

Ketamine administration at the 1-4 somites stage zebrafish does not alter the distribution patterns of serotonin 5-HT-2B receptor in adult animals

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INTRODUCTION

Ketamine is a dissociative anaesthetic, which also exerts antidepressant effects, especially by acting on serotonin receptors. The 5-HT-2B serotonin receptor is known for its distribution in human brain, gut, and heart. This receptor is described to have important roles in the peripheral and central nervous system (CNS) being a therapeutic target of antidepressant effects and required for the action of selective serotonin antidepressants. Zebrafish is a widely used model in research, namely in antidepressant and toxicological studies, and an ortholog to mammalian 5-HT-2B receptors is present in zebrafish. Nonetheless, their precise distribution in the zebrafish CNS is still poorly identified. The aim of this study was to determine the distribution patterns of 5-HT-2B in the CNS of larvae and adult zebrafish, following ketamine exposure.

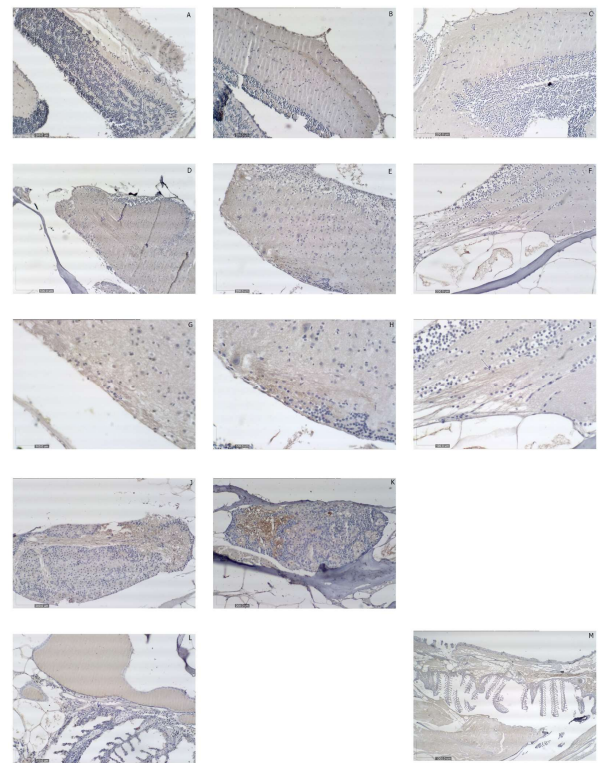
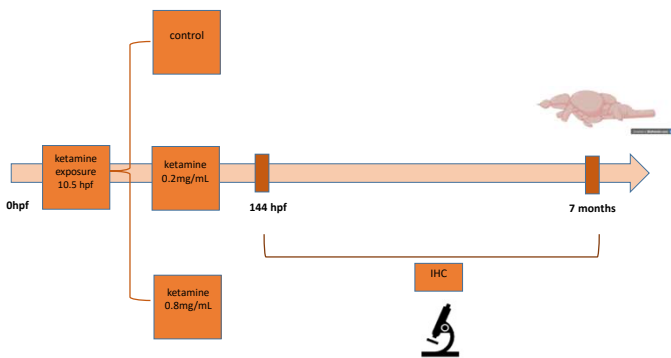


Figure 1. Representative images of 5-HT-2B expression in the CNS of adult zebrafish: A, D, G and J control group animal; B, E, H, K ketamine 0.2 mg/mL exposed animals; C, F, I and M ketamine 0.8 mg/mL exposed animals.

RESULTS

5-HT-2B expression was only seen in the CNS of adult zebrafish: olfactory bulb (OB), optic tectum (TeO), torus longitudinal (TL), medulla oblonga (MO), vagal lobe, and in the pituitary and thyroid glands, with no apparent differences between groups. Figure 1 expression was seen in TeO, in all groups (A, B, C) as well as in MO both at 200x (D, E, F) and at 400x magnifications (G, H, I). Pituitary expression was seen in sections of control (J) and ketamine 0.2 mg/mL (K) groups. Thyroid also evidenced expression (L and M).

CONCLUSION

The study revealed widespread expression of 5-HT-2B in the adult zebrafish CNS regardless of ketamine exposure. As in humans, zebrafish serotonin seems to be involved in the hypothalamus-pituitary-thyroid axis activity, as 5-HT-2B receptors were detected in the pituitary and thyroid glands.

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