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PATHOLOGY

Nuclear Pockets in Normal Leucocytes

RECENTLY there have been several reports on nuclear blebs found in human leukaemic cells¹ and in human bone marrow cells of leukaemic patients on drug therapy². Similar nuclear structures have also been found in developing human³ and guinea-pig⁴ thymocytes, and possibly in Burkitt's lymphoma⁵. Anderson⁶ noted identical nuclear structures in myeloblasts from patients with treated and untreated acute myelocytic leukaemia and referred to them as nuclear loops.

Fig. 1. Nuclear pockets in nucleus of lymphocyte ($\times 15,750$).

Electron microscopy of leucocytes from eight normal people showed that nuclear blebs, which we prefer to term "nuclear pockets" (see Fig. 1), were present in the lymphocytes and neutrophils of all eight. We consider the term "nuclear pockets" to be more accurate than "nuclear blebs" as we have demonstrated by serial sectioning. The significance of nuclear pockets in leukaemia cells has to be evaluated in relation to frequency and ease of demonstration in leucocytes from normal people.

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Formation of Methanol by an Enzyme in an Ectopic Pinealoma

THE tissue of origin of a tumour is conventionally determined by histological examination. It has been possible to identify some tumours by their secretion of substances specific to tissue into the general circulation. Thus phaeochromocytomata—tumours which originate in chromaffin tissue—secrete large amounts of catecholamines, hormones normally manufactured by chromaffin tissue. Malignant carcinoids, derived from the enterochromaffin cells of the intestine, may secrete serotonin, a normal product of enterochromaffin cells. Phaeochromocytomata and malignant carcinoids respectively contain high concentrations of catecholamines and serotonin. These tumours presumably also contain the enzymes required to synthesize these compounds. Similar unique biochemical characteristics have not yet been described for tumours within the central nervous system. Recent studies from this laboratory have identified at least two enzymes which are highly localized in specific sites in the central nervous system. It was found that hydroxyindole-*O*-methyl transferase (HIOMT), the enzyme which *O*-methylates *N*-acetylserotonin to form melatonin¹, is present almost exclusively in the pineal gland of several mammalian species². HIOMT activity has been found to be of comparable magnitude in the pineal glands of human beings from 3 to 70 years of age, suggesting that calcification of the human pineal gland during adulthood does not interfere with this biochemical function³. Melatonin, the product of the enzyme action, has been found to exert an inhibitory influence on gonadal growth and on the oestrous cycle in rats⁴. Wurtman *et al.*⁵ have identified melatonin and HIOMT activity in a metastatic parenchymatous pinealoma and suggested the utility of this enzymatic assay in the diagnosis of this tumour.

Axelrod and Daly⁶ have described an enzyme which forms methanol and is localized in the pituitary gland of several mammalian species including man. The reaction involves either the methylation of water by *S*-adenosylmethionine to form methanol or a hydrolytic cleavage of *S*-adenosylmethionine to form methanol and *S*-adenosylhomocysteine as follows:

The methanol forming enzyme in the anterior pituitary has one-fourth the activity of the posterior pituitary, and negligible activity is present in all other tissues examined, including brain, pineal gland, liver, lung, kidney and adrenal.

The present report will describe biochemical investigations of an ectopic pinealoma. Ectopic pinealomata are frequently located in the region of the optic chiasma. Although the histology of these tumours resembles that of pineal parenchymal tissue, their tissue of origin is not well established. It is thought that such tumours can arise in the pineal gland and metastasize to the floor of the third ventricle and the optic chiasma. They may also originate in the