

“Biological functions of stable microtubules: a proposed role in cellular memory”

Francesca Bartolini

Abstract

Microtubules are prominent elements of the internal scaffolding of the cell (the cytoskeleton) and are necessary for structural support, cell division and intracellular trafficking. They act by moving chromosomes during mitosis or by serving as rigid tracks for the intracellular transport of a variety of structures and molecules within the cell. However, the mechanism by which individual microtubules are assigned to different functions remains elusive. It has long been known that long-lived microtubules (stable microtubules) are generated by different stimuli and can be marked by a range of posttranslational modifications that are conserved throughout evolution. Recent evidence suggests that these microtubule posttranslational modifications can act alone or in combination to affect specific microtubule functions. In this commentary I will review the structural/functional properties of stable microtubules in relation to well characterized cellular processes, and I will propose a role in a much less defined cell behavior known as “cellular memory.”