

Zoophysiology Double-Seminar

Thursday, 18/6, 10.00–11.30, 1130-123



Meike Stumpp & Marian Hu

Zoological Institute, Kiel
University, Germany

Energetics in marine larvae: key mechanisms for coping with ocean change

Over the past decade, my research group has focused on understanding underlying physiological mechanisms of invertebrate larvae that shape their performance, resilience, or vulnerability to changing ocean conditions. Using integrative approaches that combine organismal physiology, cell biology, bioenergetics, and developmental biology, my group revealed how specific processes such as calcification, growth, metabolism and energy management are impacted by environmental stress, and demonstrated that the physiological characteristic of the larval digestive system play a key role in species-specific larval stress performance. In this talk, I will present an overview on the most striking features of the sea urchin larval biology with a focus on their responses to changes in seawater pH and ocean acidification.

Membrane transport physiology of marine mineralizing systems: From molecular mechanisms to global relevance

This talk highlights membrane transport mechanisms in marine organisms, focusing on pH regulatory systems that underpin calcification. Marine calcifiers use metabolic CO_2 to produce calcium carbonate, a process that generates protons requiring efficient removal while simultaneously concentrating inorganic carbon. Using the sea urchin larva as a model and combining live-cell imaging, intracellular pH measurements, protein biochemistry, and molecular approaches, we identified key ion transporters and channels that mediate carbon concentration and pH regulation in calcifying cells. These findings advance our understanding of calcification, improve predictions of organismal responses to ocean change, and may inspire novel CO_2 capture and utilization technologies.

