

Thesis Title            IMMUNOCYTOCHEMICAL STUDY OF AMINO ACIDS  
TRANSMITTER AND NEUROPEPTIDE IN PINEAL  
GLAND

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Degree                  Master of Science (Neurosciences)

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Date of Graduation 19 July B.E. 2534 (1991)

#### ABSTRACT

The indirect evidence indicating neuropeptide Y (NPY), gamma-aminobutyric acid (GABA) and glutamate in the maintenance of physiological functions of the pineal gland has been proposed. However, the presence of these nerve fibers has not been demonstrated. In the present study, therefore, the immunocytochemical localization of NPY, GABA and glutamate were performed in the pineal gland of cat (Felis domesticus) and bovine (Bos taurus) by using polyclonal antibodies against NPY, GABA and glutamate with the peroxidase-antiperoxidase (PAP) complex method.

By the use of free floating and semithin technique, a large amount of NPY-immunoreactive (IR) nerve fibers was demonstrated throughout both cat and bovine pineal gland. These fibers were located in the periphery

usually piercing into the gland together with blood vessels as well as in the parenchyma, where the fibers intervened between the pinealocytes and perivascular space. They then terminate on the pinealocyte membrane as terminal-like dots. Within the rostral and caudal pineal stalk, the NPY-IR fibers were also observed and could be followed into the gland. Therefore, the NPY-fibers have been suggested to originate from sympathetic ganglia coming into the gland from the periphery and from the brain via rostral and caudal stalk.

Concerning the GABA-immunoreaction in the semithin technique, GABA-IR fibers interposing between the pinealocytes and terminal-like dots on the pinealocyte membrane were observed in cat and bovine pineal gland. In addition, cluster of GABA-IR pinealocytes were demonstrated in bovine pineal gland. These findings may indicate their possible role a local circuit in controlling enzyme serotonin-N-acetyltransferase activity. On the other hand, in cat pineal gland, GABA-IR glial cells were observed. These cells may act as the primary sites of synthesis and uptake of GABA in the pineal gland.

Moreover, the Glutamate-immunoreaction on the semithin sections showed Glu-IR fiber and terminal-like dots in both cat and bovine pineal gland. In addition, the Glu-IR pinealocytes were also found throughout the gland in both species. The Glu-IR fibers made contact with both positive- and negative-glutamate

pinealocytes, ending as terminal-like dots on their membranes.

Therefore, the present study supports the proposed NYPerergic, GABAergic and glutamatergic innervation in the pineal gland.