FC26-06

DEVELOPMENT OF INTERNEURONS EXPRESSING SEROTONIN 3A SUBTYPE RECEPTOR AND SLEEP REGULATION

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Introduction: Serotonin (5-HT) is known to play a key role in a number of psychiatric disorders. The effects of abnormal 5-HT neurotransmission on the modulation of circadian rhythm have been proposed to be one of the mechanisms underlying these disorders.

Objectives and aims: Here we describe developmental characteristics of interneurones (IN) expressing 5-HT type 3A receptor (5-HT3AR) in mice. This receptor is a ligand-gated ion channel which activation leads to a rapid excitatory response in neurons.

The expression of 5-HT3AR during embryonic development in mice is mainly restricted to caudal ganglionic eminence (CGE) and entopedoncular area (EPA). We hypothesized that these regions are those specifically involved in the neurogenesis of the IN expressing 5-HT3AR.

Methods: To assess this hypothesis, we used homochronic in utero grafts. Cells were collected from CGE and EPA regions of transgenic mice embryos expressing Green Fluorescent Protein under the control of 5-HT3AR gene promoter. After in utero transplantation in non transgenic embryo, we examined at adult age the location of the grafted cells, as well as their morphological properties.

Results: We observed that CGE-derived cells gave rise to IN that mostly populated the neocortex and the hippocampus, whereas EPA-derived cells integrated the amygdala, the pyriform cortex and the Ventro-Lateral Pre-Optic (VLPO) nucleus. Moreover, the VLPO EPA-derived cells are similar to “sleep active cells” found in this region and responsible of sleep induction.

Conclusion: These results lead to the better understanding of the IN expressing 5HT3AR development. Its activation is possibly implicated in triggering sleep mechanismes.

https://doi.org/10.1016/S0924-9338(11)73667-7 Published online by Cambridge University Press