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Design principles of early animals: Insights from Cnidaria

During development, organisms interact with their natural habitats while undergoing morphological changes, yet it remains unclear how behaviors impact animal morphogenesis. Here, we use the cnidarian Nematostella vectensis as a developmental model to uncover a mechanistic link between organismal size, shape and behavior. Using quantitative live imaging in a large population of developing animals, combined with molecular and biophysical experiments, I will discuss how the muscular hydraulic machinery that controls body movement also acts as a global mechanical regulator that coordinates tissue remodeling during larva-polyp morphogenesis. In many engineered systems, hydraulics is defined by the ability to harness pressure and flow into mechanical work, with long-range effects in space-time. Our findings suggest that the evolution of early animals in an aquatic environment may have exploited the same physics, with hydraulics likely underlying both developmental and behavioral dynamics. Furthermore, I will discuss the close connection between nutrition, metabolism, and signaling that contributes to the impressive developmental plasticity observed in sea anemone tentacles.

Thursday, 09.11.2023, 13:00 pm

Host: Jochen Rink