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Changes in Electrical Potential During Oestrous Cycle of the Rat.* III. Vaginal Oestrus.

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It has been shown that the difference in electrical potential between the symphysis pubis and the vagina is directly correlated with the oestrous cycle.[1, 2, 3] A definite type of curve is obtained when the readings are plotted. After ovariectomy and hypophysectomy, the daily readings, instead of being cyclic in nature, vary in relation to each other so that the curve obtained is quite patternless. The normal cyclic type of potential is reproduced when castrate animals are given injections of theelin.

The reasons why the electrical potentials act as they do are as yet unexplained. However, an attempt is made in the following experiment to localize as far as possible the region which is responsible for the changes of electrical potential during the oestrous cycle.

Thirty-five days after ovariectomy, 16 mature rats were given intra-vaginal doses of 0.02 to 0.04 gamma of aqueous theelin. In each case the amount of hormone given was divided, the second dose being administered 24 hours after the first. About 55 hours after the first dose had been given, full cornification took place in all animals. As far as is known, the uterus takes no part in this vaginal oestrus. Electrical determinations were made on these and 7 control castrate animals every few hours throughout the duration of the experiment. Fourteen of the 16 rats coming into vaginal oestrus failed to show the rise in potential which is characteristic in those ovariectomized animals receiving subcutaneous injections of theelin. The results indicate that the potential readings are of the castrate variety where no 2 animals examined have the same type of potential curve. The increase in the difference in potential during the time of cornification in 2 out of the 14 rats may be interpreted as a part of the natural rise and fall of the potential of a castrate animal.

Preliminary results on hysterectomized animals indicate that such

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1 Rogers, P. V., *Anat. Rec.*, 1936, **64**, Suppl. 3, 40.

2 Rogers, P. V., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 644.

3 Rogers, P. V., *Am. J. Physiol.*, in press.

animals also fail to show an oestrous rise in potential when given subcutaneous injections of theelin.

One concludes that cornification of the vagina alone will not produce the changes in electrical potential characteristic of normal oestrus or that produced by subcutaneous injections of threshold amounts of theelin, and therefore that it is necessary to have the uterus as well as the vagina take part in the oestrous changes in order to obtain the characteristic type of oestrous potential readings.

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Potential Variations of Extremities and of Precordium in Pericarditis.

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In pericarditis the most conspicuous abnormalities of the ventricular complex of the standard electrocardiogram are early displacement of the RS-T segment and subsequent inversion of the T-wave. It is the generally accepted view that these changes depend upon myocardial damage.[1-4]

With a view to learning more about this problem the extremity and precordial potentials[5] were studied in 8 cases of pericarditis. The etiology of the pericarditis was rheumatic fever in 3 cases, uremia in 2, tuberculosis in 1, and gonococcus infection in 2.

In neither patient with uremia did the electrocardiograms vary after development of a friction rub. At necropsy, although both showed fibrinous exudate on the visceral pericardium, neither displayed a large effusion or subepicardial myocarditis.

In the remainder, regardless of etiology, the electrocardiographic abnormalities were similar both in the standard and in the special

1 Wilson, F. N., Hill, I. G. W., and Johnston, F. D., *Am. Ht. J.*, 1934, **10**, 163, 176.

2 Van der Veer, J. B., and Norris, R. F., *Am. Ht. J.*, 1937, **14**, 31.

3 Katz, L. N., Feil, H. S., and Scott, R. W., *Am. Ht. J.*, 1929, **5**, 77.

4 Herrmann, G., and Schwab, E. H., *Trans. Assn. Am. Phy.*, 1934, **49**, 229.

5 Wilson, F. N., Johnston, F. D., Macleod, A. G., and Barker, P. S., *Am. Ht. J.*, 1934, **9**, 447.