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Precocious Development of Sexual Characters in the Fowl by Daily Injections of Hebin. I. The Male.*

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In a previous report the precocious development of sexual characters following homeoplastic hypophyseal implants in cockerels was discussed.[1] The present report concerns the effects of daily administrations of hebin, a purified gonad-stimulating hormone prepared from sheep pituitary glands, on the juvenile sex characters of cockerels.[2]

Light brown Leghorn cockerels ranging from 21 to 47 days at the beginning of the experiment received daily injections of hebin over a period ranging from 14 to 36 days. The daily dosages administered per bird varied from 4 to 32 rat units. Treated and control birds were weighed and head furnishings measured at regular intervals. Treated individuals, with but one exception, remained active and in good condition throughout the duration of the experiments.

The first effect to be noticed was a pronounced stimulation of head furnishings, in some instances, as early as 48 hours after injections began. These became turgid and reddish in color and revealed steady growth throughout so that at the conclusion of experiments they were usually perceptibly larger than controls—in some instances very considerably so. Bird No. 250, 28 days old when the experiment began, received 20 rat units daily for 21 days. The day the experiment began its comb measured 2.0+ cm. in length and 0.8+ cm. in height, while 21 days later its comb measured 7.3 cm. in length and 3.7 cm. in height. The largest control comb measured but 4.3 cm. in length and 1.8 cm. in height at the conclusion of the experiment, though its size at the beginning was similar to that of the treated individual. Some of the older individuals were known to crow and attempt treading, a reaction not

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

[2] For similar experiments with females see Domm, PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 351.

exhibited by normals until considerably older.† Plumage and spurs revealed no noticeable modifications.

Necropsy revealed hypertrophy of testes which were larger and heavier in treated individuals. The testes of bird No. 250 (See above) weighed 0.669 gm. whereas those of 2 controls weighed 0.176 and 0.116 gm. respectively. The ductus deferens revealed hypertrophy following administration of higher concentrations. Thyroids were likewise larger and heavier in treated individuals. These in bird No. 250 weighed 0.123 gm. whereas those of 2 controls weighed but 0.031 and 0.016 gm. respectively. Such organs as the spleen, liver, and heart did not seem to show any significant changes in weight, in fact, experimental spleens and livers were quite frequently somewhat lighter than respective controls.

Histologically testes from treated individuals revealed significant modifications. The tubules of control testes were in all instances distinctly juvenile, many still showing primordial germ cells, whereas those of treated testes were greatly advanced. In all of the latter the tubules were distinctly larger and revealed spermatogenesis.

The results in general confirm the earlier observations of Domm[1] on the precocious development of sexual characters in Leghorn cockerels following daily subcutaneous homeoplastic hypophyseal implants. However, head furnishings revealed a greater response and thyroids hypertrophied only following injections, probably a quantitative response attributable to a larger amount of hypophyseal hormone having been supplied by the injections. Preliminary experiments on capons revealed no response in head furnishings or behavior though they did reveal hypertrophy of thyroids.

It is assumed that the injected gonad-stimulating hormone acted directly on the thyroids and gonads and that the precocious development of the latter is responsible for the development of other sexual characters.

† Young males have recently been found to crow at 9 days of age following 6 daily injections, while the initial treading reactions were first noticed at 13 days following 10 daily injections. Treatments began when 3 days old.