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Computational analysis of the cell growth regulatory network of fission yeast cells

The rod shaped fission yeast cells grow only at their tip, unidirectional growth in G1 is followed by length extension also from the other end in G2. Microtubules are responsible for the proper localization of the growth zones at the tips and localized actin polymerization is needed for growth induction. Similar actin polymerization process in the middle of the cell is needed for cytokinesis. Several members of the molecular network that connect microtubule and actin dynamics to cell growth and cell division are identified and some of their interactions are also known, but these data do not give a complete picture of the system. After identifying the conserved regulatory molecules and their interactions in other organisms we perform network analysis on the predicted interaction network of fission yeast growth regulatory system to identify the key core components and the links that connect cell growth and cell cycle regulation. We are analyzing the networks also from bottom-up by creating computational models for the interactions of the core regulators of cell division and cell polarity.