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G. C. Ashton*

Animal Health Trust,
Farm Livestock Research Centre,
Stock,
Essex.

* Present address: C.S.I.R.O. Sheep Biology Laboratory, Prospect, N.S.W., Australia.

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Juvenile Hormone in Thymus, Human Placenta and other Mammalian Organs

The development of methods for extracting and assaying the juvenile hormone of insects[1] has encouraged a search for the same biological activity in animals other than insects. Schneiderman and Gilbert have reported the first progress in this direction. Ether extracts of various invertebrates, including Hydrozoa, Polychaeta, Oligochaeta, Holothuroidea, Balanoglossida and Decapoda, give positive tests for juvenile hormone when assayed on pupæ of the silkworm, *Antheraea polyphemus*[2]. Equally surprising is the demonstration of juvenile hormone activity in certain crude aqueous extracts of bovine adrenals[3].

These extraordinary findings suggested the need for a more complete census of the distribution of juvenile hormone activity among mammalian tissues and organs. Our present purpose is to report that most, and perhaps all, mammalian tissues contain demonstrable amounts of a substance the biological activity of which in the insect assay is indistinguishable from that of juvenile hormone.

Our initial studies were performed on 1-day-old rats which were anæsthetized and blended at room temperature in 3 : 1 diethyl ether–ethanol. After washing with water and evaporation of the solvent, a golden oil was obtained which gave positive tests for juvenile hormone.

Afterwards, we took advantage of the fact that desiccated pulverized preparations of individual bovine organs are commercially available from the H.M. Chemical Co., of Santa Monica, California, and the Nutritional Biochemicals Corporation of Cleveland, Ohio. 50-gm. samples of ten of these pulverata were blended and extracted at room temperature with diethyl ether, and the extracts washed several times with water. After evaporation of the solvent, the oily extracts were tested for juvenile hormone activity by a modified version of the 'wax test' described by Schneiderman and Gilbert[2,3]. In brief, a zone of cuticle, about 1 mm. square, was excised from the thoracic tergum of a previously chilled *A. polyphemus* pupa. The oily extract was applied topically to the exposed epidermis and the latter then capped and sealed with melted wax. If the extract contains juvenile hormone, a patch of pupal cuticle forms under the wax wound during the pupal–adult development[2,3].

Positive tests were obtained for extracts of the following pulverata: thymus, bone marrow, placenta, ovary, corpus luteum and adrenal cortex. Liver, testis, kidney and spleen gave negative tests.

The extracts were chromatographed on alumina columns by precisely the same techniques that fractionate juvenile hormone in extracts of insect material. The individual fractions were dissolved in a small volume of peanut oil and tested by injection into *A. polyphemus* pupæ. After this purification, all extracts, including those that were formerly negative, gave positive test for juvenile hormone activity. Among the ten pulverata, thymus gave extracts of highest activity and adrenal cortex of next highest.

These results were confirmed and extended in the preparation of very active fractions from fresh calf thymus and liver, beef tenderloin and fresh human placenta. Positive tests were also obtained from preparations of deep-frozen pituitaries of sheep.

In contrast to these uniformly positive findings on mammalian organs, we have failed to detect any trace of activity in wheat-germ oil, soy-bean oil or extracts of dried brewer's yeast.

Extracts of commercial lard gave negative tests. However, we can report that substantial activity is found in purified extracts of ordinary heavy cream and in products prepared from cream. In contrast to this, extracts of powdered skimmed milk are inactive.

In summary, the picture that takes shape reveals a very broad distribution in the mammalian body of a factor which is indistinguishable from the juvenile hormone of insects. In view of the extraordinary biological activity of this hormone on the growth, metamorphosis and aging of insects, it seems important to decide whether the juvenile hormone may play a part in mammalian physiology or whether its presence in higher forms is something of a biochemical curiosity.

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Carroll M. Williams
Lynn V. Moorhead
Jean F. Pulis

Biological Laboratories,
Harvard University,
Cambridge 38, Mass.
Nov. 24.

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Recovery of Injected Progesterone and its Relation to the Onset of Human Labour

The conception that progesterone is the hormone responsible for the maintenance and therefore secondarily also for the onset of labour is based on several important findings: the indispensability of the corpus luteum for pregnancy in the rabbit[1]; the extraction of the effective substance from corpora lutea[2]; the role of progesterone in the implantation and early development of the fertilized ovum[3]; the excretion of progesterone as urinary pregnanediol and the relation between pregnanediol output and the prognosis of pregnancy[4]; finally, the elucidation of the mechanism of the endocrine control of the pregnant rabbit uterus[5–7].

In the rabbit the indispensability of progesterone for the maintenance of gestation is thus definitely proved. In the human, however, the role of progesterone in the maintenance and termination of pregnancy is much more obscure: it is not possible to prevent premature labour[8] and to prolong pregnancy[9] by means of progesterone administration; the increasing