4444

Occurrence of Heat Labile Toxins in Closed Intestinal Loops.

J. T. MCCLINTOCK AND H. H. HINES.

From the Department of Physiology, State University of Iowa.

The report of Williams[1] has stimulated interest in the possibility that heat labile bacterial toxins may play an important rôle in the toxemias of intestinal obstruction and allied disorders. The physical nature of the material obtained from the intestinal tract in these clinical or experimental conditions is such that it is extremely difficult to prepare a sterile filtrate which exhibits anything like the potency of the original material.

Experiments were undertaken to determine whether the fluid from closed intestinal loops of dogs contained appreciable quantities of filterable heat labile toxins. The method of Berkefeld filtration was employed to obtain sterile material for injection into guinea pigs, rabbits and pigeons. A comparison was made of the toxicity of unheated Berkefeld filtrate and fluid heated to 65° C. for one hour and strained through glass wool. Filtration was extremely slow and the quantity of material available from each closed loop usually permitted only one toxicity test to be made.

Intravenous injections of fluids from 7 closed loops were made in rabbits, but because of the frequent complications of intravascular clotting, the results were undecisive. The toxicity of fluids from 13 closed loops was determined for guinea pigs (intraperitoneal administration). In 6 of the 13 cases no definite toxemia occurred with either the heated or unheated fluid, although the maximum amount of available material was used. In 6 cases the administration of the untreated filtrate in amounts of 1.3 to 9 cc. per kilo was fatal to guinea pigs in from 12 to 48 hours. Equivalent amounts of the heated fluid failed to cause marked intoxication or death. In one case both fluids were apparently equally toxic. No difference was noted in the potency of the material from different parts of the intestinal tract or from loops of animals with different survival times. Attempts were made to determine the presence of the exotoxins of *B. welchii* by an injection of the filtrate into the breast muscles of pigeons. With doses of 3 cc. per kilo no intoxication or lesions were found similar to those described by Bull and Pritchett[2] for the exotoxin of *B. welchii*. It is concluded that an un-

[1] Williams, B. W., *Brit. J. Surg.*, 1926, xiv, 295.

[2] Bull and Pritchett, *J. Exp. Med.*, 1917, xxvi, 119.

heated Berkefeld filtrate from closed intestinal loops was more toxic for guinea pigs than fluid heated for one hour at 65° C. The possibility that the diminished toxicity of the heated fluid might have been due to mechanical loss of toxins rather than to thermal inactivation has not been excluded.

4445

The Free-martin Effect in Experimental Parabiotic Twins of Triturus torosus.*

E. WITSCHI AND H. M. MCCURDY.

From the Zoölogical Laboratory, State University of Iowa.

It is known since the work of Keller and Tandler[1] and Lillie[2] that in heterosexual twins of cattle with fused chorionic membranes the male part exerts a very characteristic influence on the differentiation and the development of the gonads of its female cotwin. This action results in the following distinctive features of the free-martin gonad:

(1) Sterility in consequence of the absence of germ cells.

(2) Reduced or completely suppressed ovarial cortex.

(3) Hypertrophied medulla with more or less pronounced male type of differentiation.

Experiments with amphibians joined in parabiosis at an early embryonic stage were expected to provide possibilities of a detailed analysis of the mechanism of this effect. This hope was rather disappointed, however, when it appeared from the results of Burns'[3] and Witschi's[4] investigations that Amblystoma and Rana behave otherwise than cattle twins and represent two different and new types of reactions. In heterosexual combinations of Amblystoma either one of the sexes may already in the primary sex differentiation assume the absolute leadership, so that pairs of males and pairs of females are obtained exclusively. In frogs, on the other hand,

* Aided by a grant from the Committee for Research in Problems of Sex of the National Research Council.

[1] Keller, K., and Tandler, J., *Wiener Tierärztl. Wochenschrift, III. Jahrg*, 1916, 513.

[2] Lillie, F. R., *Science*, 1916, lviii, 611; *J. Exp. Zool.*, 1917, xxiii, 371; *Biol. Bull.*, 1923, xliv, 47.

[3] Burns, R. K., *J. Exp. Zool.*, 1925, xlii, 31.

[4] Witschi, E., *Biol. Bull.*, 1927, lii, 137; *J. Exp. Zool.*, 1927, xlvii, 269.