

Collective cell migration during gastrulation in the chick embryo

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We investigate the mechanisms that control and integrate the behaviours of rapidly increasing numbers of cells that generate and shape the primitive streak in the chick embryo. We address this question using a combination of lightsheet microscope in combination with novel transgenic chick lines that allow the detailed visualisation and quantitative characterisation of up to several hundred thousand cells in the early chick embryo. A dedicated image processing and analysis pipeline allows linking individual cell behaviours to largescale tissue flows under conditions of normal and experimentally perturbed development. These data have led to the formulation of a mechano-chemical hypothesis to explain the coordination of critical cell behaviours into the large-scale tissue flows underlying the formation of the primitive streak in the early chick embryo. We are currently testing this hypothesis through a combination of detailed biophysical modelling and further experiments.