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Sommario/riassunto

Together with the microfilament, microtubule and intermediate-filament networks, septins constitute an integral part of the eukaryotic cytoskeleton. Historically identified as proteins critical for septum formation in the budding yeast Saccharomyces cerevisiae, septin family GTPases are expressed and participate in the process of cytokinesis in most eukaryotes except higher plants. More than a dozen septin genes in mammals, together with various splice variants displaying tissue-specific expression patterns and flexible hetero-polymeric higher-order assembly achieve an unfathomable complexity superior to the other cytoskeletal components. Even though the initial studies in the septin field was restricted to their evolutionarily conserved role in cell division, strong expression of septins in the non-dividing cells of the brain generated great interest in understanding their role in neuronal morphogenesis and other aspects of cellular function. On one hand, recent developments indicate complex non-canonical roles for septins in diverse processes ranging from neuronal development to immune response and calcium signaling. On the other hand several lines of data including those from knockout models question the universal role for septins in animal cell cytokinesis. Mammalian hematopoietic cells seem to proliferate and efficiently undergo cytokinesis in the absence of pivotal septin proteins in a context-dependent manner. The lack of septin-dependence of hematopoiesis also opens the possibility of safely targeting septin-dependent cytokinesis for solid-tumor therapy.

Thus the septin field is perfectly poised with novel roles for septins being discovered and the basic understanding on septin assembly and its canonical functions constantly revisited. The objective of this research topic was to provide an exclusive platform for discussing these rapid advances in the septin field. With a mixture of reviews and research articles encompassing diverse areas of septin research, ranging from the humble yeast model to human cancer, this ebook will be an interesting reading material for both experts as well as new comers to the septin field.