ASSESSING NEUROTOXIC EFFECTS OF CADMIUM ON JUVENILE SEABASS (*DICENTRARCHUS LABRAX*)

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Background

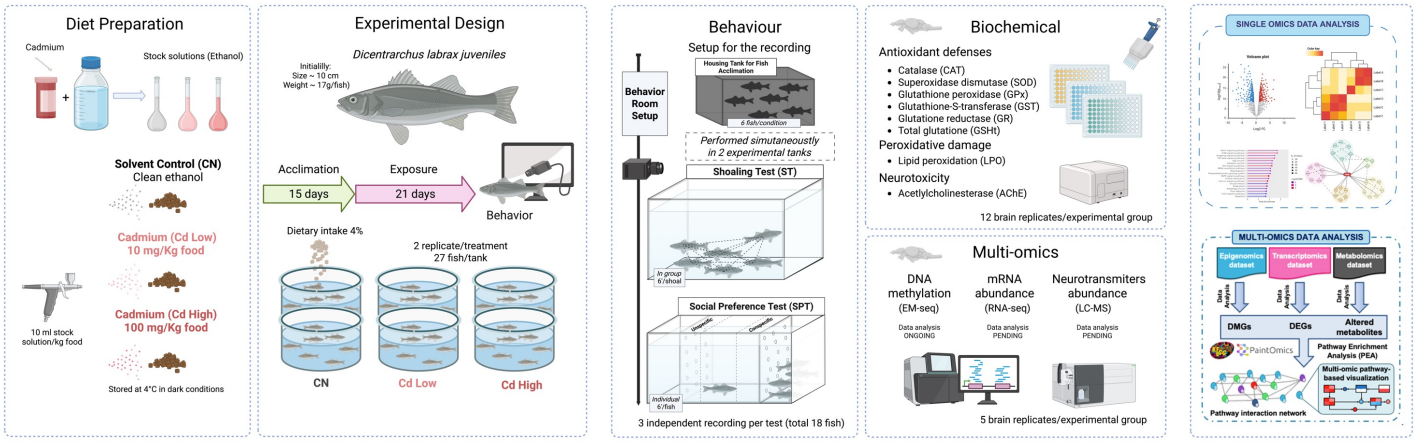
Cadmium (Cd) is a major pollutant of serious concern in aquatic environments due to its impact, bioaccumulation potential and resistance to degradation. These factors contribute to the spread of Cd contamination through the food chain [1].

While Cd-induced alterations in neurodevelopment and locomotor behaviour are well established in model organisms such as *Danio rerio*, its effects on aquaculture species like *Dicentrarchus labrax* remain poorly understood [2].

AIM: To assess the neurotoxic effects of Cadmium in European sea bass (*Dicentrarchus labrax*) juveniles after 21 days of dietary exposure

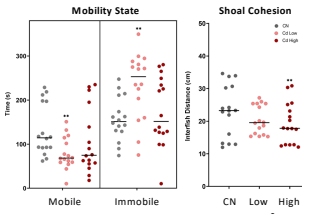
Methods

21-day Chronic Dietary Exposure

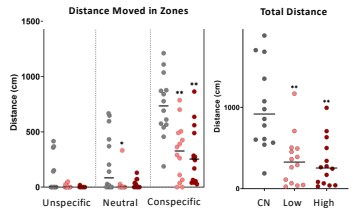


Results and Discussion

Shoaling Test (ST)



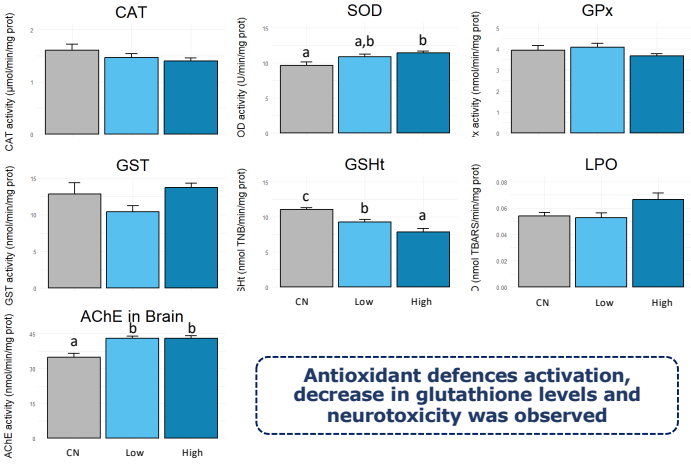
Social Preference Test (SPT)



- Fish exposed to Cd Low spend more time in a immobile state
- An increase in cohesion and a decrease in basal locomotor activity observed in fish exposed to Cd

Decrease in Swimming activity + more time in immobile state + increase in cohesion = stress or anxiety-like responses

Biochemical



Antioxidant defences activation, decrease in glutathione levels and neurotoxicity was observed

Takeaway Message: The current results highlight the neurotoxic effects of dietary cadmium (Cd) in the fish brain, as evidenced by the increased activity of the neurotransmitter-related enzyme acetylcholinesterase (AChE), followed by antioxidant imbalances. Behavioural endpoints further support this conclusion. This study highlights the need to incorporate sublethal endpoints into toxicological monitoring studies to protect marine ecosystemsThese findings may have potential ecological implications that warrant further investigation.

NEXT STEPS: To conduct pending data analysis on whole genome DNA methylation (EM-seq), transcriptomics (RNA-seq) and neurotransmitters to better elucidate the molecular mechanisms causing neurotoxicity and behavioural changed after exposure to cadmium. This integrative strategy will help uncover novel biomarkers and mechanistic insights, improving environmental risk assessment frameworks for aquatic toxicants.

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