Morphogenesis of some Dense Laminated Bodies in Histiocytosis X

Dense laminated bodies were found in 'histiocytosis X' histiocytic cells[1], frequently in close relation to lipid-filled vescicles in the cytoplasm. These dense bodies, which may mimic the structure of myelin[2], were interpreted as lysosomial remnants. They were also found in multinucleated giant cells of histiocytosis[3]X. As these dense bodies may sometimes appear vacuolated, a possible derivation from altered mitochondria has been suggested[4]. Their aspect may be round and homogeneous or convoluted; sometimes they may bear a myelinlike structure; anyway their origin has not been well elucidated.

Material and methods. Small tissue samples of 3 mm in diameter were taken from a neoplastic subcutaneous mass of the back of a 13-year-old girl with a previous clinical and histological diagnosis of Hand-Schüller-Christian disease. This tissue was fixed in 3% glutaraldehyde in 1/10 *M* cacodylate buffer immediately following excision; 1% osmic acid in the same buffer was used for post-fixation.

Dehydration was carried out by passing through alcohol and propylene oxide. The tissue was finally embedded in Epon 812. Thin sections cut with an ultramicro-

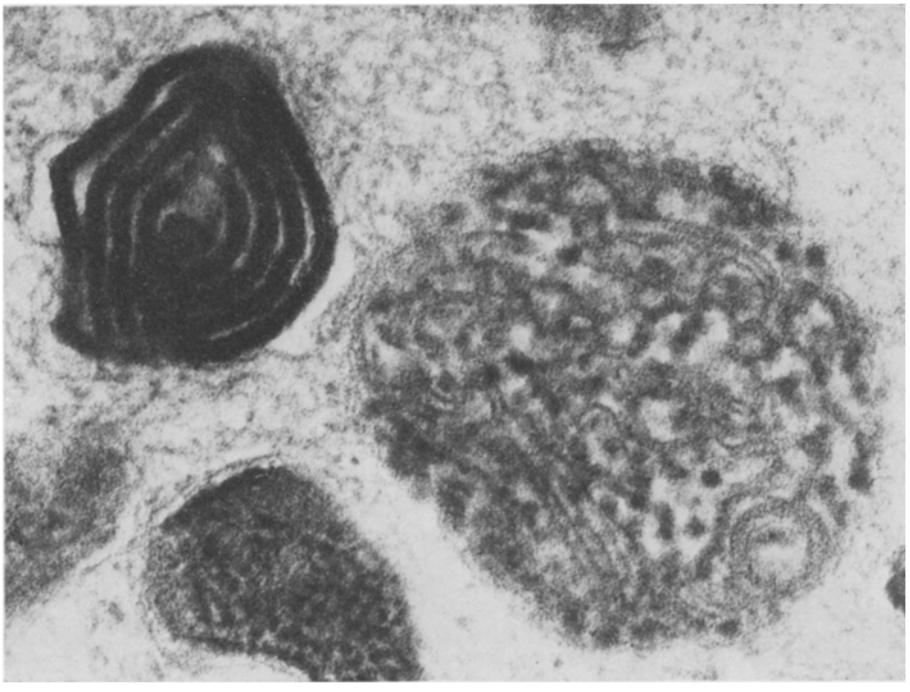

Fig. 1. Abnormal granule made of concentric, dense and large laminations, in a mast cell.

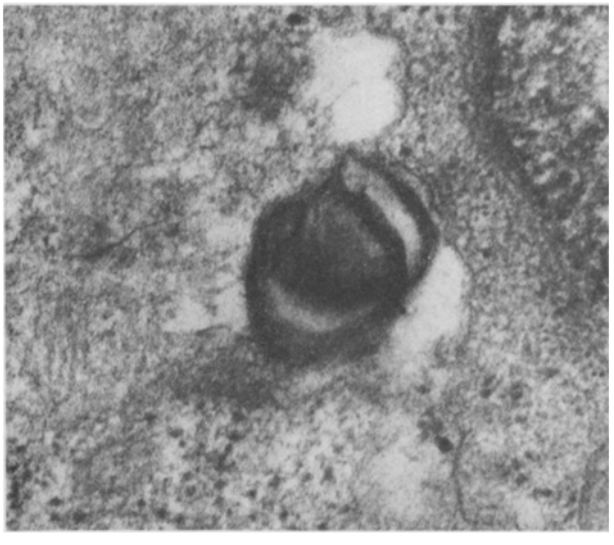

Fig. 2. A dense laminated body in the intercellular space close to a mast cell.

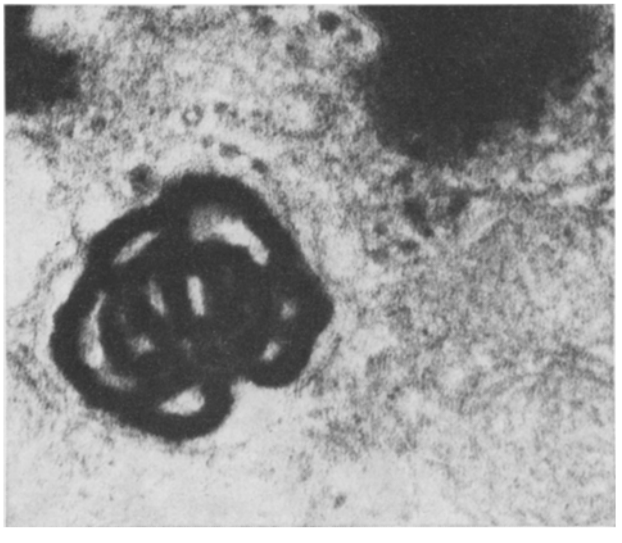

Fig. 3. A granule with a dense laminated pattern close to some lysosomes in the cytoplasm of a histiocyte. The morphology of this dense laminated body is similar to that of the abnormal granule shown in Figure 1.

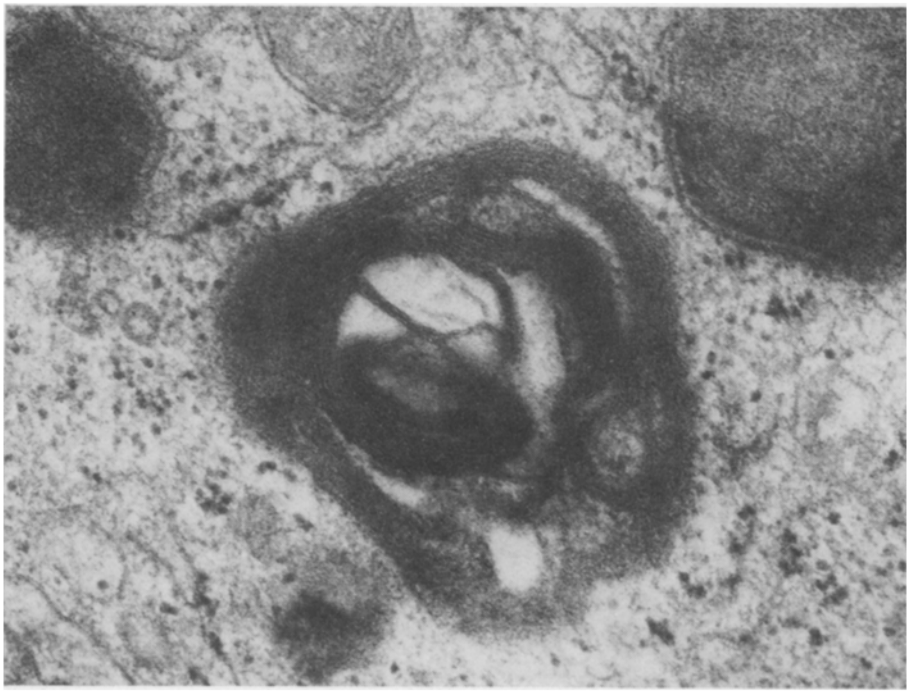

Fig. 4. A phagosome with a laminated pattern in the cytoplasm of a histiocyte and adjacent to some lysosomes.

tome were stained with Reynolds' lead citrate. Stained sections were observed under an electron microscope (Philips 201). 1 μm sections from the same tissue samples were stained with 1% tholuidine bleu solution at pH 7.4 for light microscope.

Light microscope observation is sufficient to recognize the peculiar pathological aspects of Hand-Schüller-Christian disease, namely the presence and dislocation of foam cells, lymphocytes, monocytes, neutrophils, eosinophils, fibrocytes, abnormal histiocytes and multinucleated giant cells.

Moreover, in 1 μm sections certain particular cells are sporadically detected. These are medium-sized cells, round to oval in shape, with central or peripherical nuclei. Their cytoplasm contains many roundish or blackish granules of variable size.

Under electron microscope observation these cells resemble abnormal mast-cells. Some lipid-filled vesicles are scattered among the granules in their cytoplasm. These vesicles are of variable shape, size, density and structure. Every granule is surrounded by a thin membrane; some of them show breakage of the membrane and take a semilunar shape. Spirally arranged granules and fingerprint-like granules are also detectable. Numerous granules are situated in close proximity to the cytoplasmic membrane, which possesses many prolongations often joining the cytoplasm of neighbouring cells. These cells are rich in endoplasmic reticulum and have large mitochondria.

Some granules show lamination patterns with spirally arranged dense layers separated from each other by an electron-light thin fissure. These abnormal granules of the mast cells are similar to those observed in histiocytes of the same neoplastic tissue.

Comment. Ultrastructural investigation showed the presence in mast cells of abnormal granules made of concentric, dense and large laminations. These granules are similar to those found in histiocytes. It is well known that in the granulation tissue pertaining to Hand-Schüller-Christian disease, many eosinophils are usually found, and they are functionally correlated to mast cells.

In this study, numerous eosinophils were observed, and this circumstance is related to mast-cells degranulation; these granules are phagocytized by histiocytes showing a similarity between the lamellar granules of the mast cells and certain kinds of granules which are observed in histiocytes. These granules are incorporated by phagosomes into the histiocytes.

Riassunto. La indagine ultrastrutturale in un caso di istiocitosi X (malattia di Hand-Schüller-Christian in una bambina di 13 anni) ha dimostrato nelle mastcellule la presenza di granuli abnormi lamellari; granuli con analoga morfologia sono stati osservati in cellule istiocitarie in corrispondenza dei lisosomi. È probabile che con la degranulazione delle mastcellule alcuni di questi granuli a tipo di corpi densi lamellari siano fagocitati dagli istiociti.

M. Guarino and C. Cozzutto

Department of Pathology, 'Giannina Gaslini', Institute, Via 5 Maggio 39, Genova (Italy),
25 March 1975.

[1] F. Basset, C. Nézelof and J. Turiaf, Bull. Soc. med. Hop. Paris *117*, 413 (1966).
[2] R. A. Ritter, Cancer *19*, 1155 (1966).
[3] M. V. Barrow and K. Holubar, Medicine *48*, 844 (1969).
[4] K. Hashimoto and M. S. Pritzker, Arch. Dermat. *107*, 263 (1973).