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Dopaminergic markers in rat thymus

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The aim of this work was to study rat thymus micro-anatomical localization of dopamine D1, D2 receptors and dopamine transporter (DAT) immune reaction. Recent our unpublished resuts have found expression of dopamine, dopamine receptors and DAT in thymus, suggesting a role of the dopaminergic system in the maturation and selection of lymphocytes and the activation of immune response. Indeed, other studies have pointed out dopamine and noradrenaline co-release by sympathetic fibers innervating cortical medullar and medullar regions of the thymus. DAT is an important marker for the dopaminergic system indicative of a dopamine reuptake; it is normally expressed in cells involved in dopaminergic neurotransmission. In the present work, we observed that dopamine and DAT have similar immune reactive appearance and localization in thymus parenchyma. Furthermore, our findings after specific nerve axotomy show that it cannot be excluded that a dopaminergic system is present in sympathetic nerve fibers.

It has been hypothesizezd non-synaptic release of dopaminergic neurotransmitters by sympathetic

fibers. Indeed, neurotransmitter release diffusion in a paracrine fashion may explain the normal appearance of dopamine immune reaction in many cells of the thymus.

D1 and D2 receptors are the most widespread receptors types in dopaminergic system, performing intracellular events, and acting by different pathways. Dopamine and dopamine receptors were widely diffused in the lobular cortical medullar junction region and in the medulla of the thymus, where the final steps of thymocyte maturation and their trafficking take place. No variation in dopamine and DAT immune reaction was observed following total or partial parasympathectomy or phrenic nerve cutting. After chemical or surgical sympathectomy however, neither dopamine nor DAT immune reaction was noted again. On the contrary, D1 and D2 dopamine receptor expression was not affected by thymus enervation. These findings on dopaminergic system highlight the importance of neurotransmitter receptor expression in the homeostasis of neuronal immune modulation.