

## Reversal of Anabolic Effect of Testosterone. (18618)

H. SPENCER HOYT, TOLAND DOUD, AND ROBERT S. HOYT.  
(Introduced by Herbert M. Evans)

*From the Division of Urology, Stanford University School of Medicine, San Francisco and the  
Department of Clinical Laboratories, Monterey Hospital, Monterey, Calif.*

The anabolic effect of male hormone is well known. Nitrogen is retained and body tissue formed, with increase in body and organ weight. Whether or not this action of the male hormone is mediated through the pituitary has been studied by Simpson, Marx, Becks and Evans(1), and in a subsequent contribution by Gordon, Evans and Simpson (2) and recently by Kochakian(3). The relation between the male hormone and the growth hormone as regards their anabolic effect has been studied(4). It has been shown that there is a summation of their anabolic effects in certain aspects, with no evidence of inhibition in any effects studied.

Long-continued administration of testosterone in our hands has, however, resulted in a reversal of the anabolic effect as shown by growth retardation of the entire body. There was selective retardation in development of the organs of internal secretion. The liver and kidneys were retarded equally and slightly less than the total body weight ratio. The thyroid was selectively inhibited, and the gonad almost totally atrophied. The spleen was retarded to a greater degree than the liver and kidneys. Bone development was retarded, both in maturation, *i.e.* appearance of and development of centers of ossification, and in growth.

**Method.** Baby chicks 3 days old, without regard to sex, were divided into 2 groups.

1. Simpson, M. E., Marx, W., Becks, H. and Evans, H. M., *Endocrinology*, 1944, v35, 309.
2. Gordan, G. S., Evans, H. M., and Simpson, M. E., *Endocrinology*, 1947, v40, 375.
3. Kochakian, Chas. D., *Am. J. Physiol.*, 1950, v160, 66.
4. Kochakian, Chas. D., *Am. J. Physiol.*, 1948, v155-2, 255.

TABLE I.

|                             | Male hormone<br>for 77 days | Control | Ratio of wt<br>Testosterone<br>treated   Control |
|-----------------------------|-----------------------------|---------|--------------------------------------------------|
| Total body wt (g)           | 450                         | 835     | .54                                              |
| Organ wt as g/100 g body wt |                             |         |                                                  |
| Liver                       | 2.4                         | 3.8     | .63                                              |
| Spleen                      | .082                        | .27     | .30                                              |
| Kidneys                     | .70                         | 1.07    | .65                                              |
| Thyroid r                   | .03                         | .15     | .20                                              |
| Thyroid l                   | .06                         | .23     | .26                                              |
| Gonad                       | .006                        | .10     | .06                                              |
| Adrenals*                   | .018                        | .008    | 2.2                                              |

\* Due to the plexus of veins about the adrenals and their small size, the conclusion that there was an actual AC hypertrophy is only tentative.

Four animals were given testosterone, 5 mg daily, dropped on the comb(5) from a hypodermic needle, for 77 days. Four animals received no hormone. Systemic effect of the hormone was obvious in marked growth of comb and head ornaments, with increased plumage. Body and organ weights are shown in Table I.

NOTE: Since writing the above, Kochakian, Chas. D., Robertson, Evangeline, and Bartlett, Mary N. have published a further report (*Am. J. Physiol.*, 1950, v163, 332.). These studies carry out the administration of testosterone for long periods, comparable to our experiments, and they describe a "wearing off" effect. We used somewhat larger doses and have shown what we interpret as an actual reversal of the anabolic effect of testosterone propionate.

We wish to thank Dr. Herbert M. Evans and Dr. Gilbert S. Gordan for helpful criticism. We also wish to thank the Ciba Pharmaceutical Co. for a generous supply of testosterone propionate.

5. Doriman, Ralph I., *Endocrinology*, 1948, v42, 1.

Received March 7, 1951. P.S.E.B.M., 1951, v76.