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Effect of Certain Endocrine Secretions on the X Zone of the Adrenal Cortex of the Mouse.*

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The discovery of a sex dimorphism in the adrenal cortex of the young mouse¹ and its relation to age and sex² suggests that this structure is influenced by certain endocrine secretions. The dimorphism, termed the X zone by Miller,² is present in the female adrenal and lies between the *zona fasciculata* and the medulla, the cells at this border being freely interspersed among each other; in the male adrenal, the X zone is absent and the *zona fasciculata* and the medulla are clearly separated by a distinct connective tissue capsule. This morphological difference is definitely established in mice 40 days of age. An attempt was made in this investigation to determine the effect upon the X zone of injecting various hormones which are intimately related to sex.

The procedure employed in this research involved the extraction and standardization of 5 endocrines, the daily injection of these preparations into normal and castrate mice of varying ages and finally the histological study of stained sections of the adrenal glands. A total of 155 mice were used, of which 79 were injected with different hormones, 56 served as controls and the remaining 20 were employed in testing extracts. The results may be conveniently summarized as follows:

The presence of the X zone in the adrenal gland of male and female mice 21 days of age and the establishment of a sex dimorphism in this gland at 40 days by its disappearance in the male adrenal have been confirmed. The characteristic persistence of the zone in castrate males and the absence of an effect following ovariectomy in females have also been confirmed.

The body weight was not affected by the continued injection of the 5 preparations employed. It does not seem plausible to ascribe the changes produced in the adrenal cortex of the mouse to any toxic action of the injected material.

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¹ Masui, K., and Tamura, Y., *J. Coll. of Agriculture, Imperial Univ. of Tokyo*, 1926, **7**, 353.

² Miller, E. H., *Am. J. of Anat.*, 1928, **39**, 251.

The injection of standardized preparations of oestrin, corpus luteum, testicular hormone and the lutelizing and gonad stimulating hormones of the anterior hypophysis, for short periods (3-8 days) produced no change in the character of the X zone.

Injection of the corpus luteum hormone (oestrin free) which is responsible for the inhibition of oestrus, the vacuolation of the vaginal mucosa, production of placentomata and the pseudopregnancy picture in the rabbit's uterus, for either long or short periods (4 to 30 days) did not change the sex dimorphism in the adrenal glands of normal and castrate male and female mice.

Total degeneration of the X zone was produced by prolonged injection of oestrin into immature castrate males and normal and spayed females. In corresponding adult animals, marked but incomplete atrophy was found in the adrenals. In normal immature males, continued injections of oestrin caused a persistence of the zone or a feminization of the male character of the adrenal gland. In the normal adult male, the X zone reappeared upon administration of oestrin.

Injections of the lutelizing hormone of the anterior hypophysis for short or extended periods had no effect on the X zone. The result following prolonged injections of the gonad stimulating hormone of the anterior hypophysis tended to show that the X zone increased in size in the immature normal and spayed female and that it persisted in the immature normal male whose testicles remained normal.

An extended period of injection of the testicular hormone into mice that possess an X zone, produced a uniform effect in that a total or marked disappearance resulted.

It is suggested that in the non-castrate male mouse, the X zone is inhibited by the presence of the testicular hormone and that in the castrate male, normal and spayed female, its presence is dependent upon the gonad stimulating hormone.