most of the eosinophils from each patient showing the same level of autofluorescence. Table 1 illustrates the autofluorescence according to principal diagnosis.

Although the eosinophil has been the subject of countless investigations, its remarkable autofluorescence in the range of the commonly used fluorescent microscopy systems has received scant attention. This study confirmed the previous report in which Grossi and Zaccheo described the autofluorescence of eosinophilic granules but made no comparisons between individuals. Our attempts to quantitate the autofluorescence revealed marked individual differences but apparently no relation to principal diagnosis (Table 1). We also found that no correlation was

Table 1. Autofluorescence of Eosinophils from 20 Patients according to Principal Diagnosis

Diagnosis	Autofluorescence
Lymphoma (2), multiple myeloma (2)	1+
Iron deficiency anaemia (3)*	1+–2+
Arteriosclerotic heart disease, cirrhosis, chronic lymphatic leukaemia (2), malabsorption, prostatic hypertrophy, rectal carcinoma	2+
Intestinal parasitism (2), pneumonia	3+
Bronchogenic carcinoma (2), prostatic hypertrophy and uraemia	4+

* Variation occurred in the eosinophils of three patients with iron deficiency anaemia.

possible between the drug therapy and the intensity of autofluorescence. A correlation may exist in the case of certain drugs, but a much larger series of well-controlled data would be necessary to reveal it. Many organic chemicals are fluorescent within the range of the equipment used in this study and many factors are probably important in producing the autofluorescence of eosinophilic granules demonstrated in this report. The phenomenon certainly warrants further investigation, but it is proper to direct attention to the need for caution in interpreting results of fluorescent staining techniques applied to bone marrow. Changes in *p*H, temperature, viscosity, ionic strength, heavy metals, and fixation can either increase or decrease fluorescence emission, and these factors must be meticulously controlled in all experiments. In the case of eosinophils the added factor of remarkable autofluorescence must also be carefully considered.

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Mast Cells of the Pituitary Gland

There is a marked similarity in the morphological appearance of mast cells and the parenchymatous glandular cells of the infundibular process (neural lobe) of the pituitary gland described by Gersh[1]. It has been suggested by Rennels and Drager[2] that the parenchymatous glandular cells may play a part in the final release of the hormones of the posterior pituitary into the general circulation. Although Gray[3] described mast cells in the pituitary gland of man, ox and cat, the presence of these cells seems to have been largely ignored by more recent workers.

In the present investigation an attempt has been made not only to identify mast cells in a variety of mammalian pituitary glands, but also to determine their relationship to the parenchymatous glandular cells.

The pituitary glands of man, bullock, calf, rat and mouse were investigated. Of a variety of fixatives employed, formol–Zenker gave the clearest detail. Mast cells were identified following staining with 2 per cent new methylene blue in 0·5 per cent lithium carbonate or with 1 per cent toluidine blue at *p*H 3. For the identification of the parenchymatous glandular cells the method described by Gersh[1] was used. For each specimen examined, control tissues, known to contain mast cells, were removed and processed with the glands. These controls were mounted on the same slides as the pituitary sections. In this way identical control staining was obtained.

Mast cells. These were present in great number in the infundibular process of the bullock and the calf; as many as 150 per low power field were seen. A few were found in the pars intermedia and occasional ones in the pars distalis. The infundibular stem of the bullock was particularly rich in mast cells and they could be traced proximally to the region of the para-ventricular and supra-optic nuclei of the hypothalamus. More were found in the para-ventricular than in the supra-optic nucleus. None was found in sections of brain taken from a variety of sites other than the hypothalamus. Only occasional mast cells were observed in the pituitary gland of the rat, and many sections were completely devoid of them. Although an occasional mast cell has been seen in the capsule of the pituitary gland in the mouse, none was found in the parenchyma of the gland. In the human the mast cell population was variable. Occasional mast cells were found in the pars intermedia and pars distalis in all glands examined. In the infundibular process of one gland many mast cells were present, but in another no mast cells were seen. The distribution in the remaining glands examined lay between these extremes.

Parenchymatous glandular cells. In the pituitary gland of the rat and the mouse typical parenchymatous glandular cells were observed in all the sections examined. The mast cells in the control tissues failed to reduce osmic acid and could not be positively localized by this method alone. In the human, bullock and calf, no cells containing the typical black granules found in the rat and mouse were seen in the infundibular process, nor were these cells found in the control tissues. Cells containing refractile granules were seen, but they were identified as mast cells when stained with new methylene blue.

It is known that the mast cell distribution in the tissues varies from species to species, and the present findings indicate that this is true of the pituitary gland. The pronounced variation in the mast cell population of the human pituitary gland may be related to the physiological state of the body at the time of death. Variation with age cannot be a factor in the present survey, for all human glands examined were removed from cadavers of the same age group.

While it is possible to differentiate the parenchymatous glandular cells of the pituitary from mast cells in the rat and mouse, this is not the case in the human, bullock or calf. In these it is apparent that the cells described by Gersh[1] which contained refractile granules that did not reduce osmic acid are, in fact, mast cells.

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RADIOBIOLOGY

Dependence of DNA Synthesis on Irradiation Dose Rate

The following report of work on the relationship of dose-rate depression of DNA synthesis is part of a more comprehensive investigation of the effects of irradiation on the biosynthetic mechanism of DNA replication. One of the specific reasons for the investigation was to determine whether one of the major criteria (dose-rate independence)