

would seem that between 55 and 138 mg. of ascorbic acid daily are required to bring a tuberculous patient into equilibrium as regards vitamin C nutrition. In one case dosages above 200 mg. daily did not cause a positive reaction.

The investigation is being extended to demonstrate the requirements of vitamin C in tuberculosis and the possible prognostic value of determinations of the daily excretion of ascorbic acid. The present indications are that an increased requirement of ascorbic acid is manifested in tuberculosis and that the determination of the daily excretion seems to parallel determinations of activity made roentgenologically.

## 8733 P

### Electric Potentials in Normal, Castrate, and Theelin Treated Rats.\*

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The development of the Burr-Lane vacuum tube microvoltmeter has opened up a new field in endocrine research. With the use of this machine a study of the electrical changes taking place during the reproductive cycle has been undertaken<sup>1</sup> since it has already been found that the instant of ovulation in the rabbit may be determined by the microvoltmeter.<sup>2, 3</sup> The following is a report of experiments with rats designed to record the electrical changes that take place during the normal oestrous cycle, and the effects of ovariectomy and of hormonal injections upon these changes.

In normal rats the difference in electrical potential between the vagina and the symphysis pubis changes greatly during the oestrous cycle. Daily readings taken while the animals were anesthetized with sodium amytal† have been completed on 35 female rats, from 2 to 8 months old, over periods varying from 10 to 30 days. In all cases vaginal smears were taken immediately before making the electrical readings in order to insure a close time correlation between the

\* Aided in part by a grant from the Fluid Research Funds of Yale, administered by Professor Edgar Allen.

<sup>1</sup> Rogers, P. V., *Anat. Rec.* (Suppl.), 1936, **64**, 40.

<sup>2</sup> Burr, H. S., Hill, R. T., and Allen, E., *Proc. Soc. Exp. Biol. and Med.*, 1935, **33**, 109.

<sup>3</sup> Hill, R. T., Allen, E., and Kramer, T. C., *Anat. Rec.*, 1935, **63**, 239.

† Supplied by the Eli Lilly Company.

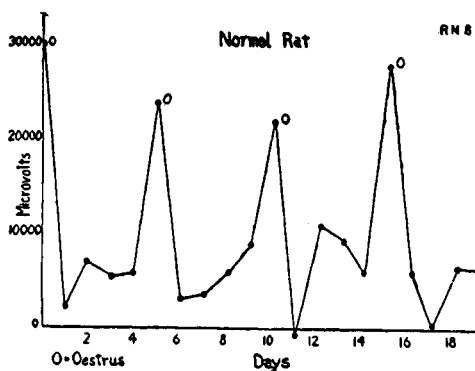


FIG. 1.

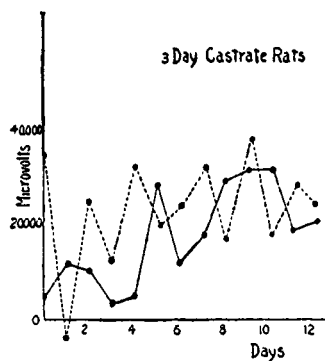


FIG. 2.

2 determinations. When these readings are plotted a very definite type of curve (Fig. 1) is obtained which is repeated during each cycle. When an animal is in oestrus, as shown by the cornified smear, the vagina is negative to the symphysis by several thousand microvolts. There then follows a sudden drop in the potential as the animal goes into post-oestrus. In many cases at this time a reversal in polarity occurs so that for one reading the vagina is positive to the symphysis. During the period of dioestrus the potential remains low. As pro-oestrus approaches there is a gradual rise until the oestrous peak is once more attained. In 50% of the cases a lesser rise occurs 2 days before the animal comes into heat. Due to the fact that readings were taken only once a day this intermediate peak, occurring before pro-oestrus, may take place more often than recorded. This rise is not so great as that at oestrus, but is far above highest dioestrous records.

Removal of the ovaries results in an entirely different type of curve (Fig. 2). Instead of being cyclic in nature the daily readings vary in relation to each other so that the curve is quite patternless. The potential differences may be very great, even greater than in normal oestrus, rather than small as might be expected.

About 19 hours after injecting theelin† into castrate rats there is always a definite rise in the potential above the castrate level (Fig. 3). This peak seems to be comparable to the preoestrous rise that occurs in the normal rat. As in the normal animal, there is a drop before the rat comes into oestrus. When aqueous theelin is given (22 rats) the animal comes into oestrus during the third day, stays in for a short time, and then goes into post-oestrus. During the period of cornification in these rats the electrical readings are high, forming a definite oestrous peak. This, as in the normal rat, is followed by a drop as the animal goes out of oestrus. When theelin

† The aqueous theelin and theelin-in-oil were furnished by Parke, Davis & Co.

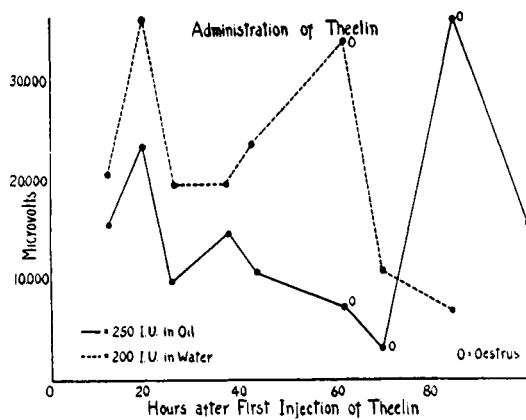


FIG. 3.

in oil is given the animals remain in heat for a longer time. These rats again show the rise about 19 hours after theelin injection but, in 8 out of 9 rats thus far studied, there is no second rise on the third day when they come into heat. The readings remain low until a few hours before postoestrus sets in when the expected rise in potential occurs. Further tests of these reactions are being made to ascertain if electric potentials are constant enough to furnish a unit of measurement for estrogenic substances.

*Summary.* In normal rats the difference in electrical potential between the symphysis pubis and the vagina is much greater at oestrus than during the rest of the cycle. Readings from castrate animals form a patternless type of curve. Administration of theelin causes two rises in potential: nineteen hours after the first injection, and just before the animal passes out of oestrus.

## 8734 P

**Basal Metabolism in Experimental Anemias.**

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Basal metabolic changes have been observed in various types of anemia and in different stages of the same anemia. A number of theories have been advanced to explain this phenomenon, among which may be mentioned the hematopoietic activity<sup>1</sup> and the presence of immature cells in the blood.<sup>2</sup> While immature erythrocytes

<sup>1</sup> Jeney, A., *J. Exp. Med.*, 1927, **46**, 689.

<sup>2</sup> Alt, H. L., *Arch. Int. Med.*, 1929, **43**, 488.