Pattern formation and dynamic of active gels at soft fluid interfaces

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The Actin cytoskeleton is an active gel that can respond to outside stimuli, through the consumption of ATP, by forming into varied patterns. These patterns, in turn, cause macroscopic changes in the cell's form, resulting in different behaviors such as shape shifting, motility, and mitosis. By activating or deactivating certain signaling pathways, the system can control which pattern is assembled as a response to a given signal. Of special importance to the formation of these patterns, and to their effect on cellular behavior, is the interaction between the cytoskeletal network and the plasma membrane, which acts as both signaler and substrate for the actin cytoskeleton. We use in vitro model systems, reconstituted from purified proteins and lipid membranes, to examine the effects of protein concentrations and surface curvature on the formation of cytoskeletal patterns.