A simple melatonin treatment protocol attenuates the response to acute stress in the sole Solea senegalensis - DTU Orbit (07/09/2017)

Several compounds have been tested in fish in order to attenuate the effects of different stressors, most often following previous observations in mammals. The hormone melatonin (MEL) and the amino acid L-tryptophan have been tested for this purpose with different degree of success. In Senegalese sole (Solea senegalensis) we have previously observed that during prolonged exposure to relatively mild stressors, the presence of MEL in the water helped to reduce the stress response. Here, we aimed to investigate the potential anti-stress effects of a short melatonin exposure that could be easily performed in fish farms before an intended manipulative event with the animals. Our results demonstrate that adding MEL to the tanks 30 min before an acute chasing stress is effective in reducing the intensity of the stress response in fish from its beginning, as evidenced by the attenuated and delayed cortisol response in MEL-exposed animals. The hypothalamic levels of serotonergic activity and the mRNA levels of corticotropin-releasing factor were also attenuated in MEL-treated fish, suggesting that MEL effects occur through its inhibitory actions on the CNS pathways controlling the stress response in Senegalese sole. In view of the observed anti-stress effects of MEL, further research is warranted in order to optimize doses and timing of application to improve the effectiveness of the MEL treatment for aquaculture purposes.
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