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DREAMM: Developmental Response to Environmental Alterations in the Mediterranean mussel *Mytilus galloprovincialis*

The Mediterranean Sea is considered a hotspot of climate change, undergoing rapid environmental transformations. Rising temperatures are causing more frequent and intense marine heatwaves, while increased evaporation alters water salinity and limits nutrient mixing. At the same time, higher absorption of CO_2 is leading to ocean acidification, and combined warming and stratification are reducing oxygen levels in deeper waters. Such combined stressors can interact and significantly affect the survival, growth, and fitness of marine organisms.

Mussels of the genus Mytilus are particularly important both ecologically and economically in European coastal areas. Their early life stages are especially vulnerable to environmental stress. In *Mytilus galloprovincialis* larvae, environmental stressors can disrupt key physiological and developmental processes without causing immediate death. During early development, when the nervous system is still forming, conditions like hypoxia and warming can interfere with neurodevelopment. This may result in long-term functional impairments. Studying the combined effects of environmental stressors on developing *Mytilus galloprovincialis* is pivotal to understand their interactive impacts on the overall developing organisms, as well as on highly susceptible tissues, such as the nervous system.

DREAMM aims to investigate the interactive effects of seawater warming and hypoxia on the early development of *Mytilus galloprovincialis*. By employing cutting-edge experimental approaches, including molecular and cellular biology techniques, “Omics”, biochemistry and imaging, we will focus both on the general larval phenotype and cellular and molecular changes. We will pay special attention on the developing neurons, highly metabolically active cells, strongly depending on O_2 supply.