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ABSTRACTS



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DEVELOPMENTAL ACTION OF STEROIDS ON HYPOTHALAMIC MECHANISMS OF BEHAVIOUR

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The relationship between hormone-dependent, structural sex-differences in the brain and sexually dimorphic behaviour is presently being studied. The sexually dimorphic area (SDA) in the pre-optic part of the hypothalamus of the Mongolian gerbil represents an area which is thought to mediate sexual components in the behaviour of the adult male. Regions within the SDA appear to be differentiated by the presence of androgenic steroids early in development. Data will be presented on the study of relationships between the development of cellular mechanisms in the gerbil brain and sex-differences in adult behaviour. First, intracranial implants of nanogram amounts of androgen into the developing hypothalamus of female gerbils have a differential stimulating effect on various male-type ultrasonic vocalizations and other precopulatory patterns, shown in adulthood. Second, the hypothalamus in the developing gerbil a/ has several enzymatic pathways converting testosterone into oestrogens and other metabolites, and b/ the activity of enzymes co-vary with their topographic distribution in the hypothalamus and the age of the animal. It is suggested that the sensitivity of neural tissues underlying vocal and other patterns of precopulatory behaviour during development may be due to either different levels of androgen in the hypothalamus or to responsiveness shown to androgenic metabolites produced by the target neurones or associated neuroglial cells.

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SEXUAL DIFFERENTIATION AND NEUROANATOMICAL LOCALIZATION OF BRAIN AROMATASE ACTIVITY

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In contrast to males, adult female Japanese quail never copulate in response to testosterone (T). T exerts its behavioural effects through its metabolites. Especially aromatization of T to oestradiol-17 β (E2) in the preoptic area (POA) is thought to be important for the activation of male sexual behaviour. Females may be less sensitive to the behavioural effects of T than males because they produce less behaviourally active E2 at the level of the POA. To test this hypothesis, we studied the *in vitro* metabolism of 3H-testosterone by different brain parts of male and female quail at different developmental stages. Birds were intact, castrated or castrated and treated with different amounts of T. The precise neuroanatomical localization of aromatase activity has been determined in 13 distinct nuclei by using the "punch technique" of Palkovits.

Results show that 1) preoptic aromatase activity is higher in males than in females, 2) T induces preoptic aromatase activity more efficiently in adult males than in females, independent of the amount of T administered, 3) highest amounts of aromatase activity are located within the sexually dimorphic nucleus preopticus medialis (POM), 4) preoptic aromatase activity becomes sexually differentiated during development at the time when females lose their sensitivity to T and 5) the inducibility of the preoptic aromatase appears during the critical period of sexual differentiation. These results provide further evidence that aromatization of T to E2 is involved in the activation of male sexual behaviour by T and show that the process of female demasculinization consists at least in part in sexual differentiation of the T-inducible preoptic aromatase system.

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VISUAL PROCESSING IN THE MPTP TREATED MONKEY

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1-methyl 4-phenyl 1,2,5,6-tetrahydropyridine (MPTP) produces a chronic and irreversible Parkinsonian Syndrome (PS) in humans and monkeys. There are characteristic lesions in the nigrostriatal system, similar to those seen in human Parkinson's Disease (PD). We have previously described that in PD and in haloperidol blockade there are stimulus specific visual changes which respond to dopaminergic therapy. We postulated that in PD there is a specific retinal dopaminergic deficiency. Now we studied the visual effects of the MPTP induced PS in eight cynomolgous monkeys. ERG and visual evoked potential (VEP) recordings (serially performed in a period extending over 20 months in the longest survivor) reveal that in PS, similar to PD, the VEP is delayed only to spatial frequencies near the peak of the spatial tuning curve: low frequencies are not affected. ERG amplitude is reduced, also in a frequency dependent manner. Moreover, dopaminergic therapy acutely improves both ERG and VEP. HPLC studies of the retina in MPTP induced PS in our monkeys show chronic depletion of Dopamine and HVA. Apparently MPTP affects retinal processing and its visual effect is similar to that seen in human PD. The results suggest that retinal dopaminergic deficiency may cause explain stimulus specific visual defects in human PD.