Poster Presentation

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The LGN:Insc tetramer stabilises the apical site in asymmetric cell divisions

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Asymmetric cell divisions regulate the position and the fate choice of daughter cells, with impact on developmental programs and tissue homeostasis. The asymmetric outcome of a stem cell division relies on the coordination between cortical polarity and the orientation of the mitotic spindle. To date the adaptor Inscuteable (Insc) is considered the molecular bridge between cortical polarity proteins and the spindle tethering machinery assembled on NuMA:LGN:Gαi. Insc interacts with the polarity protein Par3, and competes with NuMA for the binding to LGN [1]. I will present the crystallographic structure of Drosophila LGN in complex with the asymmetric domain of Insc. The structure reveals a tetrameric arrangement of intertwined molecules, and is compatible with the concomitant binding of Insc to LGN and Par3. Binding assays indicate that Insc interacts directly with the PDZ region of Par3. The finding that LGN enters a stable tetrameric complex with Insc and Par3 suggests a novel function for LGN in stabilizing the apical site, where polarity proteins enrich during asymmetric cell divisions. I will propose a revised model for mitotic spindle coupling to polarity cues based on the dual role of LGN in organizing microtubule motors when in complex with NuMA and Dynein, and securing their cortical attachment when bound to Insc and Par3.

[1] *Culurgioni S., Alfieri A., Pendolino V., Laddomada F. and Mapelli M. (2011) Inscuteable and NuMA proteins bind competitively to Leu-Gly-Asn repeat-enriched protein (LGN) during asymmetric cell divisions. PNAS, 108, 20998-1003.*

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