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UPTAKE OF ^{125}I-THYROXINE BY THE RAT PLACENTA AND TRANSFER TO PETUSES AND FETAL BRAINS

Susirith Mendis and Roger Ekins*
Dept. of Physiology, Faculty of Medicine, Galle,
*Dept. of Molecular Endocrinology, University College and Middlesex School of Medicine, London.

Pregnant rats of different periods of gestation (POG) were injected with 10 microcuries of ^{125}I-Thyroxine and 1.5 microcuries of ^{131}Iodide intravenously and the uptake of radioactivity by the placentae, fetuses and fetal brains were assessed.

The placental uptake ratio (22.1 - 30.2) showed a gradual increase throughout gestation. This was 20-30 times higher than that of maternal liver (1.27), and 5-6 times than that of maternal thyroid (5.10). The ^{125}Iodide/^{131}Iodide ratio of 1.26 in fetal tissue at day 14 was significantly higher than unity (>1.0) indicating not only uptake, but fetal metabolism of thyroxine. Only the ^{125}Iodide:^{131}Iodide uptake ratio of 1.35 at day 14 in fetal brain was statistically significant. The fetal and maternal brain:liver uptake ratios show high uptake by fetal brains relative to that of maternal brain.

These findings indicate that the placenta is an organ which concentrates thyroxine and transfers it to the featuses, and also that there is a highly significant uptake and metabolism of thyroxine by the fetal brain at day 14, i.e., before the onset of fetal thyroid function.

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