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Protection of Adrenalectomized Animals Against Bacterial Intoxication.

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In 1924, Scott[1] first showed the greatly reduced resistance of animals with latent adrenal insufficiency to intoxication by pyogenic bacteria. Numerous attempts to protect with cortical extract against this fatal effect were carried out unsuccessfully, the difficulty being to get rid of epinephrin without destroying the active cortical hormone. Recently Scott and Bradford[2] found some increased resistance to bacterial intoxication conferred by the administration of a cortical extract (Swingle and Pfiffner[3]). A difficulty in this experiment was that no satisfactory criterion of adequate substitution was available. In the present work the growth curve is used as an indication of adequate dosage of the cortical hormone.[4] As the function of the adrenal cortex to protect against the harmful effects of bacterial intoxication is important in clinical medicine, we have tried to prove beyond any doubt that an extract of the adrenal cortex offers such protection.

The growth curves of 32 young adult male rats were determined for 2 weeks. Both adrenals were then removed at one operation. The animals were divided into 2 groups of 16 each. All were injected with the same volume of fluid and were weighed daily. The animals of Group A were injected with cortin obtained by the ether-alcohol method,[5] those of Group B with isotonic saline. The extract used in the first week was prepared by a new method which was found to greatly reduce its potency. Two rats in each group died in this interval. A potent extract was used after the first week, under the influence of which the weight curves of the extract-injected animals recovered their preoperative slope. The product from 25 gm. of cortex was injected twice daily in each rat

[1] Scott, W. J. M., *J. Exp. Med.*, 1924, **39**, 457.

[2] Scott, W. J. M., and Bradford, W. L., PROC. SOC. EXP. BIOL. AND MED., in press.

[3] Swingle, W. W., and Pfiffner, J. J., *Science*, 1930, **71**, 321.

[4] Hartman, F. A., Brownell, K. A., and Hartman, W. E., *Am. J. Physiol.*, 1930, **95**, 670.

[5] Hartman, F. A., and Thorn, G. W., PROC. SOC. EXP. BIOL. AND MED., 1930, **28**, 94.

in Group A. In order to increase the protection at the time it was most needed, the injections were made more frequently during the 3 days before the test with killed bacteria; at first 3 times daily and in the final 24 hours 5 times, the controls receiving saline injections of the same volumes and frequencies. Two weeks after adrenalectomy, each animal of both groups was given 1½ cc. of standard typhoid vaccine (one billion killed organisms per cc.) intraperitoneally. Subsequent to this the animals were injected with extract and saline respectively about every 2 hours for 10 hours. Six hours after the injection of bacteria all the animals in Group B (saline injected) were dead and none of those in Group A (cortin injected). Four of the rats in Group A subsequently died during that night. Ten of them (71%) survived indefinitely

The resistance of adrenalectomized rats to bacterial intoxication had been significantly increased by an extract of the adrenal cortex.

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Effect of Nutritional Anemia on Size of the Heart.

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During an investigation pertaining to the influence of certain foods on anemia in rats, it was observed that the hearts of those having low hemoglobin values were considerably larger than the hearts of normal animals. Thereupon the weights of the hearts of the experimental animals, computed on the percentage basis, were compared with those of normal animals as given by Donaldson. Successive biweekly hemoglobin determinations were made throughout the period of study, the last being taken just before the animals were killed. The results indicate that there is a close correlation between the size of the heart and the degree of anemia. The heart weights of animals with high hemoglobin values—from 11 gm. to 14 gm. per 100 cc. of blood (Newcomer method) are comparable to those given by Donaldson. When the hemoglobin values fell to 10 gm. the hearts were slightly hypertrophied; this became more marked as the degree of anemia increased. At the very low hemoglobin levels, from 2 gm. to 3 gm. per 100 cc., the heart weights averaged approximately 3 times that of normal animals.