Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Seminar

Regulation of mitotic arrest in stem/progenitor cells: Mechanisms for G2 arrest

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Non-cycling stem and progenitor cells can pause in the G1 or the G2 phase of the cell cycle. We are broadly interested in the mechanisms underlying mitotic arrest and specifically the regulation of G2 arrest. In a recent study we investigated the mechanism for G2 arrest in progenitors of the adult tracheal (respiratory) system in Drosophila (tracheoblasts). Tracheoblasts remain paused in G2 for ~48–56 hr during larval life before rekindling a mitotic program. Surprisingly, arrested tracheoblasts express drivers of G2-M like Cdc25/String (Stg). We reported that the ATR/Chk1 axis, known to have a role in DNA damage-induced checkpoint activation and G2 arrest, negatively regulates G2-M in these cells (Kizhedathu et al, eLife 2018). We have since investigated how the ATR/Chk1 axis is developmentally regulated. Our findings are that Wnt signaling is high in G2-arrested cells (via multiple Wnts/Fz2,3), that the loss of Wnt signaling results in precocious mitotic entry, and that Wnt signaling is required for high levels of Chk1 expression in paused cells. Taken together our data suggests that G2 arrest in developing tracheoblasts is actively controlled by Wnt signaling via transcriptional regulation of Chk1. I will set this work in the broader context of what is known regarding mechanisms for G2 arrest in Drosophila and also discuss our preliminary findings regarding prevalence of G2 arrest in the mouse model.

Thursday, Mar 28th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Seminar Hall, TIFR-H