- Sharma, D. C., Forchielli, E. & Dorfman, R. I. (1962). *J. biol. Chem.* **237**, 1495.
 Simpson, E. R. & Boyd, G. S. (1967a). *Biochem. biophys. Res. Commun.* **28**, 945.
 Simpson, E. R. & Boyd, G. S. (1967b). *Eur. J. Biochem.* **2**, 275.

Uptake and Interconversion of Oestrone and Oestradiol in Rabbit Uterus

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The activity of oestradiol-17 β oxidoreductase in the uterus of the rabbit is hormone-dependent, being higher in the intact than in the ovariectomized animal (Macartney & Thomas, 1969); during pregnancy the enzyme activity increases 25-fold and is at its maximum a few days either side of parturition (Jutting, 1966). It has been suggested that the ability of rabbit uterus to be maintained in organ culture by oestrone, as well as oestradiol, may be a consequence of cellular interconversion of the two oestrogens by the uterine oestradiol-17 β oxidoreductase (Russell, Macdougall & Thomas, 1969).

The present study was undertaken to examine the role of uterine oestradiol-17 β oxidoreductase in regulating the hormonal environment of the uterus in the intact non-pregnant rabbit and in the lactating rabbit (24h *post partum*). Animals were infused with [6,7-³H]oestrone over a period of 1h. Although the concentration of radioactivity in the plasma rose steadily during the infusion, the concentration of free oestrone and oestradiol remained fairly constant after the first 10min. Tissues were collected 10min after the end of the infusion and were analysed for labelled oestrone and oestradiol.

In the non-pregnant animal the uptake of oestrone and oestradiol into the cortex, hypothalamus and skeletal muscle did not differ markedly from that of plasma (oestradiol/oestrone ratios 0.3–0.6), whereas in the uterus and vagina predominantly oestradiol was found (ratios 7.5 and 2.5 respectively). Of all the tissues examined the anterior pituitary showed the highest uptake of radioactivity and contained equal amounts of oestrone and oestradiol.

In the lactating rabbit the increased activity of uterine oestradiol-17 β oxidoreductase was not reflected in a marked difference in the peripheral metabolism of oestrone. The oestradiol/oestrone ratio in the uterus (3.9–5.3) was marginally depressed compared with the non-pregnant animal, whereas the ratios for the other tissues examined were essentially unchanged.

Although the tissues showed marked differences in their cellular concentrations of oestrone and oestradiol, the ratios obtained in the uterus in this study were similar to those obtained when rabbit

uterus was cultured in the presence of oestrone, showing that the oestradiol-17 β oxidoreductase is also of importance in the utilization of oestrone in the intact rabbit. However, the present study does not indicate the extent to which metabolism within the tissue may contribute to the regulation of the relative proportions of the two oestrogens in that tissue.

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- Jutting, G. (1966). *Geburtsh. Frauenheilk.* **26**, 636.
 Macartney, J. C. & Thomas, G. H. (1969). *J. Endocr.* **43**, 247.
 Russell, S. L., Macdougall, B. R. D. & Thomas, G. H. (1969). *Biochem. J.* **115**, 45r.

Cytochromes of Ovary Mitochondria: Effect of Human Chorionic Gonadotrophin

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The primary action of human chorionic gonadotrophin, which stimulates both growth and steroidogenesis in ovary, could be control of production and distribution of energy in mitochondria. The presence in the ovary of a dual cytochrome system (a normal respiratory chain and a cytochrome *P*-450-containing chain), such as that described by Cammer & Estabrook (1967a) for the adrenal gland, could enable controlled distribution of energy between ATP production and steroidogenesis.

This work aims to establish whether such a system exists in rat ovary and to determine the effect of human chorionic gonadotrophin on the cytochrome concentrations.

Groups of about 100 immature female rats were each given 50i.u. of pregnant-mare-serum gonadotrophin. Half of these rats received 25i.u. of human chorionic gonadotrophin 3 days later, and the remainder received no further treatment. The rats were killed 8 days after the first injection. The ovaries from each group were pooled and mitochondria were prepared in 0.25M-sucrose.

Measurement of the cytochrome content from the dithionite-reduced minus oxidized difference spectra indicated that human chorionic gonadotrophin doubled the cytochrome content. Similar increases in both cytochrome oxidase and succinoxidase activities measured manometrically were observed. Administration of half the dose of human chorionic gonadotrophin produced identical effects, but a second dose of pregnant-mare-serum gonadotrophin instead of human chorionic gonadotrophin had no effect. Antimycin A inhibited succinoxidase activity completely in all cases. Liver cytochromes were insensitive to human chorionic gonadotrophin.