Shaping the Ciona notochord

Michael Veeman, Division of Biology, Kansas State University

Genomes encode the spatial information manifested by developing embryos in a very indirect way via complex gene regulatory networks that control finely patterned cell behaviors. My lab uses quantitative imaging and functional genomics to dissect the mechanisms underlying the morphogenesis of the chordate body plan across multiple levels of biological organization. Our model organism, the sea squirt Ciona, is a close chordate relative of the vertebrates with unique advantages for developmental systems biology. These include a remarkably small simple embryo suitable for *in toto* imaging, a minimally-redundant genome, and extremely efficient transgenesis by electroporation. One major project in the lab addresses the mechanisms by which the notochord, an essential chordate organ, develops its graceful anterior to posterior taper through a series of subtle but cumulatively important asymmetric cell divisions. In another project, we are working to dissect the notochord gene regulatory network and relate its structure to the functions of the tissue specific effector genes it controls. Undergraduate researchers have been integral to both projects and I will highlight their contributions.