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Response in Sinistrally Ovariotomized Leghorns to Daily Injections of Hebin.*

L. V. DOMM. (Introduced by Frank R. Lillie.)

From the Whitman Laboratory of Experimental Zoology, University of Chicago.

We reported the precocious development of sexual characters in the juvenile Leghorn female following homeoplastic hypophyseal implants[1] as well as injections of hebin.[2] As a result of the daily injection of hebin, head furnishings responded by a phenomenal growth becoming large and masculine in character similar to that of treated males. Plumage and spurs exhibited no modifications, neither were changes observed in behavior. Postmortem revealed prominent ovaries which were larger and heavier than controls though revealed no signs of ovulation. Oviducts revealed pronounced hypertrophy comparable to that preceding ovulation. Thyroids were likewise conspicuously hypertrophied.

In an attempt to extend these observations 2 problems interested us particularly. The first was the source of the hormone causing masculinization of head furnishings in treated females. It was assumed that the medullary tissues of the rudimentary right gonad, as well as those of the left ovary, hypertrophied and elaborated male hormone. That this is a plausible explanation was revealed by our results following sinistral and dextral ovariotomy[3] in which the hypertrophied medullary tissues of either side were found to exert a masculinizing influence on head furnishings. Our results following sinistral ovariotomy logically would lead one to suppose that the masculinization of head furnishings following injections of hebin in the female is the result of hypertrophy of the rudimentary right gonad. However, since this organ exhibited relatively very little hypertrophy following these injections it was not considered as the major source of the hormone causing growth of head furnishings in these experiments. The second problem concerned a possible solution for the sporadic occurrence of spermatogenesis in

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1 Domm, L. V., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 310.

2 Domm, L. V., and van Dyke, H. B., PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 351.

3 Domm, L. V., *J. Exp. Zool.*, 1927, **48**, 31.

the hypertrophied right gonad of early sinistrally ovariotomized Leghorns. Why does spermatogenesis occur in such a small percentage of cases in such individuals? Is it due to an insufficiency of gonad-stimulating hormone, during an early period when the primordial germ cells are still present, preventing active growth of the rudimentary right gonad and consequent incorporation of these cells? If so, then it might be expected that daily administration of hebin, immediately following early sinistral ovariotomy, would produce a greater percentage of fertile right testes in such individuals. Experiments were devised which might facilitate a solution of these problems.

Four small groups of light brown Leghorn females were ovariotomized and 2 to 3 days later we began giving them daily subcutaneous injections of hebin.† Ages on the day injections began were 21, 28, 35, and 105 days, and duration of injections 21, 36, 38, and 42 days. Concentrations administered were 10 and 20 rat units in single daily injections. Birds were weighed and head furnishings measured at regular intervals.

Unlike our results following similar injections in the normal female the poulard revealed absolutely no response of head furnishings in these experiments. In a few of the older, longer treated poulards there were indications of a slight response near the end of the experiment but these were not regarded as significant since a similar response appeared at about the same time in a few of the controls. The assumption of male plumage did not appear to be inhibited. No perceptible modifications were revealed by either spurs or behavior.

Postmortem, as in the normal, showed some hypertrophy of the rudimentary right gonad though it is questionable whether this greatly exceeds that of controls. However, when compared with the conspicuous hypertrophy of the left ovary in treated normals the hypertrophy here seemed rather insignificant. The oviduct was apparently not modified, for its weight fluctuated little above or below that of controls. Thyroids, however, exhibited significant hypertrophy, which in some cases was quite pronounced.

These observations make it evident that the rudimentary right gonad supplies very little, if any, of the hormone responsible for the masculinization of head furnishings in the normal treated females of our experiments and show that its major source must be the left ovary. Further investigations are being made on these problems in which greater concentrations are being employed.

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