

3994

Relation of Vitamin "B" to Infection and Immunity with Special Reference to *Bacillus Welchii*.

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During the course of an investigation in which dogs were fed a diet deficient with respect to vitamin "B" one animal developed severe convulsions. Death seemed imminent. The only chance to save its life was the immediate parenteral injection of a vitamin "B" concentrate (Cowgill¹). Vitamin powder (Harris) was dissolved, neutralized, sterilized by boiling for 3 minutes and the solution injected subcutaneously. Practically all symptoms were alleviated within a few hours.

A few days later an abscess developed at the site of the injection. Palpation revealed gas crepitus. It was then recalled that the material injected had not been sterilized sufficiently to destroy resistant spores. A provisional diagnosis of "gas infection" was therefore made. The abscess was incised and drained and a pure culture of *Bacillus aerogenes capsulatus* isolated. The animal was given large doses of material rich in vitamin "B" daily and recovered rapidly. Repeated cultures subsequently made from the site of the wound proved to be negative for *B. welchii*.

The following questions arose: (1) are normal dogs immune to this organism? (2) if normal dogs possess "natural" immunity, is it possible for a lack of a dietary essential to bring about a breakdown of this immunity? (3) was the vitamin "B" therapy responsible for the very rapid development of immunity? An attempt was made to answer these questions by experiment.

Dogs, presumably normal, were inoculated with varying quantities of cultures of this organism. No untoward symptoms were observed. The animals were then fed a diet complete in every known respect except for what has hitherto been called vitamin B. *Positive blood cultures were obtained.* Vitamin "B" therapy was then instituted and the blood cultures became negative. This procedure was repeated a number of times over a period of 15 months and the same results obtained.

The possibility that the lowered resistance exhibited by these vitamin "B" deficient dogs resulted from a chronic state of inan-

¹ Cowgill, G. R., *Am. J. Physiol.*, 1923, lxvi, 164.

ition incident to starvation was eliminated by the following procedure. The animals were fed a diet containing a minimum supply of vitamin "B". This, however, was adequate to maintain a perfect appetite and resulted in a gain in body weight. Nevertheless, frequent positive blood cultures were obtained. The dogs were then given large doses of vitamin "B"—containing material and the blood cultures remained negative for months.

As a result of other experiments in collaboration with Dr. C. J. Stucky, which will be reported elsewhere, the development of anhydraemia in "B" avitaminosis was observed. An attempt was made in these immunologic studies to see whether or not anhydraemia was a contributing factor resulting in an increased susceptibility to infection. These studies are in progress at present and will be reported on in the near future.

In general the results appear to indicate that nutritional factors deserve important consideration in immunologic studies, and that vitamin "B" in particular merits special attention.

3995

Respiratory Metabolism of Excised Normal and Diabetic Tissue.

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Studies were made of excised kidney and muscle tissue of normal and depancreatized dogs, in order to answer the following questions:

(1) With normal animals what is the respiratory metabolism of these tissues when removed from the body?

(2) In excised diabetic tissue (a) is the power to oxidize carbohydrate lost? (b) is the power to split carbohydrate into lactic acid lost?

The main features of the technique were (1) the employment of the Barcroft-Warburg manometers in the study of micro-respiration, (2) the comparison of tissues of normal and diabetic animals, (3) parallel determinations of the metabolism of the tissues of the same animal, and (4) the development of a technique for obtaining relatively untraumatized mammalian muscle, by stripping the fasciculi lengthwise, instead of mincing.

The results are as follows:

(1) The figures for oxygen consumption of kidney and muscle