

A NOTE ON PITUITARY DWARFISM IN THE MOUSE

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(With Two Text-figures)

WE had intended to study the development of the pituitary gland in mice homozygous for the recessive gene for pituitary dwarfism (Snell, 1929; Smith & MacDowell, 1930, 1931). The aim of this investigation was

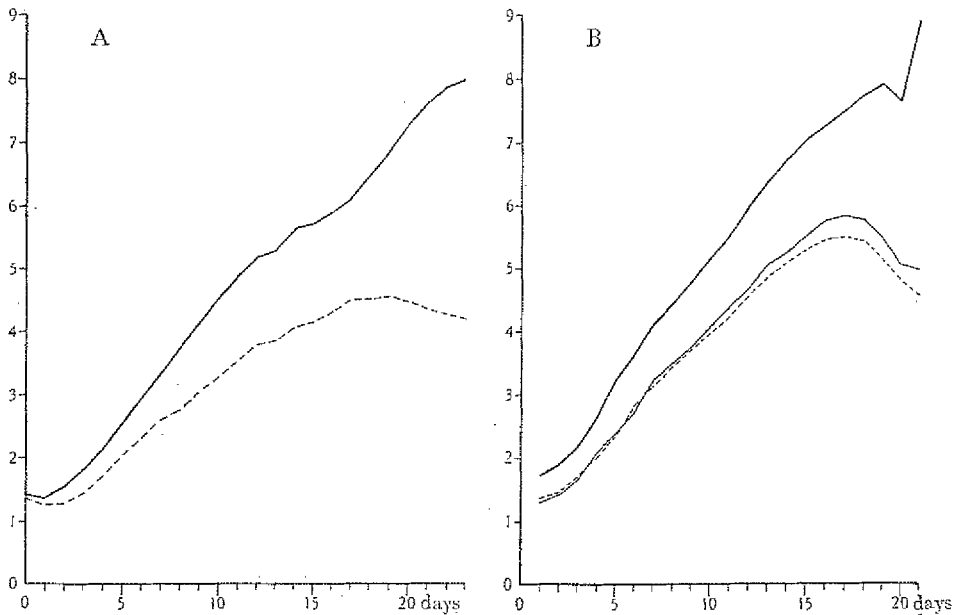


Fig. 1. A. Average growth curve of nine normals (solid line) and individual growth curve of one dwarf (broken line). B. Average growth curve of six normals (thick solid line) and individual growth curves of two dwarfs (thin solid line and thin broken line).

to trace the condition back to its very beginning in order to find out whether eosinophil cells never make their appearance in the anterior lobe of the gland, or whether they disappear secondarily. As the work has now been interrupted, we think it advisable to publish the few data in our possession in the hope that they may be of some use for other investigators.

Growth curves (weighings at 24 hr. intervals) of two litters containing dwarfs are given in Fig. 1. The birth weights of normals and dwarfs

overlap considerably. Our data are insufficient to decide the question whether there is a statistical difference between the birth weights. The growth curves show that the dwarfs tend to grow at a reduced rate already during the first few days of life. Growth stops altogether at or shortly before weaning age.

The reduced growth rate of dwarfs in their early post-natal life makes it possible to diagnose dwarfs with a fair accuracy at an earlier date than has hitherto been possible. The criterion for the diagnosis is not only the absolute weight at the time of the examination, but also the ratio of final weight/birth weight. A litter containing eight surviving young had the following ratios of final weight/birth weight at the ages of 6 and 7 days:

Final weight/birth weight

Age days	1	2	3	4	5	6	7	8
6	2.07	2.10	2.05	2.04	1.97	2.02	1.82	1.17
7	2.43	2.40	2.38	2.35	2.33	2.14	2.01	1.32

Considering the ratios at the age of 7 days, it is fairly clear that presumably the first five animals are normals and that the last one is presumably an (unusually poor) dwarf. Animals 6 and 7 are more doubtful. However, animal 6 was still well within the normal range on the sixth day, and it was probably accidental that it gained comparatively little during the seventh day of life. This renders it likely that the borderline between normals and dwarfs is to be drawn between animals 6 and 7.

This tentative classification made on the basis of the growth rates was confirmed histologically. The animals were killed on the seventh day and their pituitaries fixed in Zenker formol. Sections were cut 2μ thick and stained in acid fuchsin followed by aniline blue and orange G, or in Mallory's phosphotungstic haematoxylin with and without previous treatment with Heidenhain's haematoxylin. By the former method the eosinophil cells appear bright red; by the latter, a rich mauve.

The results obtained by all these methods were consistent. The pituitaries of two animals, nos. 7 and 8, showed no eosinophil cells in the anterior lobe. In all the remainder, eosinophil cells were present, though in differing quantities. They were most numerous in animals 2 and 5, while in 1, 3, 4 and 6, the eosinophil cells were present in lesser, but approximately equal quantities.

Fig. 2 gives at the same magnification the concentrations of eosinophil cells in typical fields of the anterior lobe of all eight animals.

The histological investigation thus fully confirms the classification made on the basis of the growth rates. Already at the age of 7 days, that

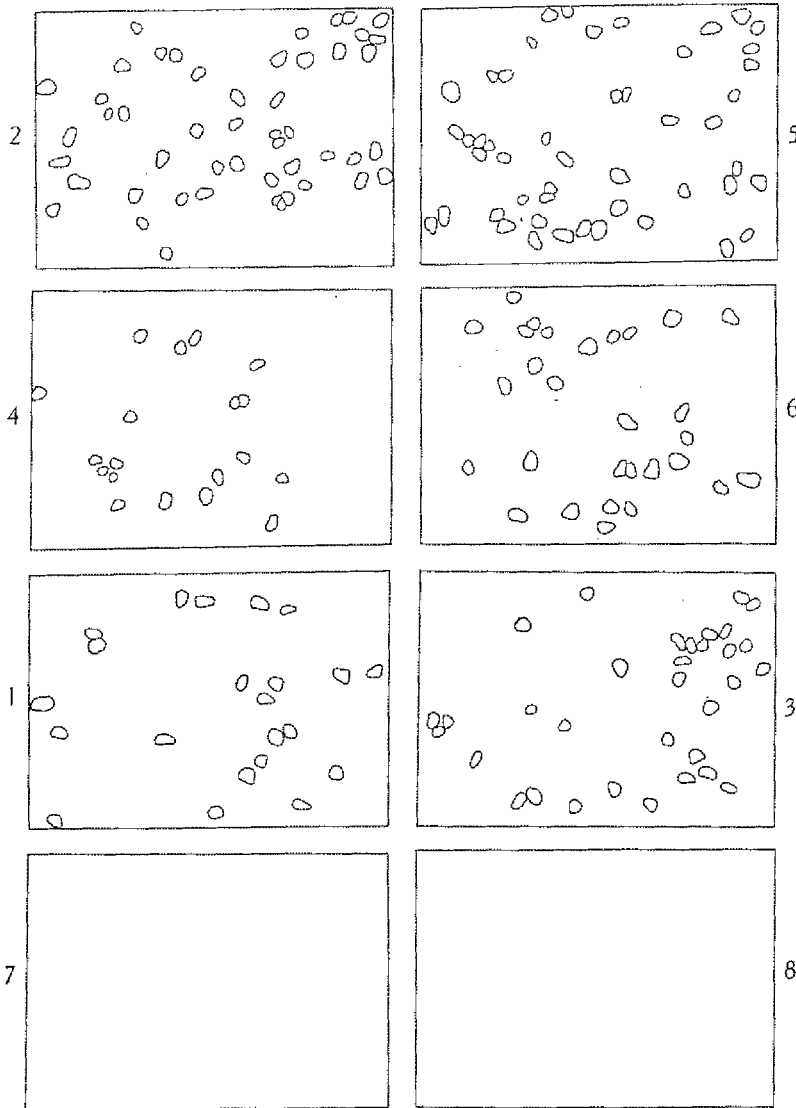


Fig. 2. Explanation in the text.

is to say, 10-14 days before the cessation of growth, no eosinophil cells are found in the anterior lobe of the pituitary gland of the presumed dwarfs. Amongst the normals, some differences occur as to the abun-

dance of eosinophil cells. It is conceivable that such differences distinguish heterozygotes from homozygous normal animals. In view of the small number of animals investigated and in the absence of any direct proof, this is no more than a suggested possibility which should be reinvestigated.

REFERENCES

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