Let's talk about stress: Can we measure the stress of a flatfish?

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Marine fish reside in a stressful environment. Wind farms, fishing activities, cruise ships, dredging but also rising seawater temperature, changing salinity and others can cause a disruption of the environment and increase the stress of the fish. This stress evokes a hormonal stress response regulated by the hypothalamus - pituitary gland - interrenal axis (HPI axis). The outcome of the activation of the HPI-axis is the production of cortisol which on its turn can help the fish to adapt to the change and cope with stress. When certain stressors remain for a longer period of time, fish experience chronical stress. This can cause harmful effects on the health and growth of fish. Despite its importance, only recently a method was pinpointed to investigate the chronical stress level of fish by evaluation of the glucocorticoid profile in the scales (Aerts et al., 2015). However, this method was only tested in aquaculture species and never in wild caught fish. Hence, the main aim of the study was to investigate the glucocorticoid profile in wild caught common dab (*Limanda limanda*). If glucocorticoids, and more specifically cortisol, are stored in the scales, this can offer a good biomarker to measure chronical stress in common dab and can even help to assess the effect of anthropogenic activities at sea.

In total 111 fish were caught and the glucocorticoid profile of the scales was analyzed of all fish. Scales of 75 fish were analyzed immediately after catch. The other 36 fish were kept in artificial environments for 4 (18 fish) or 6 (18 fish) months after which the glucocorticoid profile was analyzed.

Scales of fish that were analyzed immediately after catch contained on average 0.004 ± 0.006 µg cortisol per kg scales. Scales of fish that were kept under artificial circumstances contained more cortisol (0.066 ± 0.066 µg/kg). This demonstrates that common dab is able to store cortisol in their scales and that this analysis can be used as a biomarker for chronical stress.

Furthermore, it also indicates that wild-caught fish kept in artificial environments endure chronic stress which has to be kept in mind when performing long-term experimental studies.

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