shaped glass rod, both held on a ring stand. Apparatus for a kymograph record was arranged. The stomach was then placed in cold-blooded Ringer's solution or 0.7 percent sodium chloride solution, and a normal record made. It was next placed in one of the filtrates. At times the stomach was again placed in the isotonic solution to determine possible recovery.

In the second part of the investigation materials for perfusion were arranged following the usual method. The frog was pithed and the bulbus arteriosus cannulated in such a way that the cannula pointed away from the heart. The cannula was filled with 0.7 percent sodium chloride solution and attached to a tube system leading to an elevated funnel, all of which had previously been filled with the same solution. The left auricle was snipped that fluid might escape. An average rate of flow was established by adjusting a Hofmann clamp on one of the rubber tubes of the system. The drops from the frog's toes were the basis used in establishing the rate. An average obtained, the salt solution was removed from the tube system and the test filtrate introduced. When its effect had been determined, it in turn was removed and 0.7 percent sodium chloride solution again introduced to determine the possibility of recovery.

Red Star graham flour and desiccated, powdered curly-top spinach were used; all portions of each were weighed on an analytical balance. Bayer aspirin tablets have a standard weight of 5 gr., i. e., 0.33 gm., and aspirin solutions were made up on this basis. All liquids were measured by pipettes and all filtrates were fresh. Filtrates were tested with litmus paper and in all instances seemed neutral, eliminating the possibility of a change in pH influencing the results.

Aspirin filtrates of 0.33 percent and 0.66 percent killed the stomachs used. Filtrates between 0.165 percent and 0.0000825 percent usually caused relaxation. While a 0.0000825 percent filtrate caused death when perfused, the 0.0000000825 percent filtrate caused only arteriole contraction. Isolated stomachs relaxed under use of 0.4 percent filtrates of spinach and graham flour; 0.4 percent and 0.004 percent filtrates caused death when perfused; 0.0004 percent filtrates caused arteriole contraction alone. Since dilute filtrates of aspirin, spinach, and graham flour each produce relaxation in the smooth muscle of the stomach and constriction in the arterioles of the circulatory system, it may be concluded that they present an adrenaline-like action. This action is opposed to the allergic reaction in nature.