normal dog prostatic tissue. Equimolar concentrations of oestradiol-17 β and the disulphate and diphosphate of diethylstilboestrol had approx. 20% of the inhibitory capacity of diethylstilboestrol. Dibutylidihydrostilboestrol, synthesized by a modification of the method of Dodds, Golberg, Lawson & Robinson (1939), was nearly as effective an inhibitor as diethylstilboestrol with the human and dog enzyme systems. Only slight inhibition (<7%) was found with the *cis* and *trans* isomers of dibutylstilboestrol. It was observed that testosterone and 17 β -hydroxy- Δ -androstane-3-one stimulated the DNA polymerase isolated from certain of the human hyperplastic prostatic tissues, whereas testosterone was shown to have no effect on the DNA polymerase prepared from calf thymus tissue.

The authors are grateful to the Tenovus Organization for their generous financial support.

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Effects of Oestradiol-17 β and Progesterone on Nuclear-Protein Synthesis in the Mouse Uterus

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Oestradiol-17 β on its own stimulates mitosis in the epithelium but not in the stroma of the mouse uterus; after progesterone pretreatment oestradiol-17 β causes mitosis in the stroma but not in the epithelium (Martin & Finn, 1968). Changes in uterine nuclear-protein synthesis were followed *in vitro* after hormone treatment. A method was devised for isolating stromal and epithelial nuclei separately. Irrespective of hormone treatment, epithelial nuclei contained more acidic protein/mg. of DNA than did stromal nuclei, but the same amount of histone. After 1 hr. incubation of uteri *in vitro* with [¹⁴C]lysine, the specific radioactivities of both types of nuclear protein were two- to five-fold greater in epithelial than in stromal nuclei.

In the epithelium incorporation into acidic nuclear proteins was increased sixfold 4 hr. after treatment with oestradiol-17 β (0.05 μ g.), declining rapidly thereafter. Only a small increase was observed in the stroma. In both tissues incorpora-

tion into histones was increased 2-2.5-fold by 6 hr., and remained high up to 18 hr. These changes were reflected in increased amounts of both types of protein/mg. of DNA.

Treatment with progesterone (1 mg./day) for 3 days did not affect the amounts of either type of nuclear protein/mg. of DNA in either tissue. However, in the epithelium it depressed the incorporation of [¹⁴C]lysine into both proteins by 30-60%, whereas in the stroma it increased incorporation into histones (by 10-20%) but had no effect on the acidic nuclear proteins.

After progesterone pretreatment, in the stroma incorporation of [¹⁴C]lysine into acidic nuclear proteins was increased fivefold 4 hr. after oestradiol-17 β treatment, declining rapidly thereafter. Incorporation into histones was maximal at 6-8 hr. and had returned to control values after 18 hr. Similar changes were observed in the epithelium, but incorporation into both types of nuclear protein was lower than after treatment with oestradiol-17 β alone. Incorporation into epithelial histones also returned to control values at 18 hr., which differed from the persistent increase with oestradiol-17 β alone.

These results show that increased nuclear-protein synthesis is an early effect of oestrogen on the mouse uterus. Acidic-nuclear-protein synthesis increases before histone synthesis. Progesterone treatment accentuates the response in stromal cells but depresses it in epithelial cells.

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The Protein Phosphokinase Activity of the Oestradiol-17 β -Binding Fraction from Uterine Nuclei and its Stimulation by Oestradiol-17 β

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The binding of oestradiol-17 β to an acidic protein from chromatin (King, 1967) and its ability to form complexes with polycations prompted the suggestion that oestradiol-17 β might affect the histone-acidic protein interaction and thus alter DNA transcription (King, Gordon & Steggles, 1969). A 0.3 M-KCl extract of uterine nuclei contained the oestradiol-17 β -binding protein, protein phosphokinase and phosphate acceptor protein. The enzyme effected phosphorylation of dephosphorylated phosphvitin, but not of histones. Phosphoprotein phosphatase activity was very low. As the bonds between histone and nuclear acidic protein are predominantly ionic, the introduction of a phosphate group into the acidic protein should decrease the