

has enabled us to prepare a solution of the Johne's bacillus protein for diagnostic purposes according to the ultrafiltration method of Seibert<sup>6</sup> for preparing tuberculin. This "Johnin" eliminates certain disadvantages of previous products, since it contains none of the foreign proteins which are introduced by the use of the phlei medium, and is practically free of the crystalloids of the culture medium. It can be easily standardized by measuring the amount of protein precipitated from a sample of the solution by trichloroacetic acid.

*Conclusions.* The dead cells of *M. phlei* contain an *accessory* rather than an *essential* growth substance for the Johne's bacillus.

A purified "Johnin" containing no proteins other than the Johne's bacillus proteins has been manufactured for use as a diagnostic agent.

## 7841 P

### Effect of Adrenalectomy and Hypophysectomy upon Experimental Diabetes in the Cat.

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We have previously reported some preliminary observations upon 5 adrenalectomized-depancreatized cats<sup>1</sup> and upon 2 hypophysectomized-depancreatized cats.<sup>2</sup> In the first series of adrenalectomized-depancreatized animals the operations were performed in 3 stages, but in the present group of 5 animals we have found it possible to remove the remaining adrenal and all the pancreas at one operation. These animals have survived 8, 9, 9, 16 and 28 days respectively. By this procedure we have avoided any loss of weight prior to total adrenalectomy and pancreatectomy, and since the results obtained are substantially identical with the previous ones the criticism of Ring<sup>3</sup> that previous inanition was responsible for the effects observed would appear to be unfounded. In addition, depancreatized

<sup>6</sup> Seibert, F. B., *J. Biol. Chem.*, 1928, **78**, 345.

<sup>1</sup> Long, C. N. H., and Lukens, F. D. W. *Science*, 1934, **79**, 569.

<sup>2</sup> Long, C. N. H., and Lukens, F. D. W., *Proc. Soc. Exp. Biol. and Med.*, 1934, **32**, 326.

<sup>3</sup> Ring, G. C., *Science*, 1934, **80**, 97.

cats treated with insulin or cats in whom a pancreatic remnant is left lose considerable weight, but when insulin is withdrawn or the last piece of pancreas extirpated, they do not survive any longer than animals totally depancreatized in one stage.

In the present series of experiments we have compared the urinary glucose, nitrogen and acetone bodies of 3 normal, 4 depancreatized, 4 hypophysectomized-depancreatized and 5 adrenalectomized-depancreatized cats. All these animals were fasting. In the case of the depancreatized cats the observations were made during the remainder of life and in the other animals for 5-7 days from the day of operation. The results are in Table I.

TABLE I.

Operation	Survival (days)	Urinary glucose gm./kilo/day	Urinary nitrogen gm./kilo/day	Urinary acetone bodies mg./kilo/day	Fasting blood sugar mg. %
Normal	—	0	0.5 (0.4-0.8)	11 (1-19)	—
Depancreatized <sup>c</sup>	4 (2-5)	3.9 (2.4-5.5)	1.6 (1.2-2.4)	148 (40-370)	346 (226-788)
Adrenalectomized and Depancreatized	16 (8-28)	0.4 (0.0-1.2)	0.6 (0.2-1.0)	7 (2-13)	218 (80-342)
Hypophysectomized and Depancreatized	39 (18-85)	1.7 (1.2-2.6)	1.0 (0.8-1.2)	7 (2-11)	270 (129-291)

It will be observed that the well known high excretion of glucose and nitrogen is much reduced in the doubly operated animals while the characteristic ketonuria is almost entirely absent. The latter does not become evident throughout life unless steps are taken to induce it. Rietti<sup>4</sup> has reported comparable finding in the hypophysectomized-depancreatized dog, but so far as we know such observations have not been previously made in adrenalectomized-depancreatized animals.

It would appear that the continued survival of the doubly operated animals is in large measure due to the absence of ketosis (and acidosis) and in the case of the adrenalectomized-depancreatized cats can be prolonged for a period equal to that of hypophysectomized-depancreatized cats provided ample amounts of cortical extract are administered.

Thus one of our adrenalectomized-depancreatized cats was maintained for 28 days and then killed in good health. It received 5-10 cc. of "Eschatin" daily. At the time of death the CO<sub>2</sub> combining power was 40 volumes %, the liver glycogen 1% and the liver fatty

<sup>4</sup> Rietti, C. T., *J. Physiol.*, 1932, **77**, 92.

acids 17%. In this animal we have observed some indications that the degree of glycosuria is proportional to the adequacy of the cortical hormone therapy of Hartman and Brownell.<sup>5</sup>

We have also carried out a number of observations on the effect of anterior pituitary extracts and epinephrine upon the ketonuria and glycosuria of these doubly operated animals which will be reported at a later date.

## 7842 P

### Further Experimental Lesions of the Pyramidal Tracts.\*

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It has been shown (Marshall<sup>1</sup>) that a lesion of the pyramidal tracts in the medulla produces on the whole a less severe disorder of motility than does removal of the motor cortex. Evidence has also been presented which would suggest that lesions of the rubro-spinal tracts interfere with 2 groups of reflexes, the "Berührung-reflexe" of Munk and the contact placing reactions of Rademaker, which are dependent upon the integrity of the motor cortex. The conclusions were drawn that the pyramidal tracts do not form the only significant pathways of discharge from the motor cortex, and that other "extrapyramidal" tracts, particularly the rubro-spinal, participate as well.

If these conclusions are correct, then the removal of the motor cortex subsequent to a section of the pyramidal tracts should produce a paralysis, the severity of which might be more or less proportional to the functional importance of the extrapyramidal pathways descending from the motor area. The present experiments attempt to determine this. In 2 cats the left pyramid was sectioned, and 10 months was allowed for the degeneration of the pyramidal system and its cells of origin in the cerebral cortex. The motor area for the limb muscles (area 4 of Brodmann) which includes the

<sup>5</sup> Hartman, F. A., and Brownell, K. A., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 834.

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<sup>1</sup> Marshall, C., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **31**, 68; *Am. J. Physiol.*, 1934, **109**, 178; *Arch. Neurol. and Psychiat.*, 1934, **32**, 778.