

Title: Functional characterization of the zebrafish amygdala using behavioral paradigms and immunohistological detection of the neural activity marker pERK

Abstract

To develop zebrafish models for human affective disorders, the project establishes behavioral experiments and neural activity readouts tailored to the functional characterization of brain regions. Specifically, the project will test our hypothesis that two dopaminergic amygdaloid nuclei, namely the anterior and posterior divisions of the putative bed nucleus of the stria terminalis (BSTa, BSTpd) are involved in emotional associative learning. Preliminary data in fact suggest that the dopaminergic BST nuclei modulate associative learning and reward via their potential connections with other regions of the emotional brain. The overall goal of this project was to establish behavioral paradigm's that would allow us, in the future, to test this hypothesis. As part of the research program, Carter Hall reprogrammed a computationally operated behavior chamber and performed preliminary behavioral experiments. The zebrafish were successfully trained for choice preference and Carter was able to solve some of the major issues. These results will allow the Mueller lab in the future to update the program and deepen their behavioral analyses. In addition to performing behavioral studies, Carter performed immunohistochemistry on the transgenic reporter line Tg(tac1:GFP) that allows to visualize substance P expressing neurons critical for emotional responses to stress. The project yielded a number of complete series of brain sections that will become a part of a molecular atlas critical for establishing zebrafish models of human affective disorders.