The differences between the two plaice stocks appear to be magnified when plaice females are crossed to flounder males. For the plaice crosses, the difference between the mean of IIP groups and all the rest was 0.69 ± 0.057 , while in the flounder hybrid crosses the difference between means of the North Sea and Irish Sea plaice groups was 1.42 ± 0.046 . If this is a general phenomenon among hybrids of plaice and flounder, it could be used to facilitate studies on variation between plaice stocks—particularly where the differences are small and difficult to establish statistically.

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Post-natal Development of Rat Pituitary Melanocyte-stimulating Hormone and the Effect of Light

LIGHT influences the level of melanocyte-stimulating hormone (MSH) in the pituitary gland of rats¹. The MSH content increases after a period of constant illumination and is lowered by a period of darkness. This response requires the presence of the pineal gland and may involve melatonin and the MSH-release inhibiting factor (MIF) of the hypothalamus. During a study of the relation of the pars intermedia of the pituitary to the production and release of MSH^{2,3}, we followed the content of MSH in the neurointermediate lobe throughout the post-natal development of the rat, from 7 days to 6 months.

Male Wistar rats were killed at various intervals and individual neurointermediate lobes assayed for MSH by a photoelectric reflectance method⁴, using the melanophore response of an *in vitro* preparation of frog's skin (*Rana pipiens*).

The MSH content (whether expressed as units/mg of neurointermediate lobe, /neurointermediate lobe, or /100 g body weight) increased progressively with age (Table 1). In 16 day old rats, whose eyes had been open for up to 24 h, there was a sharp peak in MSH activity (Table 1).

Although by the time rats are 10 days old and before their eyes are open the retina is capable of responding to light and producing an electroretinogram⁵, there is little information about the stage of development at which either retinal signals may be transmitted to the central nervous system or the visual system may be linked with the hypothalamo-pars intermedia system. We cannot therefore say with certainty that the sharp rise in concentration of MSH at 16 days is the result of receipt of photic stimuli, although this is a tempting interpretation

in view of the findings of Kastin *et al.*¹. If this is the explanation, it raises interesting questions concerning the maturation not only of the central nervous control of the pars intermedia but also of the pineal. Further experiments are needed to determine the developmental stage at which these endocrine systems become fully established.

In lower vertebrates the neurohormonal reflex mechanism, involving the release of MSH in response to changes in illumination, by which the animal achieves some adaptation of its colour to that of its background, is established^{6,7}. Whatever may be the primary physiological role of MSH in mammals, and it is possible that the hormone may not be involved in pigmentation, it appears that the mammalia, in the course of phylogenetic development, have retained a similar MSH release mechanism to that in the lower vertebrates.

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Pineal Response to Light: Mediation by the Accessory Optic System in the Monkey

THE activity of the melatonin-forming enzyme in the rat pineal gland, hydroxyindole-O-methyl-transferase (HIOMT), is high in animals kept in constant darkness and low when they are kept in constant light¹. The response to light depends on the integrity of one component of the central retinal projections, the accessory optic system. Rats subjected to bilateral section of the inferior accessory optic tracts do not show a pineal HIOMT response to light although their visual behaviour is otherwise normal^{2,3}. In contrast, animals with bilateral transection of the primary optic tracts behave as though they were blind but exhibit a normal pineal response to light^{2,3}. There seem to be two separate functions carried out by the central retinal projections in the rat; one projection, the primary optic tracts, maintains visually guided behaviour, and the other, the accessory optic system, shares in the control of a pineal response to light.

An accessory optic system has been identified in all mammals studied⁴. It is a phylogenetically old retinal

Table 1. CHANGES IN PITUITARY WEIGHT AND MSH CONTENT OF THE NEUROINTERMEDIATE LOBE OF MALE RATS WITH AGE

Age	No. of rats	Body weight (g)	Pituitary weight (mg)		Units/mg N.I. lobe tissue	MSH content Units/N.I. lobe	Units/100 g body weight
			Anterior lobe	N.I. lobe			
7 days	5	12.0	0.77 ± 0.05	0.18 ± 0.02	243 ± 32	44 ± 9	378 ± 66
9 days	5	12.7	0.87 ± 0.07	0.21 ± 0.02	307 ± 47	61 ± 8	473 ± 44
15 days	4	28.0	1.10 ± 0.09	0.29 ± 0.01	754 ± 96	220 ± 29	822 ± 148
16 days eyes open	5	33.4	1.24 ± 0.11	0.29 ± 0.02	1,428 ± 170	425 ± 71	1,277 ± 191
3-4 weeks	4	51.7	1.93 ± 0.11	0.53 ± 0.06	912 ± 153	503 ± 132	963 ± 252
5 weeks	4	92.7	3.22 ± 0.10	0.66 ± 0.06	2,848 ± 221	1,929 ± 311	2,097 ± 336
10-12 weeks	27	338	8.34 ± 0.13	1.53 ± 0.04	4,228 ± 253	6,526 ± 436	1,897 ± 132
24-30 weeks	6	504	9.16 ± 0.70	1.86 ± 0.09	5,430 ± 1,412	10,472 ± 3,122	2,035 ± 535

(Pituitary weight and MSH contents are expressed as mean ± S.E.) N.I., neurointermediate.