in the presence of putrescine, there occurs a stoichiometric formation of spermidine and CO₂ (Pegg & Williams-Ashman, 1968b).

Rat ventral prostates were homogenized with 3 vol. of 0.25 M-sucrose-0.3 mM-EDTA, and centrifuged at 25000g for 20 min. The supernatant fluids were passed through columns of BioGel P-10 before assay of the two decarboxylase activities, which were expressed in terms of μ moles of ¹⁴CO₂ released/mg. of protein/hr. The putrescine-stimulated SAM decarboxylase activity declined from a normal value of 720 to 45 in animals castrated 7 days before death. Ornithine decarboxylase activity fell from 350 to 60 under the same conditions. Within 3 hr. after injection of 1 mg. of testosterone propionate into the castrated rats, the decarboxylation of SAM was doubled, and six- and ten-fold increases in activity were observed 24 and 48 hr. after administration of the hormone. Ornithine decarboxylase activities were significantly increased 6 hr. after injection of the androgen and were tripled after 24 hr. Daily injection of the androgen over a period of 2 weeks restored both activities to normal.

These findings suggest that RNA and polyamine biosynthesis may be coupled during the early phases of androgen-dependent prostatic growth. Several groups have recently found correlations between RNA and polyamine or putrescine formation during growth of other tissues (Dykstra & Herbst, 1965; Caldarera, Barbiroli & Morruzi, 1965; Kostyo, 1966; Raina, Jänne & Siimes, 1966; Jänne & Raina, 1968; Russell & Snyder, 1968).

This work was supported by a research grant (HD-01453) from the U.S. Public Health Service.

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Testosterone Metabolism in the Rat Ventral Prostate

By J. E. BELHAM, G. E. NEAL and D. C. WILLIAMS
(Marie Curie Memorial Foundation, Caterham, Surrey)

The adult rat prostate is maintained in a functional state only in the presence of androgen. Castration results in atrophy of this organ, which is reversed by testosterone administration.

Effects similar to those resulting from castration follow administration of anti-androgens or oestrogens. Whether these effects are due to direct competition for active sites within the prostate or are mediated via other organs remains largely unknown. Androgens, in comparison with oestrogens, are effective only at higher concentrations and after longer time-intervals (Jensen, 1965). Also, testosterone action is associated with metabolism of the hormone in target organs. The possibility therefore exists that the action of testosterone depends on metabolism of the hormone, and that anti-androgens exert their effect by influencing this metabolism. For these reasons we have examined the metabolism of low concentrations of testosterone and have also studied the effects of anti-androgens on this.

A simple technique has been developed whereby the metabolites of testosterone can be extracted and estimated both by radioactivity determinations and by gas-liquid chromatography. Labelled testosterone was injected directly into the prostate in comparable studies *in vivo* and whole-organ studies *in vitro*. After 0-120 min. the prostate was homogenized at 0°, deproteinized with 95% ethanol and reduced to an aqueous residue, which was extracted with ether. The ether extract was concentrated, dried and applied to a thin-layer plate. Non-specific lipid moved to the solvent front on development with benzene. The steroids, which remained at the origin, were further separated from lipid material by developing the plates in cyclohexane-acetone (69:31, v/v). The developed plates were scanned for radioactivity. The area of silica gel containing the labelled metabolites was drawn into a pasteur pipette and eluted with chloroform. The total eluate was applied to a Pye 104 Gas Chromatograph by the solid-injection technique of Menini & Norymberski (1965).

The results of both gas-liquid chromatography and radioactivity determinations indicate that testosterone metabolism reaches a steady state after 60 min. and that 20-30% of the original testosterone is converted principally to androstane diol, androsterone and dihydrotestosterone. This is in agreement with the findings of Farnsworth & Brown (1963), using rat prostate minces.

Administration of 1 mg. of cyproterone acetate or

diethylstilboestrol *in vivo* 24 hr. before testosterone injection does not appear to affect the overall pattern of metabolism.

Our thanks are due to Schering Chemicals Ltd. for their generous gift of cyproterone acetate, and to Miss G. M. Baker for performing the animal experiments.

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Changes in Glutathione Reductase and Glutathione Peroxidase Activities in Rat Liver Related to Age and Sex

By R. E. PINTO and W. BARTLEY (*Department of Biochemistry, University of Sheffield*)

Enzyme activity of many enzymes has been studied during the development of the rat (Herrmann & Tootle, 1964; Dawkins, 1966; Taylor, Bailey & Bartley, 1967; Vernon & Walker, 1968a). Differences in activities of some enzymes due to sex are also known (Glock & McLean, 1953; Taylor *et al.* 1967; Roux & Tordet-Caridroit, 1967; Vernon & Walker, 1968b), although glutathione reductase and glutathione peroxidase have not been studied. Glutathione reductase (Rall & Lehninger, 1952) is an important enzyme for the maintenance of glutathione in the reduced form and possibly for controlling the redox state of NADP⁺/NADPH in tissues through glutathione peroxidase (Mills, 1960). Glutathione oxidation (Pinto, 1961) depends on xanthine oxidase activity (Jocelyn, 1964; Christophersen, 1966) or other enzymes associated with the formation of hydrogen peroxide or organic peroxides (Christophersen, 1966) that are possible substrates for glutathione peroxidase (O'Brien & Little, 1968).

This communication reports changes in glutathione reductase and glutathione peroxidase activities in rat liver from foetal to adult life and during the oestrous cycle, and also differences of enzyme activities between pregnant and non-pregnant females.

The average glutathione reductase activities in male and female rat livers were 10.4 ± 0.8 and 9.0 ± 1.3 units respectively. Glutathione peroxidase activities were 48 ± 5 units (males) and 81 ± 15 units (females). The larger scatter in females is due to the oestrous cycle. Glutathione reductase activity in dioestrus was 10.3 ± 1.1 units and in oestrus 8.1 ± 0.7 units. Glutathione peroxidase activity in dioestrus was 64 ± 7 units and in oestrus 96 ± 7 units. Intermediate values for both enzymes activities were found during pro-oestrus and metoestrus.

Pregnant rats had about the same activities as in oestrus.

Glutathione reductase activity in the foetus increased till birth (7 units). After birth the activities showed two maxima at about 2 (11 units) and 32 days old (13 units), and one minimum at about 16 days (5.8 units). Glutathione peroxidase activity in the foetus increased till birth (18 units) and continued to increase till maturity when there was a sharp increase to adult values in the female. Differences due to sex appeared after 32 days.

These enzyme changes are associated with changes of diet and hormones during development.

R.E.P. is a Fellow of the Instituto de Alta Cultura (Portugal).

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Lipid Solubility and the Low Biliary Excretion of 3-Aminophenyl Sulphate and 4-Aminophenyl Glucuronide by the Rat

By M. M. ABOU-EL-MAKAREM, P. MILLBURN and R. L. SMITH (*Department of Biochemistry, St Mary's Hospital Medical School, London, W. 2*)

Previous studies on the biliary excretion of foreign compounds indicate the importance in this process of several factors, namely molecular size, polarity and metabolism (Abou-El-Makarem, Millburn, Smith & Williams, 1967; Millburn, Smith & Williams, 1967a). For extensive biliary excretion in the rat a minimum molecular weight (about 325 ± 50) and a polar ionizable group appear to be necessary.

We decided to try to find out why low-molecular-weight benzene derivatives are excreted poorly by rats in bile. We therefore studied the biliary excretion and the distribution between plasma, liver and bile in biliary-cannulated rats of two such compounds, namely 3-aminophenyl sulphate (mol.wt. 189) and 4-aminophenyl glucuronide (mol.wt. 285). The findings were compared with