conditions present the typical picture of predecidual proliferation. On the other hand, the inhibiting effect of certain lutein-like formations produced in the ovary under the influence of rat, rabbit or guinea pig anterior pituitary allows, in many cases, only a partial proliferation of the vaginal epithelium, notwithstanding the presence of many fully developed mature follicles which otherwise should be expected to lead to keratinization of the vaginal epithelium.

6921

Diseased Rats Showing Increase of Giardia and a Septicemic Bacillus coli.

C. A. KOFOID, E. MC NEIL AND A. E. BONESTELL.

From the Protozoology Laboratory, University of California.

During a recent series of experiments by the Department of Physiology of the University of California there appeared a very high rate of mortality in young rats. These rats, ranging in age from 3 to 8 weeks, were brought to us for protozoological examination. The symptoms were as follows: yellowish watery faeces; haemoglobinuria in some cases; anemia; and decided lack of muscular coordination. Twenty-three such rats were examined by us. They were on a *raw* milk diet.

At biopsy and autopsy the duodenum was quite inflamed, while the jejunum and ileum were frequently black with congested blood. The lungs were often hyperemic. The macroscopic appearance of the liver, spleen, and kidneys was normal.

Microscopic examination revealed the presence of a far greater number of *Giardia* than ever before observed by us in rats. They were most abundant between the limits of 6 and 20 inches below the stomach in the jejunum and ileum. They were so abundant that the microscopic field contained countless numbers of these protozoa, while tissue scrapings from the wall of the intestine revealed them massed on the surface of the cells, apparently feeding on tissue juices.

Potter[1] distinguishes 2 species of *Giardia* from the rat: *G. lamblia* and *G. muris*. The forms found in these rats were of the *G. lamblia* type in the majority of cases, occasionally accompanied by *G. muris*.

[1] Potter, L. A., *Am. J. Hyg.*, 1928, **8**, 77.

Due, however, to the fact that the disease was of such an acute nature, death occurring in from 24 to 48 hours, a concurrent bacterial infection was suspected. Cultures were therefore made aseptically in lactose-fermentation tubes from heart, liver, and intestine of typically diseased rats with the thought that we might recover one of the paratyphoid group. The bladder was also removed aseptically and the urine streaked on an agar plate. From the heart cultures we recovered 4 strains of a gram-negative lactose-fermenting bacillus. Similar organisms were recovered from the bladder of 2 rats, the small intestine of 2 rats, and the liver of 2 rats. These were grown in pure culture and put through the following sugars: lactose, glucose, sucrose, maltose, mannite, and xylose. The Voges-Proskauer tests were negative, and the methyl red positive. There was no liquefaction of gelatin. As a final test they were found to ferment salicin, which is now considered to be a more reliable sugar than dulcite.

The 8 strains isolated in pure culture were therefore proved to be identical in all respects; and by conforming with the distinguishing biochemical reaction of *B. coli*, was proved to be an aberrant, septicemic strain of that organism.

At the same time a sample of the raw milk used in the diet of the rats at weaning had been streaked out on eosin-methylene-blue plates. A strain was isolated from the milk, which proved to be identical in all biochemical respects with the strains isolated from the rats.

Eight strains (2 from urine, 2 from heart, 2 from intestine, 1 from liver, and 1 from milk) were injected intraperitoneally into the 6-week-old rats from the colony in the Department of Zoology. They each received 1.0 cc. of a heavy saline suspension of a 24-hour culture.

The strains from the heart, urine, and milk killed these inoculated rats in less than 18 hours. The intestine was inflamed, but not congested. The 2 strains from the intestine produced death, but not until after 2-5 days. The intestine was inflamed but not congested. This delayed reaction might be correlated with the original isolation of these 2 strains from the intestine which is the normal habitat of *Bacillus coli*. Those strains producing a septicaemia by their abnormal habitat in the organs had a much more toxic effect upon intraperitoneal injection.

It is known that the optimum pH for *Giardia* in rats is 6.43-6.52.[2]

[2] Kofoid, C. A., McNeil, E., and Bonestell, A. E., *Univ. Calif. Publi. Zool.*, 1933, **39**, 179.

Bacillus coli is an acid-producer and when present so abundantly apparently affords a habitat for *Giardia* which is more favorable than that of the normal rat. It is interesting to note that in the rat which lived 5 days the number of *Giardia* was markedly increased, while in those rats which lived 12-18 hours there was not sufficient time for any marked increase in *Giardia.*

6922

Evidence of Secretion of Posterior Pituitary into Cerebro-Spinal Fluid under Influence of Heat.

H. G. BARBOUR AND W. E. HAMBOURGER.

From the Department of Pharmacology and Toxicology, Yale University.

At the present time there is lack of agreement as to the existence of demonstrable amounts of posterior pituitary substance in the normal cerebro-spinal fluid and some are even inclined to doubt that the amount of this substance can be increased by physiological stimuli. The state of our knowledge was well summarized by Cushing.[1] Pituitary substance is said to be augmented by the administration of certain organic extracts and drugs, by emotional stimuli and direct electrical stimulation of the hypothalamus (Karplus and Peczenik[2]).

We have examined by the guinea pig uterus test the cerebro-spinal fluid of cats exposed to hot and cold baths respectively. The amount of Ringer's solution used was 3 cc. to which was added from 0.2 to 0.4 cc. of either cisternal or ventricular fluid. The bath temperatures were either 20°C. or between 40 and 41°C. The duration in each case was 30 minutes. In the case of the hot bath the sample of the cerebro-spinal fluid was taken before removal from the water.

From 5 cats samples of cisternal fluid were taken none of which showed any oxytocic activity in the normal unanesthetized cat. After exposure to cold baths there was only one doubtful instance of oxytocic action from the 5 animals. After the hot bath, however, the cisternal fluid from 3 of the 5 cats showed definite oxytocic action.

[1] Cushing, H., *Proceed. Nat. Acad. Sci.*, 1931, **17**, 163.

[2] Karplus, I. P., and Peczenik, O., *Arch. ges. Physiol.*, 1930, **225**, 654.