Title: The impact of actin binding protein on branched networks force generation.

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Saccharomyces Cerevisiae or budding yeast is a model organism in biology. Its genome and metabolism is being thoroughly investigated as the cells are easily manipulated in the laboratory. Yeast, as many organisms, interacts with the environment through endocytosis and exocytosis. In contrast to mammalian cells, its endocytosis follows only one pathway – Clathrin Mediated endocytosis (CME). Moreover, its actin networks are an essential part in yeast's CME mechanism and dynamics. For these reasons, we will use yeast to decipher the role of actin networks in endocytosis.

Actin is regulated by a large number of actin binding proteins (ABPs). Mutations or deletion of these proteins can trigger major changes on the endocytosis phenotype. For this project, we will study *in-vitro* the mechanics and assembly dynamics of branched actin gels assembled by Arp2/3 machinery. An innovative *in-vitro* approach, developed in the laboratory, allows us to probe the force generated by the actin gel by using lab-made magnetic micro-cylinder force sensors. These cylinders give us the possibility to probe the elasticity, the plasticity and the assembly process, in presence of opposing forces, of dense cytoskeletal networks. The advantage of the method are the range of attainable forces and its high throughput.
This study will use cellular extracts of wild type or specific mutant yeasts to precise the role of these proteins in the mechanisms of actin growth . Its role can be verified by adding the ABP in branched networks formed from a minimal set of purified proteins to validate the experiments made with the extracts.

In this manner by controlling the ABPs present and the stress applied during network growth, we can examine the role of each protein in the mechanics of the gel in order to compare the relation between physical measurements *in-vitro* (between two cylinders) and observations *in-vivo* (during endocytosis). We thus aim at understanding the phenotypes observed in mutants and wild-type yeast as well as the role of different actin partners in the force generation by the Arp2/3 machinery.