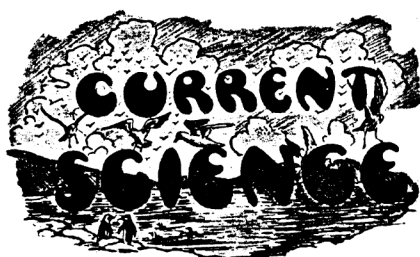


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FROM THE ARCHIVES



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The artificial preparation of the male sex hormone

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The male sex hormone may be defined as a chemical compound produced in the testicle, and which in the male organism promotes the growth and function of the sex organs and glands, and also the development and maintenance of the secondary sex characteristics and sex instinct. The discovery of this hormone resulted from successful experiments on castrated male animals, in which the atrophy of the sex characteristics and organs was cured by implantation of the testicles of other adult animals. The first experiments in this direction date as far back as 1849, i.e. long before there existed a science of hormones, when Berthold (Göttingen) successfully implanted fresh testicles into capons.

In 1929 Gallagher, Koch and Moore (Chicago) succeeded for the first time in preparing a really effective testicular extract which exhibited, in castrated ani-

mals, effects similar to those formerly obtained by grafting fresh testicles. These investigators also worked out the first practical biological test for the detection of the male sex hormone. It is the so-called capon test, which was subsequently improved by Funk, Laqueur and others, and which is based on the principle that the stunted comb of a capon increases in size by the injection of the male sex hormone, such increase being roughly proportional to the quantity of hormone injected. We call a capon unit the quantity of hormone which, with a definite technique, produces an increase of about 20% in the surface area of the comb.

With the help of this method, Butenandt (Göttingen) isolated in 1931 a male sex hormone in crystalline form from the urine of men; the injection into a capon of 0.3 to 0.4 milligrammes of the said hormone, in fractional doses, in the course of a few days produces a 20% increase in the surface area of the comb. The isolation of this hormone, called androsteron, is extremely laborious and up to the beginning of 1933 only 25 mg of it had been isolated, for which quantity 50,000 liters of urine were required. Butenandt was able to establish that androsteron is a saturated oxyketone having the formula $C_{19}H_{30}O_2$ or $C_{18}H_{28}O_2$, and possessing four rings, although an exact chemical investigation was not possible at that time owing to the difficulty of obtaining sufficient quantities of the hormone. It was, however, possible to form a hypothetical picture of the probable structural formula of androsteron on the basis of the knowledge of the folli-

cular hormone (theelin, oestrin) acquired in the meantime. . . .

From a clinical point of view, it is interesting to note that with capons in which too small a portion of testicle has been preserved for the stunted comb to be able to grow, temporary injections of androsteron cause a prolonged growth of the comb. In completely castrated capons, on the contrary, the comb stops growing on cessation of androsteron treatment, whereupon a gradual atrophy of the comb to its initial size takes place. Such effects have already been observed following the administration of testicular extracts. In certain cases of testicular hypofunction, androsteron can act as a ‘hormone fillip’ to stimulate the inactive generative glands into new activity. Investigations with mammals in that connection will be of great importance.

Furthermore, in castrated male rats, it was possible to obtain with androsteron a complete cytologic regeneration of the atrophied seminal vesicles (positive test according to Loewe-Voss). Finally the ‘wedding dress’ picture of the male small fish called *Rhodeus amarus*, which is obtainable with testicular extracts, could also be produced with androsteron. All the experiments which have been carried out in the past with the various extracts exhibiting the action of the male sex hormone and especially with testicular extracts, will be repeated with synthetic androsteron, which will subsequently also be tested clinically. These experiments will show whether androsteron, or any of its derivatives possessing stronger physiological properties, can completely play the role of the male sex hormone.