interaction and might unmask DNA. Thus any effect of oestradiol-17 β on the phosphokinase would be of interest.

The protein phosphokinase activity decreased after ovariectomy and was elevated after an intraperitoneal injection of 10 μ g. of oestradiol-17 β , whereas similar preparations from liver and kidney were not stimulated. When uterus from unovariectomised rats was separated into epithelial and stromal components (Smith, Martin & King, 1969, preceding abstract), the phosphokinase activity was higher in the epithelium than in the stroma but after ovariectomy the epithelial activity decreased to about half that of the stroma. The stromal activity did not change. This raised the possibility that the oestradiol-17 β -binding protein and the protein phosphokinase might be identical. A 0.3M-KCl extract of uterine nuclei, labelled *in vivo* with [6,7-³H]oestradiol-17 β , was prepared. The sedimentation profile of this extract on a 5–20% (w/v) sucrose gradient indicated that it contained the 4.5s oestradiol-17 β -binding protein whereas the phosphokinase had a sedimentation coefficient of about 6s, indicating that they were not identical. It is possible that in chromatin the two activities are related but were dissociated by 0.3M-KCl. The hormone sensitivity of phosphokinase suggest that protein phosphokinase activation may represent an early step in cell activation by this hormone.

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Incorporation of [2-¹⁴C]Thymidine into Deoxyribonucleic Acid of Rat Brain during Postnatal Development: Effect of Thyroid Hormone

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Cerebral synthesis of DNA during maturation has mainly been studied by radioautographic techniques. Quantitative results on the fate of labelled thymidine in the brain are scarce. The incorporation of [2-¹⁴C]thymidine into DNA in different regions of rat brain was therefore investigated (7–35 days).

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It was previously observed that treatment with thyroid hormone (tri-iodothyronine) in infancy leads to premature termination of the postnatal increase in the number of cells in the brain (Balázs, Cocks, Eayrs & Kovács, 1969). The mechanism of this effect may be studied by comparing the rates of incorporation of labelled thymidine into cerebral DNA of hyperthyroid and normal rats.

Male rats received a subcutaneous injection of [2-¹⁴C]thymidine (54.5 mc/m-mole; 20 μ c/100 g. body wt). The uptake of [¹⁴C]thymidine by the immature brain was substantial. [¹⁴C]Thymidine was incorporated into cerebral DNA, and the ¹⁴C content in other constituents of the acid-insoluble fraction was negligible. The distribution of ¹⁴C between the acid-soluble and the DNA fractions was equal in the cerebrum and hypothalamus at about 2 hr. after injection, but before 0.5 hr. in the cerebellum. The specific radioactivity of DNA increased linearly in the cerebrum and hypothalamus in the first hour after injection, and reached a plateau at about 2 hr.; the plateau was attained earlier (about 1 hr.) in the cerebellum.

To compare the rate of [¹⁴C]thymidine incorporation into DNA of different brain regions at different ages the specific radioactivities were related to the concentration of ¹⁴C in the acid-soluble fraction. The highest relative specific radioactivities were observed at 7 days; at 35 days the relative specific radioactivities were 10 and 2.5% of the values observed at 7 days in the cerebrum and cerebellum respectively. The relative specific radioactivity of DNA was much higher (two- to four-fold) in the cerebellum than in the cerebrum of 7-day-old animals, but little difference was observed at 14 days. The more precipitous fall in the relative specific radioactivity of the cerebellum is probably related to the age-dependent change in the proportion of cells not involved in proliferation.

Incorporation of [¹⁴C]thymidine was not affected by tri-iodothyronine in the brain of 14-day-old rats. On the other hand, it was previously found that the labelling of DNA was considerably decreased in the brain and especially in the cerebellum of 21-day-old rats (Balázs, Kovács, Cocks & Eayrs, 1969). The cerebral content of DNA of hyperthyroid rats compared with normals is also markedly lower at 21 than at 14 days. The results suggest that the decreased DNA content of the brain of tri-iodothyronine-treated rats is due to a premature decrease in cell multiplication.

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