The Localization of Ouabain-sensitive, K^+-dependent, paranitrophenylphosphatase(Na^+, K^+-ATPase), Mg^{++}ATPase and 5'-Nucleotidase(5'-Nase) Activities in the Rat Pineal Gland

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Electron microscopic cytochemistry of Na^+, K^+-ATPase, Mg^{++}-ATPase and 5'-Nase in the rat pineal gland cells were studied.

After transcardiac perfusion fixation with ice cold each fixative: 0.5% glutaraldehyde(GLA), 2% paraformaldehyde(PFA) in 0.1M cacodylate buffer(pH7.2) for Na^+, K^+-ATPase; 2% GLA, 2% PFA, 8% sucrose in 0.1M cacodylate buffer(pH7.4) for Mg^{++}-ATPase; and 0.5% GLA, 2% PFA, 0.25M sucrose in 0.1M cacodylate buffer(pH7.4) , the removed pineal gland were immersed in the same fixative for 60min and followed overinght washing. The frozen sections(40μ m) incubated in the following method: for Na^+, K^+-ATPase in the method of Mayahara et al(1979), for Mg^{++}-ATPase in Wachstein and Meisel's(1957) and for 5'-Nase, in Robinson and Karnofsky's (1983).

The activity of Na^+, K^+-ATPase was situated, mainly in the anti-luminal side of capillary endothelial cell and was scattered in the mitochondria of pineal parenchymal cells. Mg^{++}-ATPase activity was localized mainly on the plasma membrane of Schwann cells and nerve fibers. 5'-Nase activity was present in the luminal side of capillary endothelial cells and lysosomes of pineal parenchymal cells.

These results indicated that the possible function of these enzymes in the pineal gland might be related to transpot of intrinsic substances.

Coexistence of Cholecystokinin-8 and Calcitonin Gene-Related Peptide in the Rat Parabrachial Nucleus

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A light microscopic mirror technique was carried out to examine the coexistence of cholecystokinin-8 (CCK) and calcitonin gene-related peptide (CGRP) in single neurons of the parabrachial nucleus (PB). A large number of CCK-like immunoreactive (LI) cells occurred in the superior lateral subnucleus of the PB, whereas many CGRP-LI neurons were seen in the superior lateral subnucleus and external lateral subnucleus of the PB. The mirror technique revealed that about 30 % of CCK-LI neurons displayed CGRP-like immunoreactivity and approximately 50 % of CGRP-LI cells were immunoreactive to CCK. Diameters of cells which contained both CCK- and CGRP-like immunoreactivity ranged from 12 to 20 μm. We have previously demonstrated that CCK-LI cells and CGRP-LI cells in the superior lateral subnucleus of the PB project to the ventromedial hypothalamic nucleus (VMH). Consequently, some of the neurons which display both CCK- and CGRP-like immunoreactivity may also project to the VMH.

Ultrastructural Morphology and Immunohistochemistry of the Rat Pineal Gland

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In the present study, normal adult Sprague—Dawley rat pineal gland was observed on the electron microscopic level to distinguish and characterize the cells of the gland.

After transcardiac perfusion fixation with Karnofsky's fixative, the removed pineal gland was immersed the same fixative overnight to morphological study. For immunocytochemistry of GFAP(glial fibrillary acidic protein) with PAP method, the fixative [0.5% glutaraldehyde, 2 % paraformaldehyde and 0.2% picric acid in 0.1M phosphate buffer(pH 7.4)] was used for transcardiac fixation.

Morphologically, two main types in the rat pineal parenchymal cells are evident: pinealocytes and interstitial cells. Since to date, pineal "interstitial cells" or glial cells have been inadequately defined, the immunocytochemisty of glial fibrillary acidic protein(GFAP) was investigated.

In the present study, it was the first to observe GFAP positive cell processes of the pineal gland under electron microscopy that are similar to the cell processes having glial filaments in morphological observations.

Immunohistochemical localization of S-100 protein in salivary gland and kidney of mice, rats and hamsters

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The S-100 protein originally isolated from brain belongs in a class similar to that of Ca^{2+} binding protein which include calmodulin, troponin-C and intestinal calcium-binding protein. Consequently, S-100 protein containing cells probably participate in Ca-mediated process. Immunohistochemical localization of S-100 protein has been reported in the central and peripheral nerve tissues. In this study, immunohistochemical staining for S-100 proteins(polyclonal antiserum and monoclonal antibodies α and β) in salivary gland and kidney of mice, rats and hamsters was compared with three different fixatives(Bouin, PLP and BGPA). S-100α protein was particularly positive in duct in salivary gland. In kidney, S-100α protein was positive in proximal and distal tubule. S-100β protein was localized in serous acinar cell in rat only. It is suggested that S-100α protein participates with Ca mediated mechanism as well as water and ion absorption.