

Role of Rab11 and Rab8 during morphogenesis of the left-right organizer

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** Presenting*

Rab GTPases are the primary regulators of intracellular vesicle trafficking. Previous studies have shown Rab11 to be involved in regulating lumen formation via the RabGEF Rabin8 and its target Rab8a. To better understand the contribution of these Rab GTPases in lumenogenesis *in vivo*, we study the development of the Left-Right organizer (LR) known as the Kupffer's vesicle (KV) in *Danio rerio* (zebrafish). The development of LR involves the assembly of mesenchymal cells into polarized rosette like structure, which then forms a hollow fluid filled cavity (lumen). The LR helps in determining the left right body axis and is a conserved tissue found in humans (known as the node). Using live cell confocal microscopy, we find that Rab11, Rab8 and actin are recruited in the center of the rosette structure as the mesenchymal cells assemble together. As this rosette begins to open up to form the lumen, Rab11 and actin get recruited to the cell-cell junctions, whereas the Rab8 gets localized to the apical membrane of the cells. We then employed optogenetics to acutely disrupt Rab11- or Rab8-associated membranes. We identified that Rab11-associated membranes, and not Rab8, is required for lumen formation. Additionally, actin was found to get clustered on the Rab11 clusters and failed to be recruited to the cell-cell junctions. However, Rab 8 clustering did not have any effects on actin recruitment. Together, these results support that Rab11 but not Rab8 is necessary for lumen formation, and for the recruitment of actin to the apical membranes during LR morphogenesis.

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