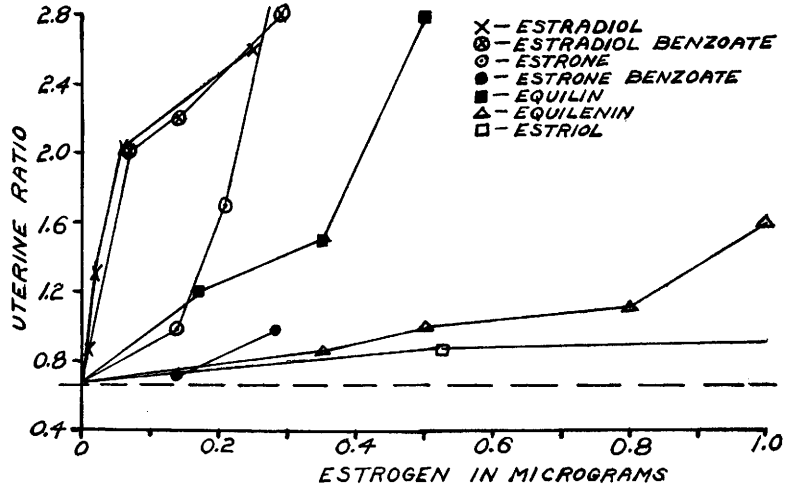


FIG. 1.

The comparative activity of naturally occurring estrogens on the infantile rat uterus. The Uterine Ratio represents the ratio of the uterus in mg to the body weight in g.

As previously described, the activity of estriol on the uterus is unique. Though a small dose stimulates the uterus, even a large dose (100γ) still does not hypertrophy the gland to its maximum size.

Under the conditions of the experiment, the uterine and vaginal activity of α-estradiol and its monobenzoate were of approximately the same magnitude, whereas estrone was definitely more active than its monobenzoate. The reason for this difference is not at the present apparent.

We are grateful to Dr. E. Schwenk of the Schering Corporation for the supply of estradiol and estrone, to Dr. O. Kamm of Parke, Davis and Company for the supply of estriol, and to Dr. Roussel of Paris for supplying us with equilen and equilenin.

## 11762 P

## Respiration of Isolated Liver and Kidney Tissues from Adrenalectomized Rats.

S. R. TIPTON. (Introduced by F. A. Hartman.)

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After adrenalectomy the basal metabolism of rats is depressed. It is possible that the depression is the result of metabolic disturb-

ance in certain special organs or tissues rather than a general metabolic weakness. The oxygen consumption of brain tissue is not influenced by removal of the adrenal cortex[1, 2] nor is that of skeletal muscle.[2] The hepatic and renal malfunction resulting after adrenalectomy suggests that energy reactions in these tissues may be altered.

The rate of oxygen consumption of liver and kidney slices from rats showing marked symptoms of insufficiency (about 9 days after operation) is significantly depressed. The mean values together with the standard error of the mean are shown in Table I. The tissues were studied in Ringer's solution with phosphate buffer at pH 7.3 with no added substrate. The depression is not due to the starvation resulting from the marked anorexia which is present since a group of starved normal rats showed values very similar to those of the well-fed normals.

TABLE I.
$Q_{O_2}$ of Liver and Kidney Slices from Normal and from Adrenalectomized Rats.

| Liver (20 rats) | | Kidney (10 rats) | |
|---|---|---|---|
| Normal | Adrenalectomized | Normal | Adrenalectomized |
| $Q_{O_2}$ | $Q_{O_2}$ | $Q_{O_2}$ | $Q_{O_2}$ |
| 8.68 ± 0.15 | 5.86 ± 0.12 | 18.66 ± 0.31 | 13.73 ± 0.45 |

The rate of oxygen consumption of liver slices from normal rats is considerably increased when pyruvic acid and succinic acid are added to the medium, indicating an active oxidation of these metabolites. It is now recognized that these substances are important intermediary metabolites in carbohydrate oxidation. The data presented in Table II show that after adrenalectomy the rate of oxidation of these substances is slower. Pyruvate oxidation is influenced to a greater extent than that of succinic acid (40% depression with pyruvate as compared with 30% in the case of succinate). The

TABLE II.
$Q_{O_2}$ of Liver Slices from Normal and Adrenalectomized Rats in the Presence of Added Substrates.

| | Control Ringer's | Sodium Pyruvate .04 M | Sodium Succinate .04 M | Dextrose .04 M |
|---|---|---|---|---|
| | $Q_{O_2}$ | $Q_{O_2}$ | $Q_{O_2}$ | $Q_{O_2}$ |
| Normal | 8.68 ± 0.15 | 14.01 ± 0.53 | 17.27 ± 0.53 | 9.48 ± 0.21 |
| Adrenalectomized | 5.86 ± 0.12 | 7.13 ± 0.17 | 9.88 ± 0.34 | 6.38 ± 0.10 |

1 Tipton, S. R., *Am. J. Physiol.*, 1939, **127**, 710.

2 Crismon, J. M., and Field, J., 2nd, *Am. J. Physiol.*, 1940, **130**, 231.

effect of adding dextrose to the medium is the same after adrenalectomy as before.

It is concluded that oxidative systems are impaired by a deficiency of the adrenal cortex hormones, but the weakening appears to be general in nature rather than restricted to some one component of the oxidation chain.

## 11763

## Nicotinic Acid as a Growth Factor for *H. Pertussis.*

J. W. HORNIBROOK. (Introduced by R. E. Dyer.)

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It has been shown that *H. pertussis* Phase I will grow in a liquid medium containing only soluble starch, hydrolyzed casein, cystine and salts.[1] Yeast extract was found to stimulate growth but was not essential. Recently it was found that an amino acid mixture could be substituted for the casein. If the inoculum were so small as to carry over no appreciable amount of growth substance from the Bordet Gengou slant, yeast extract was found to be essential for growth. On testing a number of known substances present in yeast, it was found that nicotinamid or nicotinic acid could be substituted for yeast.

To prepare the medium 2 solutions, A and B, are mixed, brought to a volume of 100 cc, adjusted to a pH of 7.4, tubed in 2 cc quantities and autoclaved.

Solution A. NaCl, 0.7 g; KCl, 0.02 g; $CaC_{12}$ anhyd., 0.02 g; $MgC_{12}$, 0.01 g; $Na_2CO_3$, 0.05 g; $KH_2PO_4$ Mono., 0.025 g; $NH_4Cl$, 0.02 g; soluble starch, 0.1 g; water, 50 cc.

The ingredients are mixed, autoclaved, cooled and filtered through paper.

Solution B. d glutamic acid, 0.18 g; l tyrosine, 0.02 g; glycine practical, 0.0045 g; l proline, 0.04 g; l histidine, 0.01 g; d arginine, 0.02 g.

The above are mixed dry and to them is added 0.001 g cystine dissolved in a drop or two of 10 N HCl. 10 cc of $H_2O$ is added and normal NaOH is added until the acids are in solution.

On incubation the tubes are slanted at an angle of approximately 6 degrees from the horizontal.

[1] Hornibrook, J. W., *Public Health Reports*, 1939, **54**, 1847.