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Cell Types and Their Proportion in Pars Anterior of Adult Male Human Hypophysis.*

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There is considerable disagreement on the number of distinct cell types in the anterior lobe of the hypophysis, as well as on the question of the relative number of each type under normal conditions. As many as 7 different kinds of epithelial cells have been described. How many of these are merely different functional stages of the same cell is not settled; but for practical purposes, at least 3 kinds can be regularly recognized by relatively simple technique. They are: chromophobe (chief, reserve, clear, undifferentiated, neutrophil), acidophil (eosinophil, oxyphil, alpha) and basophil (cyanophil, beta).

The tendency seems to be to regard the acidophils as predominating and either the chromophobes or basophils as the fewest in number, although a few authors estimate that the chromophobes are the most numerous. An increase in the relative number of basophils in old age is also a widespread notion.

It is obviously of prime importance to settle these questions in order to properly interpret abnormalities in the hypophysis, such as are now being reported frequently in the pathological literature.

This is a preliminary report on a differential count of the cells in the anterior lobe of 100 human hypophyses from normal male adults, according to the method outlined in a previous communication.¹ The only change introduced since then is to put the section

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¹ Rasmussen, A. T., and Herrick, Ruth, *PROC. SOC. EXP. BIOL. AND MED.*, 1922, xix, 416.

first for about one-half minute in ordinary hematoxylin and washing well with distilled water before staining with Mallory's connective-tissue stain.

Only cases of sudden and usually accidental death, in which the hypophysis was fixed within 12 hours after death, were used. They ranged in age from 18 to 78 years.

The chromophobes represent on an average 52% of the total cells (from 34% to 66%). The scarcity of chromophobes, so often mentioned, is not substantiated, since they are normally never below one-third of all the cells. They are also the least variable, the coefficient of variation being 15. Many of these cells contain very little cytoplasm so that they do not appear as numerous as an actual count indicates.

Acidophils are next in number, averaging 37% (23% to 59%).

The coefficient of variation is 21. In only 5 cases did they constitute one-half or more of the total number of cells. The reason why so many authors consider the acidophils to be the most numerous is very likely that they are very conspicuous, because of their size and staining reaction. In hematoxylin and eosin specimens there is also the danger of including some of the chromophobes. Since larger cells are cut into more slices than the smaller ones, only cells with nuclei should be considered and this is not generally done in rough estimations.

Basophils are the least numerous. They represent only 11% of the cells. They are also the most variable (4.5% to 27%). The coefficient of variation is 34.

Only the approximate body weight is available so that no strict correlation between the percentage of the different cells and body weight is possible. However, 14 cases (several of them conforming to the general external features of the so-called non-neoplastic post-adolescent hypopituitarism) of excessive weight (200 to 330 lbs.) were compared with the remaining 86 with body weights less than 200 lbs. Statistically the difference is not significant except possibly in a decrease of 4.6% in the acidophils in the heavier group.

There is no significant correlation between stature and the percentage of different cells. From the association of growth with the acidophils, one might expect more acidophils in taller individuals. The anterior lobe as a whole is larger in taller people;² but evidently this is not due to an increase in any one type of cell.

When the percentage of the different cells of those below 50 years of age are compared with those above 50 years, there is an increase of 3.7% in chromophobes and a decrease of 3.9% in

² Rasmussen, A. T., *Amer. J. Anat.*, 1928, xlii, 1.

acidophils in the older group; but the supposed increase of basophils with advancing years is not corroborated. The coefficient of correlation (r) between age and percentage of basophils is $-.022 \pm .065$.

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Experimental Tularemia in Muskrats.

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As one phase of a study of disease in wild life, various animals and birds have been tested for susceptibility to tularemia. Included in the group tested is the muskrat. The muskrats utilized in this work were caught in the wild and kept in captivity for a period longer than 6 months. They were under observation in the laboratory for a period of 2 months previous to the inoculation and appeared to thrive.

Muskrat 1. Inoculated subcutaneously 4-20-28, with spleen of guinea pig dying the previous day from tularemia. Symptoms of illness were present 2 days later. The muskrat died on the fourth day. Necropsy showed enlargement of left inguinal nodes and marked infiltration at the site of inoculation. The liver was studded with fine nodules. The spleen did not show studding. There was no exudate in the pleural or peritoneal cavities.

Guinea pig 1. Inoculated with spleen of muskrat; died on the third day with both inguinal nodes enlarged; spleen and omentum full of nodules.

Guinea pig 2. Inoculated with liver of muskrat; died on the third day with both inguinal nodes enlarged; intensive infiltration over abdomen. Spleen and liver were thickly studded with nodules.

Control guinea pig. Died on the fourth day with findings typical of tularemia.

Muskrat 2. Inoculated subcutaneously 4-20-28, with infective guinea pig spleen. Developed symptoms of illness 2 days later and died on the fourth day. Necropsy showed enlargement of left inguinal nodes and infiltration at the site of inoculation. Spleen was very large and thickly studded with nodules. Pleural and peritoneal exudates were present.

Guinea pig 1. Inoculated with liver from muskrat; died on the