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What assemblies of bacterial cytoskeletal protein FtsZ filaments on surfaces observed *in vitro* suggest about the generation of a contractile force *in vivo*

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FtsZ is a cytoskeletal protein that participates in the formation, on the inner side of the cytoplasmic bacterial membrane, of the "septal ring", a protein complex responsible for cell division [1]. We have used supported lipid bilayers and controlled orientation of FtsZ monomers *in vitro* to study their GTP-dependent self-assembling on surfaces with atomic force microscopy in solution, providing single molecule information of the dynamic structure of filaments and their aggregates [2-4]. A theoretical description of individual filaments that incorporates information from molecular dynamic simulations has identified that filament curvature, monomer twist, surface attachment and lateral interactions between monomers are enough to describe, using Monte Carlo simulations, some of the structures that we observe experimentally. The implication of this work is that monomer flexibility and surface attachment, additionally to filament curvature, could be important in determining the polymorphism and dynamic behavior of filament aggregates. Furthermore, we suggest a new mechanism for force generation in which the orientation and type of monomer attachment to the surface could play an important role in modulating the force exerted by filament aggregates on the bacterial membrane during cell division [5,6]. Ongoing work is directed towards testing the hypothesis that monomer attachment, flexibility and conformation are associated with the shape, rigidity and dynamics of the filaments and that this is relevant for creating tensions on the membrane.

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