

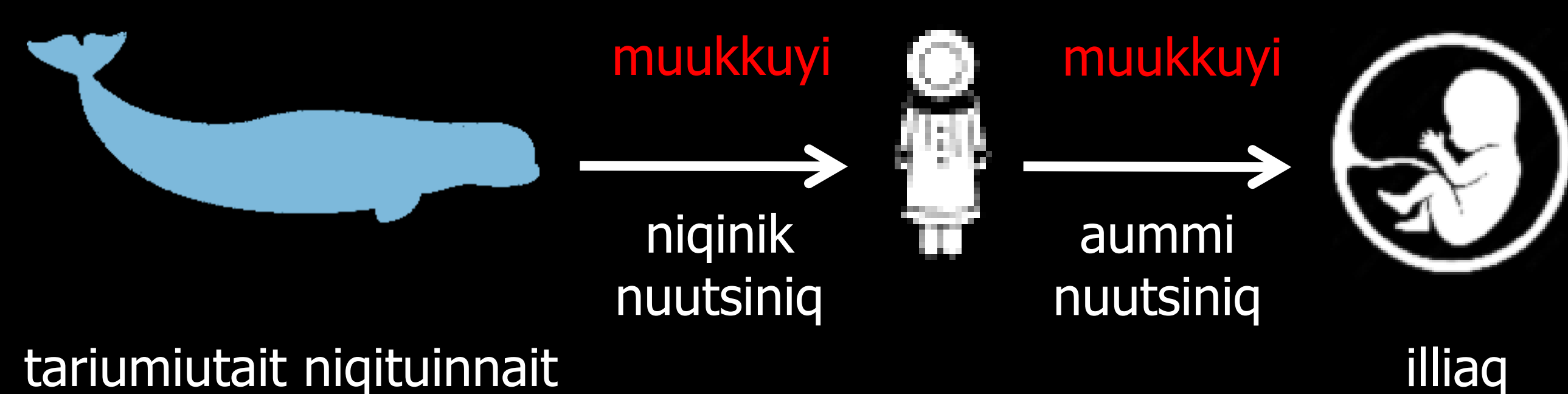
# Can Selenoneine alleviate Methylmercury Toxicity ? In-Laboratory Study Using The Zebrafish Model

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## I) Introduction

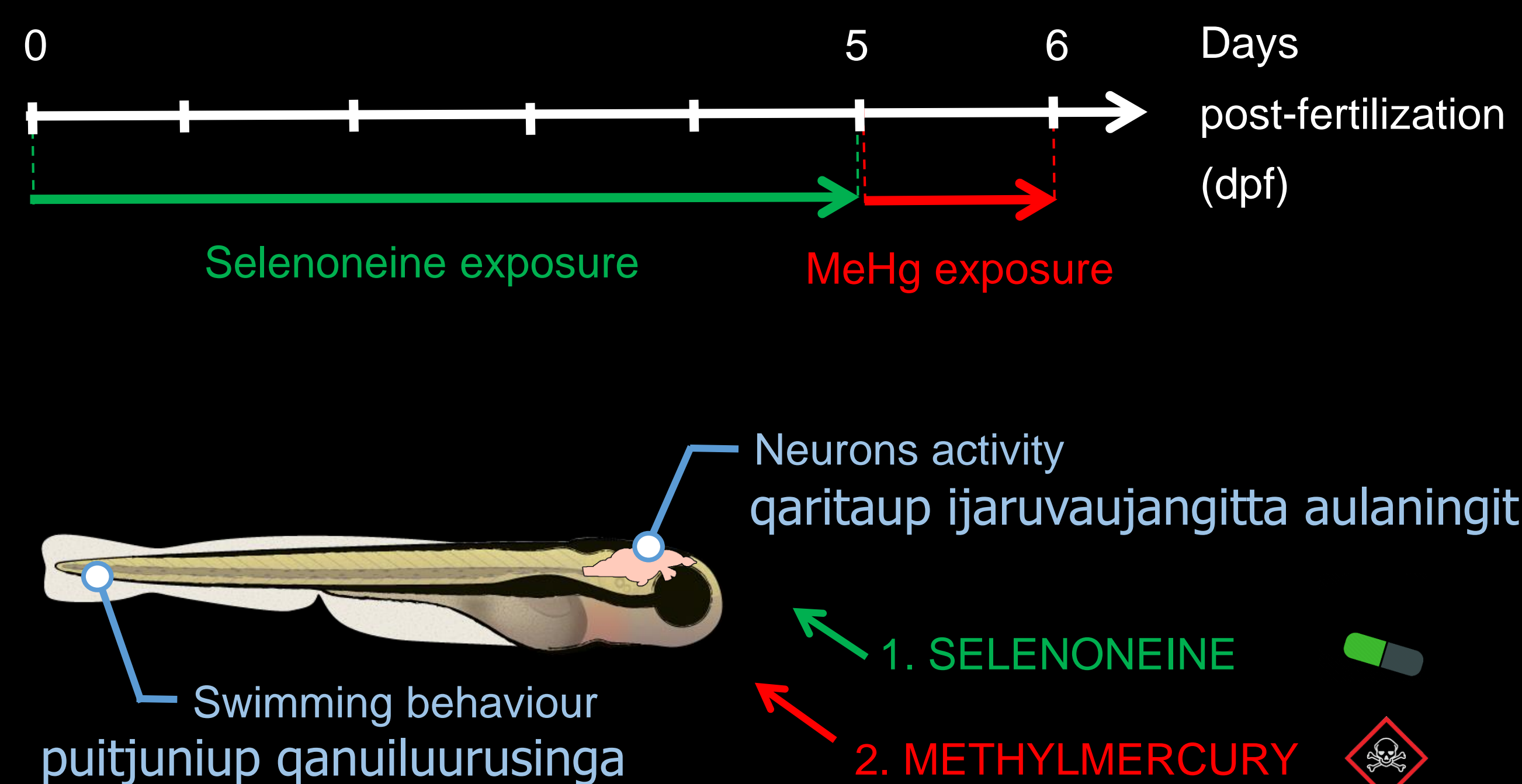
- Coastal populations worldwide are exposed to methylmercury (MeHg) through marine food consumption.
- Inuit are highly exposed to MeHg especially due to their consumption of marine mammal meat.
- Fetuses are most vulnerable to MeHg exposure, which affects brain neuronal development qaritarmigut pirurpalaniq.
- Selenoneine (SEN) is an anti-oxidant compound ilajaugutiit katititsigutiutsutit found in Inuit's blood that complexes with MeHg (I - iv).



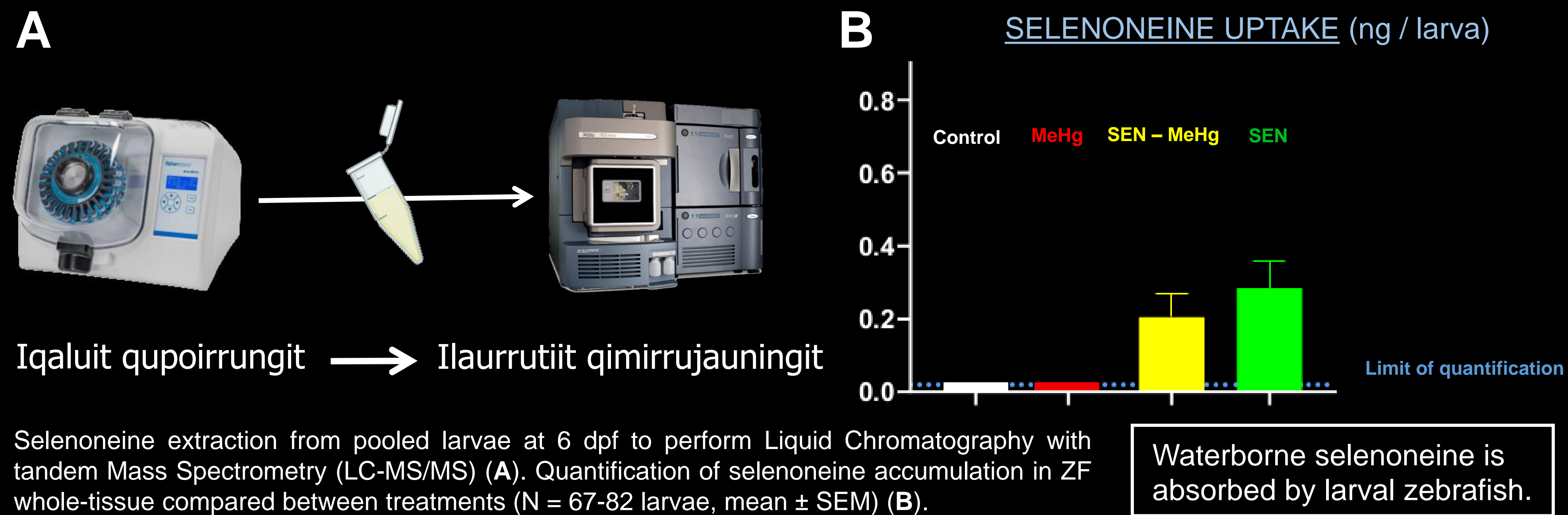
### Aim :

Investigate the neuroprotection ilajaugutiit afforded by selenoneine against MeHg neurodevelopmental toxicity qaritamut sukkunartuq.

## II) Experimental design



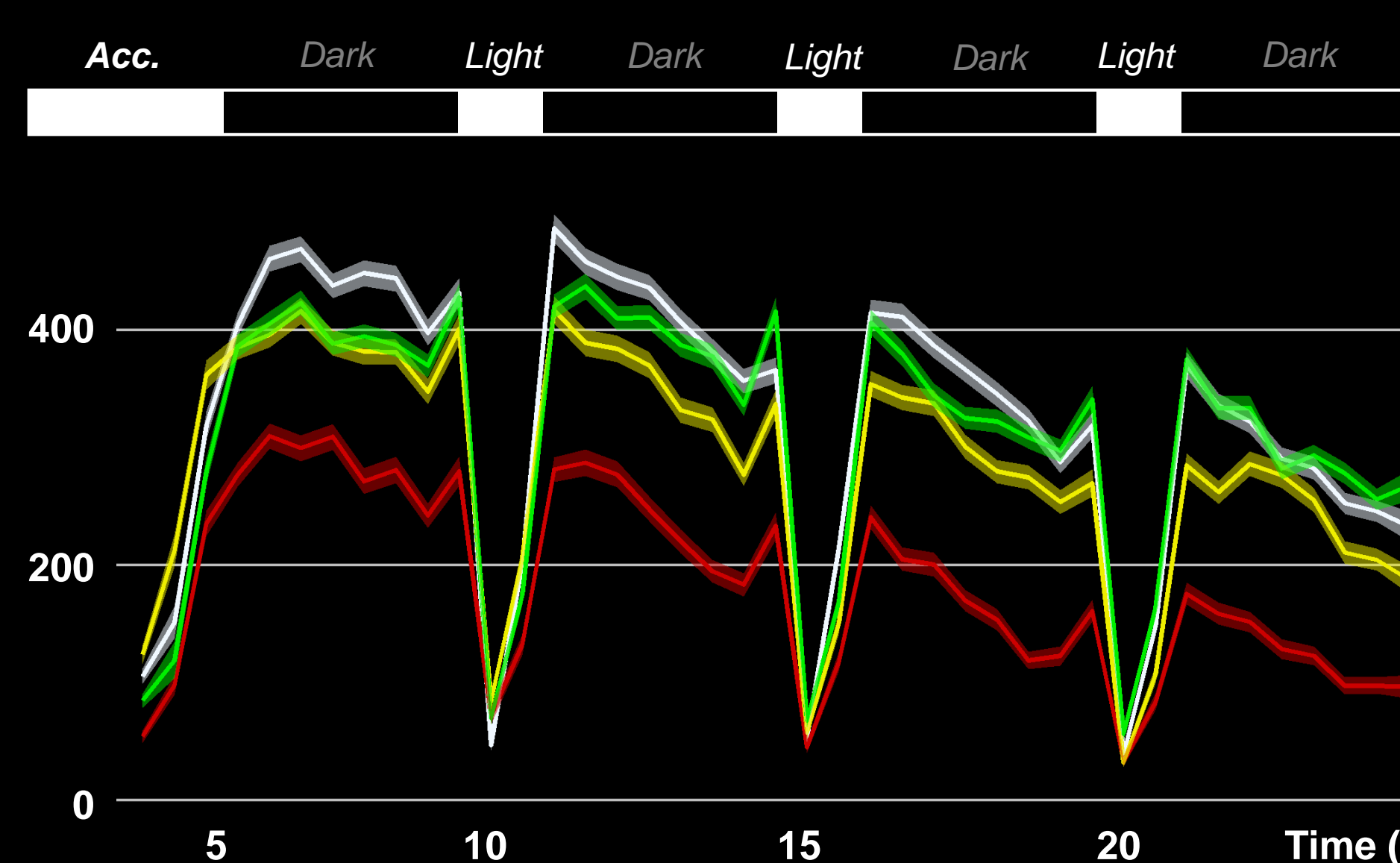
## III) Selenoneine uptake in zebrafish larvae



## IV) Sensorimotor behaviour of zebrafish larvae

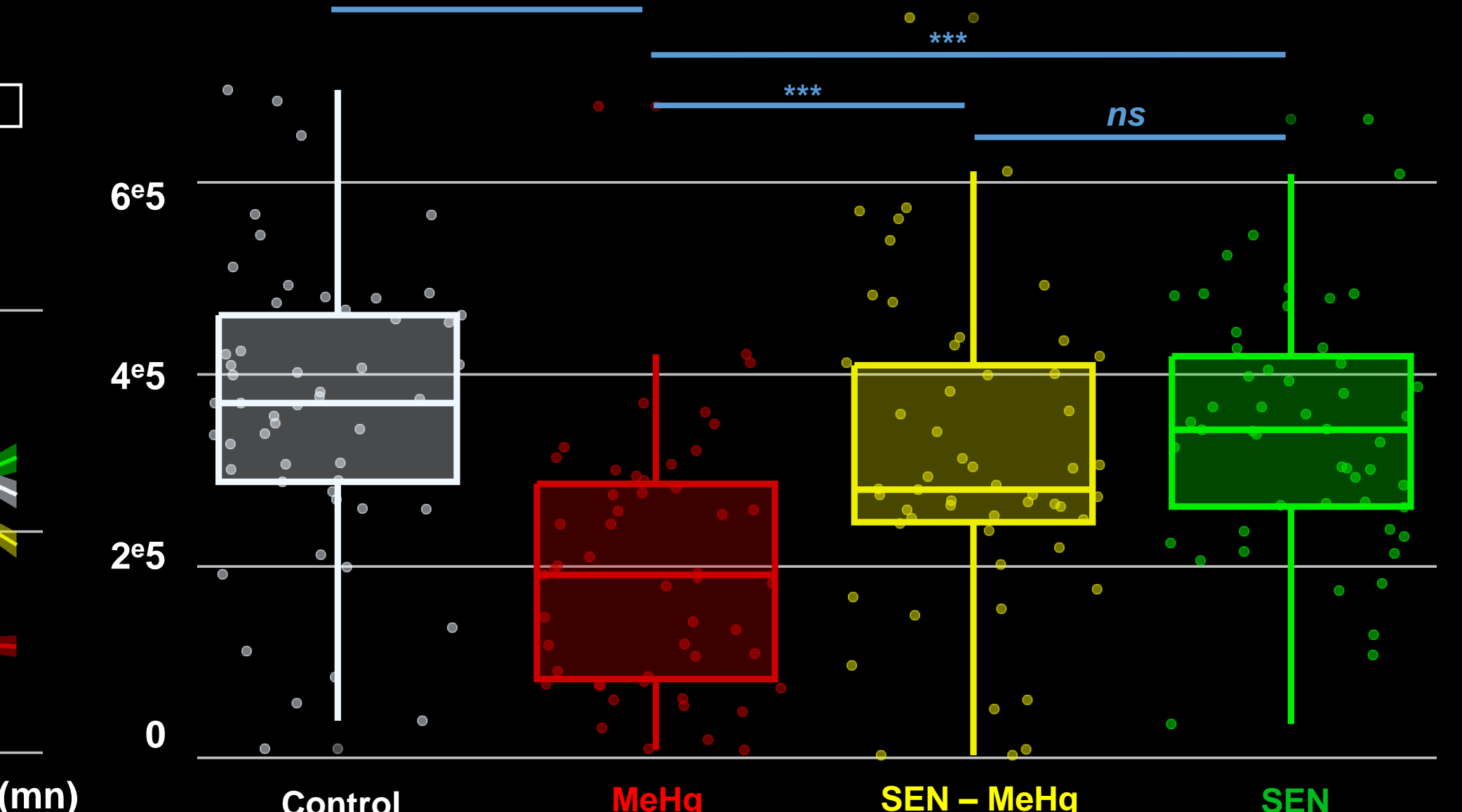


### B QUANTIFIED ZF MOVEMENTS (A.U)



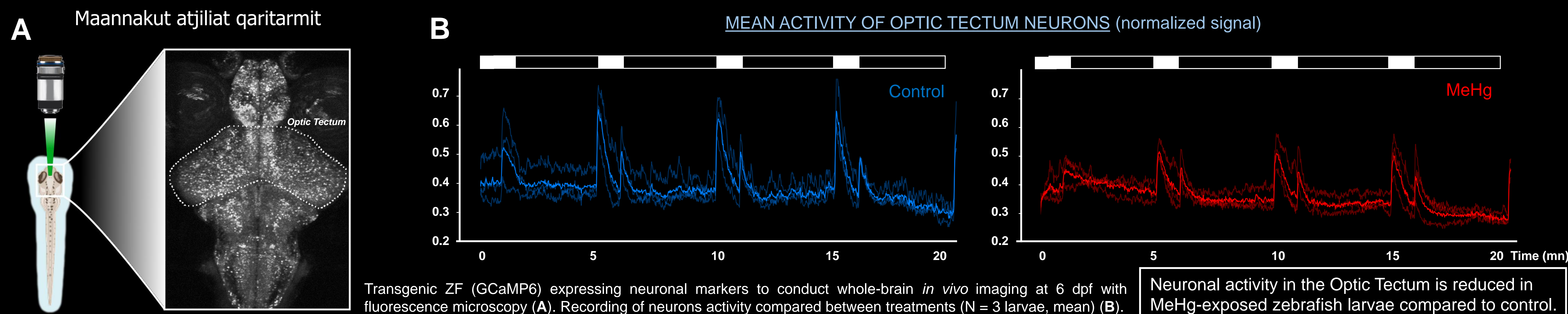
Individual tracking of ZF in a Zebrafish Behavior Analysis System (ZBAS) at 6 dpf (A). Quantization of total movements compared between treatments (N = 52-55 larvae, mean  $\pm$  SEM) under Light (1 mn) – Dark (4 mn) visual stimulations (B). Total movements across Dark stimulations show significant differences (\*\*\*,  $p < 0.005$ ) (C).

### C QUANTIFIED ZF MOVEMENTS, DARK PERIODS (A.U)



MeHg exposure reduces the zebrafish larvae sensory-motor response and selenoneine significantly alleviates the MeHg effect.

## V) Neurophysiology of zebrafish larvae



## VI) Acknowledgments & References

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- (i) Yamashita et al., 2013. Identification and determination of selenoneine as the major organic selenium in blood cells in a fish-eating population on remote Japanese Islands. *Biological trace element research*.  
(ii) Palmer and Parkin, 2015. Protolytic cleavage of Hg-C bonds by 1-Methyl-1,3-dihydro-2H-benzimidazole-2-selone: Synthesis and Structural Characterization of Mercury Complexes. *ACS*.  
(iii) Achouba et al., 2019. Selenoneine is a major selenium species in beluga skin and red blood cells of Inuit from Nunavik. *Chemosphere*.  
(iv) Kayrouz et al., 2022. Biosynthesis of selenium-containing small molecules in diverse microorganisms. *Nature*.