SEMINAR

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Conference Room AI 1153

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Hosted by Prof. Bruno Lemaitre

Complementary molecular cues ensure a robust microtubule-dependent nuclear positioning in the Drosophila oocyte

Controlling the localization of the nucleus is crucial for a variety of cellular functions. In the Drosophila oocyte, nuclear asymmetric positioning is essential for the reorganization of the microtubule (MT) arrays that control the polarized transport of axis determinants. Combining quantitative 3D live imaging and laser ablation-mediated force analysis reveals that nuclear positioning is ensured with an unexpected level of robustness. We show that the nucleus is pushed to the oocyte antero-dorsal cortex by MTs, and that its migration can proceed through distinct tracks. One migratory route is favoured by centrosome-associated MTs. Alternatively, a separate route is promoted by the MT-associated protein Mud/NuMA asymmetrically localized in a Asp-dependent manner at the nuclear envelope hemisphere where MT nucleation is higher. Our results demonstrate that centrosomes do not provide an obligatory driving force for nuclear movement, but together with Mud, contribute a set of complementary mechanisms that ensure the robustness of asymmetric nuclear positioning.