

Thesis Title Identification and Characterization of
5HT₂ Serotonin Receptor Site in Bovine
Pineal Gland

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ABSTRACT

Several lines of evidence previously indicated that serotonin receptor, categorized into three major families, might exist in pineal gland. By using radioligand binding technique 5HT₂ serotonin receptors subtype have been identified and characterized in bovine pineal gland, however, it is unlikely having this binding site in rat pineal gland. [³H]-spiperone was used as a radioligand whereas ketanserin, selective 5HT₂ serotonin antagonist, was suitable for non-specific binding drug. The saturation experiment of 5HT₂ serotonin receptor sites in bovine pineal gland revealed a single binding site with a dissociation equilibrium constant (K_D) of 1.26 ± 0.41 nM and a receptor density (B_{max}) of 193 ± 38.85 f mol/mg protein. In displacement experiment, IC_{50} , the concentration of the drugs required to inhibit 50% of the

specific binding, were determined in the descending order of potency in competing with ligand binding to be methysergide > ritanserin > pirenperone > pipamperone > ketanserin > cyproheptadine > M-trifluoromethylphenyl-piperazine > prazosin > 5-methoxy-N-N-dimethyltryptamine hydrogen oxalate > 1-(3-chlorophenyl) piperazine > serotonin. In rat pineal gland, saturation curve of [³H]-spiperone binding indicated K_D value of 25.77 ± 10.7 nM and B_{max} value of 1244 ± 471.86 f mol/mg protein.

The role of 5HT₂ serotonin receptor sites in pineal gland was investigated by studying the effect of selected 5HT₂ serotonin agonist and serotonin on the basal and on the isoproterenol stimulated activity of serotonin-N-acetyltransferase (SNAT) in bovine pineal explants as well as in rat pineal glands in organ culture. The selective 5HT₂ serotonin agonist, 1-(2,5-dimethoxy-4-iodophenyl)-2-aminopropane (DOI), significantly inhibited the SNAT activity in bovine pineal explants and rat pineal glands in culture, nevertheless, it potentiated isoproterenol-induced activity of SNAT in rat pineal glands in culture.

In conclusion, the results of these studies indicate that 5HT₂ serotonin receptor obviously exists and plays the role to inhibit SNAT activity in bovine pineal gland. Whereas, in rat, serotonin potentiates isoproterenol-induced activity of SNAT and its mechanism(s) need further clarification.