

Annotation

Nucleation of microtubules co-determines organization of this cytoskeleton component in cells and makes a significant contribution to shaping its dynamics. In plant cells, microtubules are mainly nucleated on preexisting ones and nucleation takes place in the cortex and also within the mitotic spindle and the fragmoplast. Recruiting the γ TuRC, a preserved universal nucleator, to the wall of microtubules is provided by augmin in cooperation with NEDD1/GCP-WD. The function of the γ TuRC is at least in the case of nucleation in the spindle, but apparently in other situations as well further enhanced by XMAP215/MOR1, which raises efficiency of the γ TuRC through its own polymerization activity, and TPX2, or its homologs, which for one thing, directly activates the complex and for another, locally increases concentration of tubulins by forming condensate with them, which also augments the probability of success of nucleation. Not much is known about regulatory pathways controlling this process, with the exception of the TTP complex, which is functional in the cortex. Overall, knowledge covering nucleation in plants is rather meager and information concerning the molecular mechanisms of functioning of mentioned factors comes mainly from research in animals.

Keywords augmin, cytoskeleton, γ TuRC, microtubules, nucleation, plant cell