

Sometimes, degenerating densified neuro-secretory fibres appear, being phagocytized by pituicytes themselves (Figure 4). Few cisternae of the rough endoplasmic reticulum, small mitochondria and scarce free ribosomes are observed. The nucleus is variably-shaped, showing abundant masses of condensed chromatin (Figure 1 and 2). Tissue culture provides a simplified experimental model for morpho-physiological investigations: these preliminary observations utilize this technique to investigate organotypic cultures of neural lobes where randomly localized pituicyte-like cells survive among degenerating neuro-secretory fibres. The ultrastructural features common to in vitro and in vivo pituicytes appear to be: a) the irregularity of the cell shape due to the presence of many peripheral cytoplasmic processes; b) the abundance of lipid droplets which are peculiar to the neural lobe of rats⁷; c) the high number of phagocytized degenerating fibres; d) the frequent reciprocal contact between 2 or more pituicyte-like cells.

Finally, the organotypic culture of the neural lobe makes it possible to obtain a relatively pure population of pituicytes, due to the degeneration of the interstitial

neurosecretory fibres: such a fact may be quite useful to evaluate the morpho-physiological behaviour of pituicytes under peculiar experimental conditions.

Riassunto. Nella presente nota preliminare sono analizzati gli aspetti ultrastrutturali di lobi neurali post-ipofisari in coltura organotipica ove si è evidenziata la massiccia degenerazione delle fibre neurosecretorie e la presenza di cellule simil-pituicitarie attivamente fagocitanti le fibre stesse.

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⁷ F. RAVIOLA and G. RAVIOLA, *J. Histochem. Cytochem.* 11, 176 (1953).

Ultrastructural Features of Pituicytes in the Neural Lobe of Adult Rats

The fine structure of pituicytes has been investigated mainly under experimental conditions¹⁻³. The concern of this report is to re-investigate synthetically the ultrastructure of pituicytes under physiological conditions, so far as the general features of this type of cell are concerned.

The hypophyseal neural lobe of adult normal Wistar rats of both sexes – fed with standard diet and water ad libitum – was prefixed with glutaraldehyde in phosphate or cacodylate buffer, postfixed in osmium tetroxide, dehydrated in ethanol and embedded in Epon.

Pituicytes occupy a large part of the neural lobe being interposed among the neuro-secretory fibers originating from hypothalamic nuclei. They show a roundish nucleus with a clear nucleoplasm and a large cytoplasmic area

consisting of a large perinuclear halo (Figure 1) and of peripheral elongated processes (Figure 2). A variable number of lipid droplets are scattered throughout the cytoplasm (Figure 1 and 2). At its periphery, the pituicyte assumes contact with the following structures: a) with the neuro-secretory fibres (for most part of its edge), b) with the interstitial space often represented by basement membrane material (in certain limited areas), c) with other pituicytes.

¹ S. L. PALAY, *Anat. Rec.* 121, 348 (1955).

² J. KRSULOVIC and G. BRÜCKNER, *Z. Zellforsch.* 99, 210 (1969).

³ C. OLIVIERI-SANGIACOMO, *Experientia* 28, 1362 (1972).

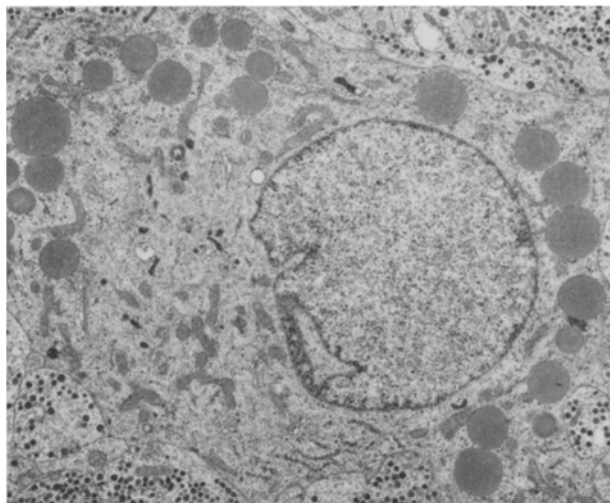


Fig. 1. Neural lobe. A large pituicytic area, recognizable from the typical lipid droplets, is surrounded all around by neurosecretory fibers. $\times 5850$.

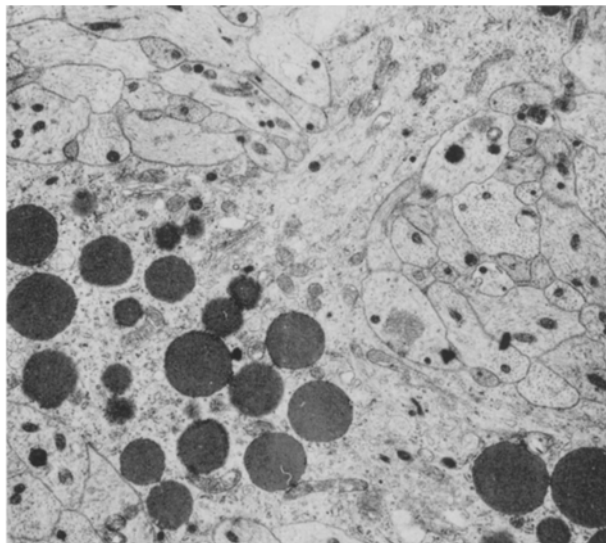


Fig. 2. Neural lobe. A small pituicytic process is emanating from a bigger one rich in lipid droplets. Note, to the right, a synaptoid contact. $\times 7700$.

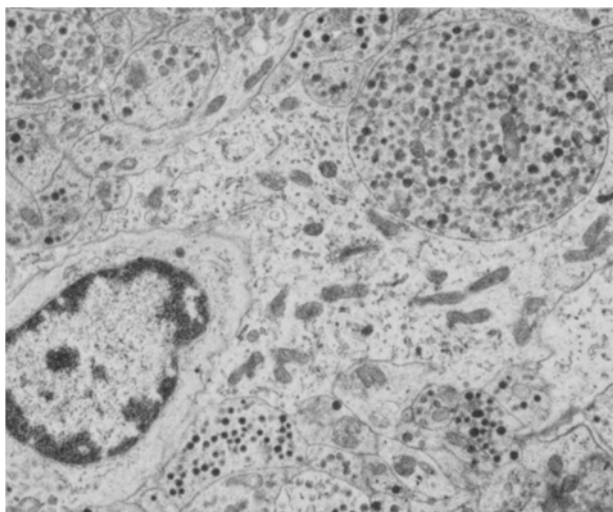


Fig. 3. Neural lobe. At the left a small, scarcely-differentiated cell shows a clear matrix and few organelles. At the right, a neuro-secretory ending is invaginated within the pituicytic cytoplasm. $\times 9750$.

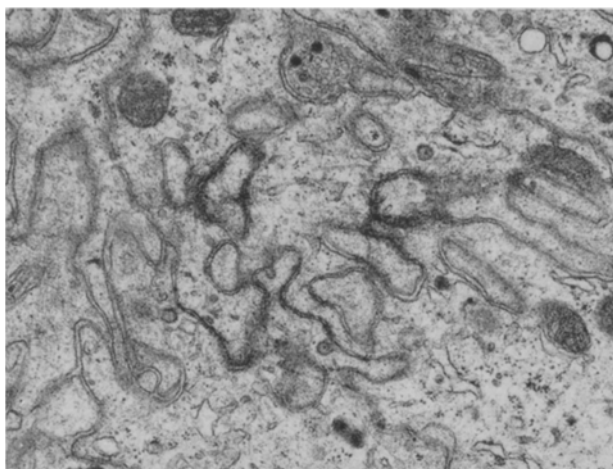


Fig. 4. Neural lobe. Many junctional complexes are interposed among pituicytic processes interweaving with each other. $\times 22275$.

The neuro-secretory fibres surround the pituicyte and often appear invaginated in it (Figure 3). At some point it is possible to observe the synaptoid contacts already described (Figure 2)^{4,5}. The interstitial space which forms, in the neural lobe of rodents, a particularly rich trabecular network⁶, comes into contact with pituicytic surface only in certain circumscribed zones.

Interpituicytic contacts are often interposed between peripheral confluent pituicytic processes: these processes reciprocally interdigitating assume in such zones a labyrinthine configuration (Figure 4). The interpituicytic contact points are characterized by the presence of variably-shaped junctional complexes generally lacking the filamentous contribution⁷.

Furthermore, small scarcely-differentiated cells are observed which show a dense nucleus and a clear cytoplasmic matrix, and often are in contact with typical pituicytes (Figure 3).

The pituicyte is considered as an interstitial glia-like specialized cell of the hypophyseal neural lobe⁸⁻¹⁰. The possibility has been suggested of a bidirectional trophic action between pituicytes and neuro-secretory fibres: one morphological expression of such action may be given by the synaptoid contacts already described^{4,5}, but another may be represented by the pituicytic processes which, being so extensively developed, enormously increase the surface contact and the metabolic exchange between the two structures.

The labyrinthine interweaving of peripheral processes interconnected by variably-shaped junctional complexes seems to be a linking interpituicytic device, both from a mechanical and metabolic point of view. The existence of different types of pituicytes¹⁰ has been supposed. These observations, although not confirming such a hypothesis at least in the rat show the existence of rare and scarcely-differentiated cells lacking the typical features of pituicytes but possibly differentiating in that direction under normal or peculiar conditions.

Riassunto. Nella presente nota sono sinteticamente analizzati i caratteri ultrastrutturali dei pituiciti e, in particolare, i rapporti dei pituiciti stessi con le fibre neuro-secretorie spesso realizzanti a livello dei prolungamenti pituicitari periferici, le zone di contatto interpituicitario ricche di complessi giunzionali e l'esistenza nel lobo neurale di cellule poco differenziate che potrebbero rappresentare i precursori dei pituiciti maturi.

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⁴ F. KNOWLES and L. VOLLRATH, *Nature*, Lond. 206, 1168 (1965).

⁵ Y. NAKAI, *Z. Zellforsch.* 110, 27 (1970).

⁶ R. BARER and K. LEDERIS, *Z. Zellforsch.* 75, 201 (1966).

⁷ M. G. FARQUHAR and G. F. PALADE, *J. Cell Biol.* 17, 375 (1963).

⁸ H. M. GERSCHENFELD, J. H. TRAMEZZANI and F. DE ROBERTIS, *Endocrinology* 66, 741 (1960).

⁹ F. M. RODRIGUEZ and J. LA POINTE, *Z. Zellforsch.* 95, 37 (1969).

¹⁰ D. ZAMBRANO and F. DE ROBERTIS, *Z. Zellforsch.* 86, 14 (1968).

On the Occurrence of Spaces Similar to Intercellular Canaliculi in the Leydig Cells of Mice

Numerous recent electron microscopic observations have confirmed the presence of a large perivascular space in different endocrine cells. Further, it is well known that the plasma membrane of the pericapillary secretory cells are generally provided with numerous irregular microvilli. These morphological aspects have been commonly related to the secretory exchanges occurring between the endocrine cells and the endothelial cells¹.

In the course of submicroscopic studies on the mouse testis, an unusual arrangement of the perivascular and intercellular spaces in the Leydig cells was observed. The present paper deals with the presence of characteristic spaces somewhat similar to 'canaliculi' existing in the

¹ A. GIROD, *Leçons sur les Glandes Endocrines* (Simep, Lyon 1968).