

11213

Distribution of Melanophore-Dispersing Hormone in Anterior Lobe of Cetaceans and Armadillo.*

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The pituitary gland of cetaceans and of the armadillo has no discrete pars intermedia and the anterior and neural lobes are completely separated by connective tissue.¹⁻⁴ In these species, the melanophore-dispersing hormone is present in the anterior lobe,^{3, 5, 6} whereas in most animals this hormone is ascribed to the pars intermedia. Hence, cells with a function similar to those of the pars intermedia of most other species are present in the anterior lobe of cetaceans and the armadillo. The present study was undertaken to determine whether this hormone is distributed uniformly throughout the lobe or whether it is concentrated in a particular region. It was felt that such an investigation might be of value in determining the distribution of the cells secreting the hormone, especially since no differential stain has been developed for these cells.

Material and Methods. 1. *Cetaceans*: Glands from the bottlenose dolphin (*Tursiops truncatus*), the finback (*Balaenoptera physalis*) and the white (*Delphinapterus leucas*) whales were fixed in acetone. The connective tissue was stripped from the anterior lobes and blocks of tissue were cut from the extreme lateral portions of the lobe, from the medial postero-dorsal and medial antero-ventral surfaces, and, in the case of one porpoise, from the antero-dorsal surface (Fig. 1). The separated portions were cut into fine pieces and ground up in acetone. After removal of the acetone, the powders obtained were extracted with 0.25% acetic acid so that 1 cc contained the activity of 1 mg of acetone-desiccated powder.

2. *Armadillo* (*Dasyus novemcinctus*): Because of the small size of the gland in the armadillo, for each set of experiments, the separated portions from 4 animals were pooled, and treated with

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1 Wislocki, G. B., *Arch. Surg.*, 1929, **18**, 1403.

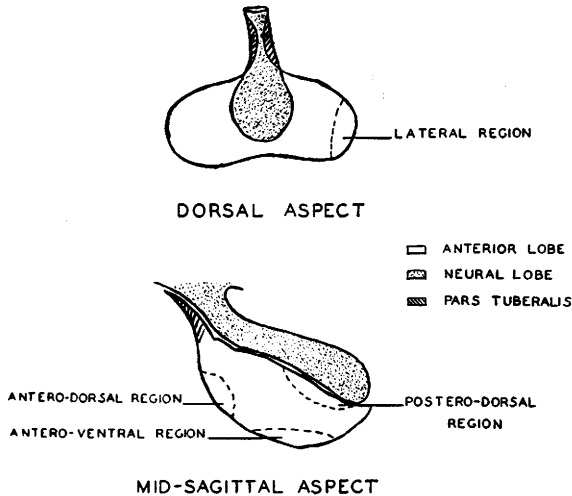
2 Wislocki, G. B., and Geiling, E. M. K., *Anat. Rec.*, 1936, **66**, 17.

3 Oldham, F. K., *Anat. Rec.*, 1938, **72**, 265.

4 Wislocki, G. B., *Anat. Rec.*, 1938, **70**, 451.

5 Geiling, E. M. K., *Bull. Johns Hopkins Hospital*, 1935, **57**, 123.

6 Valsö, J., *Klin. Wochenschr.*, 1934, **13**, 1819.



acetone and 0.25% acetic acid, as described in the preceding paragraph. In the preliminary experiments, glands were separated into a central and a lateral portion; and an anterior and posterior portion respectively. Assays of these 4 preparations indicated that the central and the anterior portions contained more melanophore-dispersing activity than the lateral and posterior portions. In the third set of glands, therefore, 3 divisions were made consisting of (1) the extreme lateral portions, (2) the medial postero-dorsal (juxta-neural portion) and (3) the medial antero-ventral portion.

All extracts were assayed for melanophore-dispersing activity by the method of Teague⁷ in which the hypophysectomized frog is used as a test-object. The results are summarized in Tables I and II. In Table I, the concentration of the hormone in various regions of the glands is expressed as units per gamma of acetone-desiccated powder (1 unit is the melanophore-dispersing activity of 1 γ of alkali-treated U.S.P. XI posterior pituitary powder.⁷). In Table II, the hormone concentrations are expressed in percentage values, the antero-ventral portion being given the arbitrary value of 100.

The most striking finding is the comparatively low concentration of melanophore-dispersing hormone in the postero-dorsal (juxta-neural) region of both the armadillo and cetacean glands. This area corresponds topographically to the pars intermedia of other species. The highest concentration of the hormone was found in the antero-ventral region. The differences between these 2 regions are most marked in the dolphin and the armadillo glands, which were fixed

⁷ Teague, R. S., *Endocrinology*, 1939, **25**, 962.

TABLE I.

	Dolphin.		Finback	White Whale	Armadillo
	A	B			
Antero-ventral region	1.0	3.3	0.028	0.111	5.0
Postero-dorsal "	0.08	0.4	0.017	0.045	0.86
Lateral "	0.5	2.0	0.017	0.083	0.59
Antero-dorsal "	0.4				

The hormone concentration is expressed as units per γ of acetone desiccated powder.

TABLE II.

	Dolphin.		Finback	White Whale	Armadillo
	A	B			
Antero-ventral region	100	100	100	100	100
Postero-dorsal "	9	12	61	41	17
Lateral "	50	61	61	75	12
Antero-dorsal "	50				

The hormone concentration of the antero-ventral region is given the value of 100, and the concentration in other regions is expressed as % of this value.

in acetone immediately after the death of the animals, and assayed soon after fixation. In the case of the white and finback whales, the glands could not be removed for several hours after death, hence postmortem diffusion may have occurred. The lower absolute values for hormone content in these species may be due in part to autolysis, or in the case of the finback whale to deterioration, since this gland had been stored in acetone for 4 years.

Discussion. Our results are in accord with those of Kleinholz and Rahn⁸ and DeLawder, Tarr and Geiling⁹ on the distribution of the melanophore-dispersing hormone in the chicken hypophysis.

Histological examination of the hypophysis of the armadillo and of the white whale reveals no obvious cytological differences between the anterior and posterior regions of the anterior lobe. Wislocki¹ and Wislocki and Geiling² report that in the bottlenose porpoise (dolphin) and the finback, sperm and blue whales, the anterior lobe is relatively homogeneous in character and no residual cleft is present. Recently, however, we have examined a freshly-fixed gland of the bottlenose porpoise. In this specimen, there is a large colloid-filled cleft in the ventral region of the anterior lobe. In order to determine whether this represents the residual lumen of Rathkes pouch, the embryonic development must be studied. We

⁸ Kleinholz, L. H., and Rahn, H., *Proc. Nat. Acad. of Sci.*, 1939, **25**, 145.

⁹ DeLawder, A. M., Tarr, L., and Geiling, E. M. K., *J. Pharm. and Exp. Therap.*, 1934, **51**, 142.

have a number of embryonic glands at our disposal and from the study of these we hope to throw further light on this problem.

Summary. In the cetacean and armadillo hypophysis, the melanophore-dispersing hormone is found in greatest concentration in the antero-ventral region. The postero-dorsal (juxta-neural) region contains the lowest concentration. These findings accord well with those of DeLawder, Tarr and Geiling and of Kleinholz and Rahn in the chicken hypophysis, in which the highest concentration of melanophore-dispersing activity was found in the anterior region of the gland.

11214 P

Whealing Response of Human Skin to Ultraviolet Light and the Histamine Theory of Allergic Reactions.*

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Although a whealing response to ultraviolet light has been reported previously, there is apparently no record of the spectral region of hypersensitiveness in the individuals who comprise the group hypersensitive to ultraviolet light. For the past 3 years a case of this type (*Urticaria solare*) has been studied and the following data may now be reported.

(1) The region of spectral hypersensitiveness (in this woman of 32 years) as manifested by whealing begins very close to 3700 Å and extends to lower wave lengths with increasing sensitiveness in the region where absorption occurs. This zone corresponds to the zone of response of the skin to pigmentation reported by Luckiesh and Taylor.¹ The syndrome, therefore, might be connected with the pigmentation process, although pigmentation may be induced in the usual way. The case studied by Blum, *et al.*,² is probably another entity for his case responded in the visible region. The statement by Laurens that *Urticaria solare* is produced by luminous violet and blue rays from 3900 to 5300 Å must evidently be modified.³

* This investigation has been aided by a grant from the Josiah Macy, Jr., Foundation.

¹ Luckiesh, M., and Taylor, A. H., *J. A. M. A.*, 1939, **112**, 2510.

² Blum, H. F., Allington, H., and West, R., *J. Clin. Invest.*, 1935, **14**, 435.

³ Laurens, H., *J. A. M. A.*, 1938, **111**, 2385.