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Response in Unilateral and Bilateral Castrate Leghorns to Daily Injections of Hebin.*

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We previously reported the precocious development of sexual characters in cockerels following homeoplastic hypophyseal implants[1] and later a similar effect was reported following daily injections of hebin.[2] These experiments not only revealed a profound response on the part of head furnishings and behavior but primary and accessory sexual characters were affected as well. Following injections of hebin head furnishings soon became many times larger than controls and masculine in character. Cockerels crowed as early as 9 days of age and began treading at 13. On postmortem testes and ductus deferens revealed definite and frequently pronounced hypertrophy. Thyroids likewise were larger and heavier than controls. Histological examination of testes revealed significant modifications. The tubules of treated testes were, in all cases examined, distinctly larger and more advanced in development and in many cases revealed complete spermatogenesis.

In view of these interesting results on normal cockerels it was considered advisable to study the effects of similar experiments in unilateral and complete castrates. Accordingly a group of left unilateral castrates, a group of right unilateral castrates, and some capons were given daily subcutaneous injections of hebin. Ages at the time injections began were 28 and 35 days. Castrations in all cases having been done 2 to 3 days before the injections began. The duration of injections was 21 and 22 days. The dosages were 10 and 20 rat units in single daily injections. All individuals in the experiments were weighed and head furnishings measured at regular intervals. Treated birds were not adversely affected by the injections.

It was found that unilateral castrates responded much as did normals following daily injections of hebin. Pronounced growth of head furnishings was manifested just as early as in normals and was

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[1] Domm, L. V., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 308.

[2] Domm, L. V., and van Dyke, H. B., PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 349.

equally pronounced. The capon, however, revealed no such response. The head furnishings here remained small and pale throughout and revealed no growth. Behavior was likewise unmodified, remaining typically capon throughout.

Postmortem revealed hypertrophy of the remaining testis in both unilateral castrate groups. The testes here were larger and heavier than those of comparable controls. The following comparative weights of testes from treated and control unilateral castrates are of interest. The average weight of a group of 5 left testes from treated birds was 1.044 gm., while that of 6 controls was 0.106 gm., of 6 treated right testes 0.658 gm., and that of 6 controls 0.121 gm. The heaviest treated left testis weighed 2.339 gm. to 0.240 gm. for the control; the heaviest treated right 1.398 gm. to 0.326 gm. for control. The ductus deferens revealed hypertrophy in treated cases. Thyroids likewise exhibited hypertrophy in both groups of treated unilateral castrates. The average thyroid weight of the left testis group above is 0.075 gm. for treated to 0.014 gm. for controls and for the right testis group above 0.105 gm. for treated to 0.017 gm. for controls.

The only organ exhibiting unquestionable response in the capon was the thyroid. This organ, as in normals, was usually considerably larger and heavier in treated capons. Capon No. 235, 28 days old when injections began, received 10 rat units daily for 21 days and was killed on the day following the last injection. Its thyroids at this time weighed 0.215 gm. while those of 2 controls weighed 0.028 gm. and 0.034 gm. respectively.

Our observations thus indicate that unilateral castration does not inhibit the response of sexual characters, observed in normals following injections of hebin,† while complete castration does. Castration, however, did not inhibit a thyroid response. Our results thus indicate a direct action on gonads and thyroids and show that the hypertrophy of gonads in turn is responsible for the development of sexual characters.

† Purchased through Dr. David Kline from The Wilson Laboratories, Chicago.