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5-Ht5a Receptors during Ontogeny

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Introduction

Serotonin is one of several neurotransmitters that are small molecules acting in developing organisms also as morphogens and growth factors; small metabolites are often regulatory signals to control gene expression [1,2]. The action of these molecules is led by the activation of their receptors but it might be considered also that some of them are biosynthesized from amino acids and can be reactive species, participating in other ways in the metabolism and signaling pathways, as serotonylation for example [3].

They act specifically through the activation of its own receptors but they can also be modulators of other signaling pathways; serotonin is an allosteric modulator of nicotinic receptor for example [4].

Our group has been working in the expression of the receptors during ontogeny for glycine, GABA, purinergic signals and, particularly, serotonin [5-9].

Our group had reported some findings of 5-HT5A receptor during ontogeny of the rat as well as in the chicken [10]. Serotonin signaling during neurulation can be of particular interest, considering that neural tube defects are a frequent type of congenital malformations; the exposure of mouse embryos to 5-HT2 ligands results in craniofacial and cardiac malformations. Trophic actions of 5-HT2B is well recognized, and the participation of other serotonin receptors may be involved in a fine-tuning action for this molecule. 5-HT5A was found to be expressed differentially in somite's, caudal region and encephalon, suggesting a role for this subtype of receptor in the development of several systems, including the central nervous system [10].

In the rat we have found changes in the expression of 5-HT5A receptor particularly in hippocampus, which is one of the well-known areas that have adult neurogenesis. It is differentially expressed compared to 5-HT2C and 5-HT7 [9].

In conclusion, members of the 5-HT receptors, especially 5-HT5A are expressed during early development, suggesting a possible role during morphogenesis.

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