

Electron microscopy studies of cytoskeletal structures in *Streptomyces*

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Abstract

The bacterial cytoskeleton is important for cell shape, polarity and division. These are functions maintained by the cytoskeleton in higher eukaryotic cells as well. Proteins and cellular functions are related, however, only partly conserved and the similarities are not obvious at the first glance.

The intermediate filament protein family is a very diverse group of cytoskeleton proteins, important for cellular stability and at the same time elasticity. Bacterial intermediate filament proteins can be identified on their secondary and tertiary structural characteristics and chemical properties although the sequence similarity with eukaryotic intermediate filaments is weak. We use electron microscopy (EM) to characterize the structure, assembly and organization of intermediate filament like proteins.

In the filamentous bacterium *Streptomyces coelicolor* the intermediate filament like protein FilP forms cytoskeleton structures, which have a role in cell architecture and confer rigidity to the hyphal cells. Purified recombinant FilP polymerizes *in vitro* in physiological buffer into thick, branched and repeatedly segmented filaments. We have studied the *in vitro* assembly of FilP with negative staining EM.