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FINAL PROGRAM

The dynamics of the response of brain serotonergic and dopaminergic systems to an acute stressor in rainbow trout

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During the fish stress response, both the brain-sympathetic-chromaffin (BSC) and the brain-pituitary-interrenal (BPI) neuroendocrine axes become activated, resulting in the release of catecholamines and cortisol into circulation. The role of brain serotonergic and dopaminergic systems in controlling these axes is not well known. It has been shown that serotonergic activity increases consistently after exposure to different stressors. The dopaminergic response to stress is less consistent and seems to depend more on the type and duration of the stressor. The serotonergic system is involved in the BPI axis in a complex manner: At short term, an increase in serotonergic outflow may activate the BPI axis. On the other hand, situations of prolonged or chronic stress may affect the basal level of serotonergic activity more permanently. In order to obtain a picture of the timing of monoaminergic activation during the acute stress response, we analized telencephalic and hypothalamic monoaminergic activities in fish sacrificed after handling stress for 0.25, 2, 5 and 15 min. In a second experiment, the animals were exposed to handling stress for 5 min and sacrificed after 15, 45, 120, 240 and 480 min. Several stress markers such as the plasma levels of catecholamines, glucose, lactate and cortisol were also monitored. In the obtained temporal sequence of activation of the several parameters, it was noteworthy the very rapid activation of the serotonergic system, that resulted obvious even at only 15 sec. The relevance of such a rapid response of serotonergic activity within the integrated stress response of the fish remains to be determined. The increase in the serotonergic activity seems to occur previously to the massive release of catecholamines to plasma, suggesting that the serotonergic system could have also a role in the activation of the BSC axis.