

## LETTERS TO THE EDITORS

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## Mitotic Activity of the Mouse Parathyroid Gland

During the course of an investigation upon the cytology of the parathyroid gland of the mouse, it was observed that in immature animals the cellular differentiation characteristic of the adult did not commence until about fourteen days after birth. It was suggested<sup>1</sup> that this stage might (1) mark the

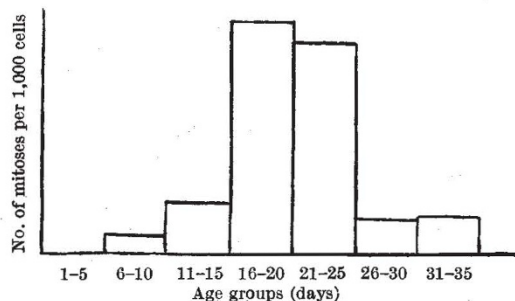
gland: (1) the number of mitoses per section ( $m$ ); (2) the area ( $a$ ) of the section measured in terms of the unit squares of a micrometer eyepiece at a magnification of  $\times 350$ ; and (3) the number of cells ( $n$ ) per unit square at a magnification of about  $\times 700$ , five readings being taken for each section. The mitotic frequencies were standardized by calculating the values of  $\frac{m}{4.a.n} \times 1,000$ , which gives the approximate number of mitoses per 1,000 cells. The average results for various ages are shown in the table. For the purpose of the graphic representation of the mitotic activity at various ages, the mean values of  $\frac{m}{4.a.n} \times 1,000$  for five-day age groups were obtained.

Age (days)	Av. wt. (gm.)	No. of glands studied	Av. size of section ( $a$ )	Av. cell frequency ( $n$ )	Av. for $a \times n$	Av. mitoses per section ( $m$ )	$\frac{m}{4.a.n} \times 1,000$ = number of mitoses per 1,000 cells
6	2.8	3	13.6	6.3	85.7	0.26	0.75
* 7	4.5	1	44.9	6.2	278.4	0.8	0.75
* 9	5.0	2	32.5	6.7	217.8	0.4	0.5
15	8.0	4	19.5	5.9	114.6	0.8	1.7
16	6.0	3	43.0	6.2	266.6	9.8	9.2
18	9.0	2	50.3	6.3	318.4	7.8	7.3
20	9.4	3	41.9	6.2	259.8	5.8	5.6
21	9.5	3	40.8	6.4	261.1	6.4	6.7
26	13.0	5	44.0	6.5	286.0	1.2	1.0
33	20.0	4	57.0	6.2	353.4	1.6	1.1
90+	30.0	4	68.2	6.0	409.2	0.2	0.1

\* It will be noted that these glands were unusually large, as also were they precociously differentiated. In this case their low mitotic frequency suggests that their true position is after the peak values of the 16-20 day age groups.

beginning of a period of increased mitotic activity associated with differentiation, and (2) be correlated with weaning, which is normally accomplished by the third week. The preliminary data reported here appear to support these suggestions.

Immature and adult mice of various ages and both sexes were injected subcutaneously with colchicine. The adult animals received 0.1 mgm. in 0.25 c.c. of distilled water, and the immature a dose in proportion to their body weights, 30 gm. being taken as a standard for an adult. After 9.5 hr. both glands were removed, together with the thyroid, larynx and part of the oesophagus, and immediately



fixed. Serial sections were cut in the sagittal plane, and so far as possible both glands were studied, except in certain instances, where this was prevented by the involvement of one of the parathyroids with thymic tissue.

The results were obtained from an examination of five 5- $\mu$  serial sections from the area of largest cross-section, and the increased mitotic frequency in the cells of the epithelium of the oesophagus was used as an index of the efficacy of the injection. In all instances the injections were effective.

The following data, in the form of an average for each of five serial sections, were obtained for every

It will be seen from the diagram that there is a sharp and marked increase in the absolute mitotic frequency beginning at and extending through approximately the third week after birth. During this same period previous work has shown that the gland has passed from a state of cytological uniformity to one practically indistinguishable from the adult in the diversity of its cells and, judging by cytological criteria, from a condition of relative physiological inactivity to one of activity. In addition, it will be observed that this intensification of mitotic activity occurs during the latter part of the suckling period.

It is suggested that these observations might perhaps be explained on the assumption that a lowering of calcium intake through the milk towards the time of weaning stimulates the differentiation and activity of the gland. Horning's observation<sup>2</sup>, that a decrease in the inorganic salt content of the alveoli of the lactating mammary gland of the mouse becomes noticeable at the 9-11th day of lactation, may have some bearing on this suggestion. So also may the observation of Morgan<sup>3</sup>, that the dark principal cells of the adult human gland first appear at about six months of age; since in the mouse also, similar dark secretory cells first appear in significant numbers at a comparable time—that is, towards the end of the suckling period.

In conclusion, I would like to thank Dr. J. H. Woodger and Prof. Samson Wright for their advice and criticism.

C. L. FOSTER.

Dept. of Biology,  
Middlesex Hospital Medical School,  
London, W.1.  
Feb. 2.

<sup>1</sup> Foster, C. L., *J. Endocrinol.* (1943, in the press).

<sup>2</sup> Horning, E. S., "Cytology and Cell Physiology", edited by G. Bourne (Oxford, 1942), p. 177.

<sup>3</sup> Morgan, J. R. E., *Archives Path.*, 21, 10 (1936).