INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

EML2 as a Tracker of Shortening Microtubules

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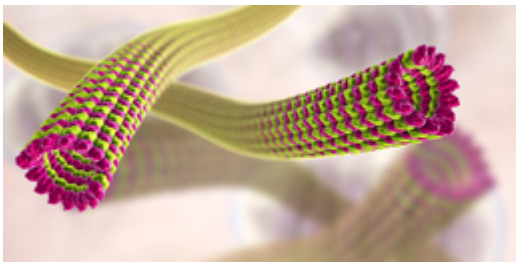

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Category
Research Tools and Reagents
Life Sciences

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OVERVIEW

EML2 is a microtubule-stabilizing factor that tracks shrinking microtubules

- A novel screening method for readers of tyrosinated and detyrosinated tubulin
- Allows for investigation of the full range of microtubule dynamics in mammalian cells

BACKGROUND

Microtubules are dynamic polymers assembled from the protein tubulin. During periods of normal cellular functioning, microtubules exhibit dynamic instability during which they grow and shorten to aid biological processes such as cell division, intracellular trafficking, and establishment of cell polarity. Tubulin post-translational modifications (PTMs) alter microtubule properties by affecting the binding of microtubule-associated proteins (MAPs). The study of microtubule dynamics commonly includes the use of probes which aid the analysis of live cell microscopy. The probes employed to 'decorate' the growing ends of the microtubules are a heterogeneous class of proteins referred to as +TIPS. These end binding (EB) proteins are indispensable for microtubule research, though one drawback to their use is that they do not decorate microtubules when they are in the process of shortening. Therefore, a need exists for a probe that decorates both growing and shrinking microtubules to delineate microtubule dynamics and functioning in cells more fully.

INNOVATION

Researchers at the University of Michigan have discovered a protein (EML2) that tracks the ends of microtubules while they are in the process of shortening. The creation of this agent will be paired with EB to develop a 2-gene tool kit that decorates the ends of microtubules in all of their dynamic phases. As post-translational modifications through tyrosination and detyrosination of

tubulin occur, EML2 localizes to shrinking microtubule plus ends to serve as 'readers' of these processes. The discovery shows that EML2 tracks the tips of shortening microtubules, a behavior not previously seen among human MAPs in vivo, and influences dynamics to increase microtubule stability. This single reagent will allow investigators to measure the full range of microtubule dynamics, in any mammalian cell type. The screening pipeline utilized to define EML2 can also be modified to discover readers of other tubulin post-translational modifications, such as acetylation or polyglycylation.