



POSTER #1

## SPATIOTEMPORAL CHARACTERIZATION OF CYTOKINETIC ABSCISSION IN DEVELOPING ZEBRAFISH EMBRYOS

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Animal cell division ends with the cutting of the microtubule and membrane intercellular bridge connecting the 2 daughter cells. This process, known as cytokinetic abscission, is widely regarded as the last step of cytokinesis. Major breakthroughs have been recently achieved, illuminating mechanistic aspects of abscission; however, little is known about this process during embryonic development. In this study, we carefully tracked the spatiotemporal dynamics of the intercellular bridge at different division cycles of developing zebrafish embryos. Through this analysis we found that intercellular bridges formed prior to the 10th division cycle persist much longer (~50 minutes) than intercellular bridges formed during the 10th division or afterward (less than 30 minutes). This is in contrast to the fast division rate occurring during these early stages (division every 20 minutes). During the first 10 division cycles we often observed cells maintaining their intercellular bridges as they enter the next mitotic cycle indicating that during these stages cell cycle progression is uncoupled from abscission. This resulted in networks of cells connected by intercellular bridges. Interestingly, we did not detect abscission events occurring prior to the 10th division cycle suggesting that abscission is inhibited during these early division cycles. The 10th division cycle in zebrafish embryos is termed the Mid blastula transition (MBT). This stage is characterized by the appearance of a G1 phase of the cell cycle and by loss of synchronized division. The temporal coupling of these events to abscission suggests that resolution of the intercellular bridge is a fundamental step in early development. Deciphering the regulatory basis for abscission timing during these stages will no doubt contribute to our understanding of the highly orchestrated events occurring during early embryogenesis.

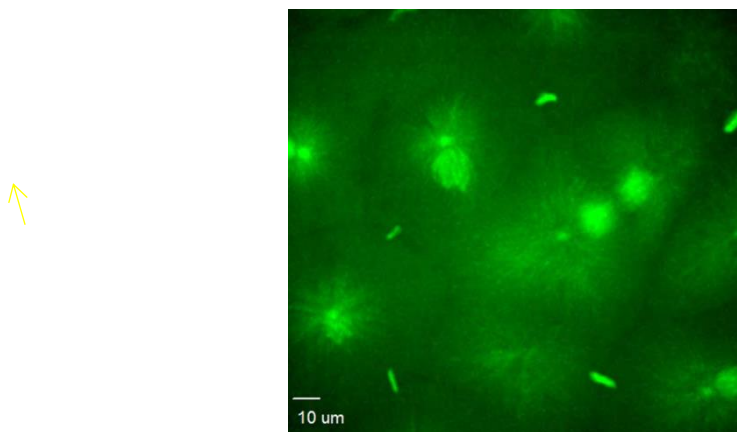


Figure 1. Dividing cells in zebrafish embryo pre mid-blastula transition. HiLyte488 tubulin. Maximum intensity projection of 30 slices of 0.9  $\mu\text{m}$ . White arrow- intercellular bridge. Yellow arrow- central spindle.

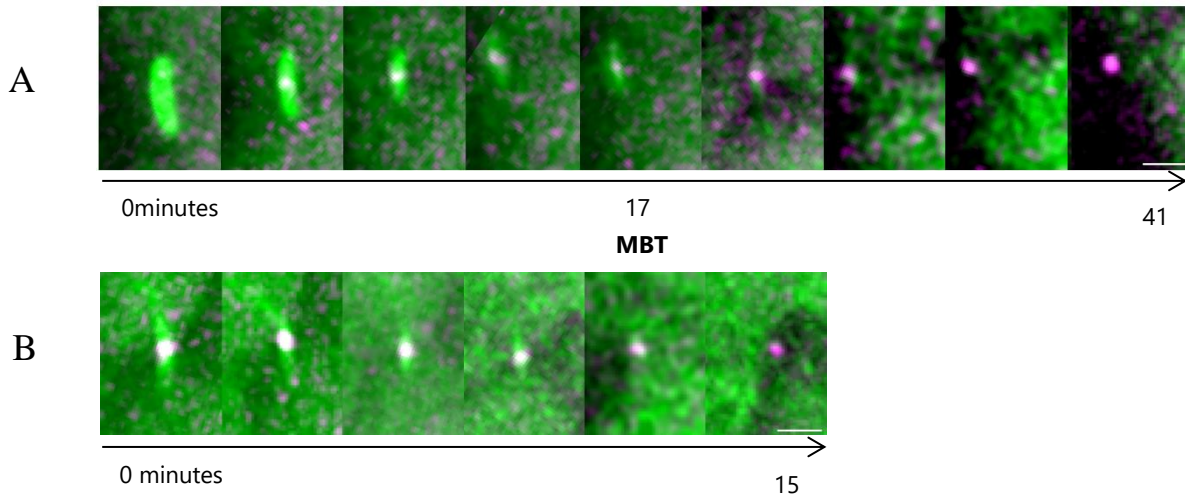


Figure 2. Abscission prior and post MBT. (a) Intercellular bridge that formed prior to MBT abscised after 41 minutes, after the embryo entered to MBT. (b) Intercellular bridge that formed after MBT abscised after 15 minutes. Green- HiLyte488 Tubulin. Magenta- CEP55, marker for the midbody.