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HAUS architecture as a foundation: Molecular insights into augmin's role in cell division

Accurate organization of microtubules is essential for diverse cellular processes such as intracellular transport and chromosome segregation. Therefore, precise spatial and temporal control of microtubule nucleation is critical, as its dysregulation causes spindle defects and contributes to various diseases, such as cancer. A predominant mechanism for rapid microtubule amplification during spindle assembly is branched microtubule nucleation. Central to this process is the augmin complex—a conserved hetero-octamer composed of HAUS (homologous to augmin subunit) proteins—which functions as a key microtubule branching factor. During mitosis, augmin binds to pre-existing spindle microtubules to recruit the γ-tubulin ring complex (γ-TuRC), the principal microtubule nucleator. This recruitment facilitates the nucleation of new microtubules at defined angles relative to the parental microtubules, ensuring proper spindle architecture. Elucidating the molecular architecture of the augmin complex provides a structural framework for dissecting its functional domains, which underlie its role in microtubule branching. Such insights may offer broader implications for understanding mitotic fidelity and its perturbation in pathological contexts.

Research type

Basic research

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