Contribution ID : **60** Type : **Short Talk**

The Physics of Blastoderm Flow during Early Gastrulation of Tribolium castaneum

Wednesday, 15 August 2018 09:45 (15)

The early embryo of the red flour beetle, Tribolium castaneum, initially consists of a single-layered blastoderm covering the yolk uniformly that differentiates into an embryonic rudiment as well as extraembryonic amnion and serosa. The germband anlage forms inside the egg during gastrulation when the embryonic rudiment condenses and folds along the ventral midline; this process is accompanied by large-scale flow and expansion of the extraembryonic serosa which ultimately covers the entire surface of the egg, thus engulfing the growing embryo. The mechanical properties of these tissues and the forces governing these processes in Tribolium, as well as in other species, are poorly understood. Here, we present our findings on the dynamics of myosin in the early blastoderm of Tribolium using multiview lightsheet live imaging of transiently labeled wild type embryos. We quantitatively measure the global distribution of myosin throughout the flow phase and present a physical description that couples the contractile forces generated by myosin to the mechanical properties of the blastoderm. In particular, we describe the overall tissue as a thin, actively contractile, viscous bulk medium that exhibits friction with the vitelline membrane. This description accurately captures the large-scale deformation the tissue undergoes during the initial stages of gastrulation. Our findings lay a foundation for the physical description of gastrulation in Tribolium and will allow, in combination with the well-studied Drosophila paradigm, for the first time the comparative analysis of blastoderm tissue morphogenesis

Affiliation

TU Dresden, MPI-PKS, MPI-CBG

Terms and Conditions

Yes

Primary author(s) : Dr MÜNSTER, Stefan (TU Dresden - MPI-PKS - MPI-CBG); Mr MIETKE, Alexander (MPI-PKS); JAIN, Akanksha; TOMANCAK, Pavel; GRILL, Stephan

Presenter(s) : Dr MÜNSTER, Stefan (TU Dresden - MPI-PKS - MPI-CBG)

Session Classification : Developmental biology applications of light sheet microscopy

Track Classification : Light sheet fluorescence microscopy