

Hydra: a possible dependence of Wnt/ β -Catenin signaling on the microtubule cytoskeleton during early regeneration and axis formation

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The phylogenetically old genus Hydra (class Hydrozoa), has the ability to regenerate from fragments. This process shows a striking similarity to the development of early embryos of other animal species regarding genes expressed and patterns formed. Hydra is an established model organism that can give us insights into development of embryonic tissue, establishment of body axis, regeneration of the tissue and the evolution of multicellular organisms. Here, we investigate the mechanisms of axis formation. At the axis defining moment, the early hydra embryo exhibits a strong sensitivity to external mechanical perturbations [1]. We develop the idea that these mechanical fluctuations induce the orientation of microtubules, which contribute to β -catenin nuclear translocation increasing the organizer-forming potential of the cells. We will investigate this hypothesis, among others, by applying mechanical forces on hydra spheres with magnetic tweezers.

[1] H. Sander, A. Pasula, M. Sander, V. Giri, E. Terriac, F. Lautenschlaeger, and A. Ott, *bioRxiv* (2020).