Investigating COMT Influence on the Proactive-Reactive Stress Coping Axis in Zebrafish

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Background

Proactive-Reactive Stress Coping Axis

Explosive Behavior

Fearful Behavior

Stress/Anxiety

Low

Low

High

High

Stress coping styles often consist of combined rates of behaviors. One set of alternative stress coping styles found in many species consist of behavior on a proactive (High) and reactive (Low) axis, which emerge out of an array of neural and genetic mechanisms.

Controlled-Dopamine-transferrin— A regulator of stress behavior in the frontal lobe, one neural mechanism which may play a role in proactive coping styles. Proactive coping is higher in zebrafish individuals compared to reactive individuals.

Materials and Methods

COMT expression in zebrafish is affected by many environmental and hormonal conditions. This study used a combination of different methods: qPCR, Western Blot, and Behavioral testing. qPCR was used to measure expression levels across different conditions, and Western Blot to confirm the expression of COMT in the brain. Behavioral testing was used to assess stress coping styles.

Conclusions and Future Directions

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<th>Outcome</th>
<th>Description</th>
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<td>25/25</td>
<td>Survived at 24h — a common time point in similar studies (Varshney et al., 2016).</td>
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<td>18/25</td>
<td>Mortality rate increased over time as stress and reactive stressors were introduced.</td>
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18/25 individuals (76%) were verified for genotype variants by HRMA

18/25 - 9 individuals (data not shown for 10/25) assayed by HRMA.

18/25 verified for variants in the target region compared to controls.

18/25 verified for variants in 5/25 individuals aligned with those of controls; individuals removed from the study.

15/18 HRMA verified individuals assayed by qPCR sequencing.

Enzymatic and Clinical assessment revealed 100% identity of the target sequence.

Within and downstream of the target sequence, various mutation types were revealed.

Several samples displayed heterozygosity; sequencing files were deconvoluted and base-calls manually modified to distinguish between variants.

Across variants, 15/18 individuals displayed successful frameshifting- causing and/or other mutation types.

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References


