Theory on active stress generation in a cytoskeletal network

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We are focusing on active mechanics of a cortical cytoskeleton. Mechanical properties of a cortical cytoskeleton govern not only cell's resistances to deformation but also the motor-induced contractility, which plays crucial roles in dynamic cellular behaviors, such as cytokinesis and cell migration.
In the presentation, I will explain our theoretical work on active stress generation in a cortical cytoskeletal network. I will propose a mechanical model of motor-induced stress in an isotropic stiff F-actin network with crosslinkers and share our results on motor-induced contractility. In particular, since a cortical cytoskeleton in a living cell should be flowable, we consider the network in which there are few amount of crosslinkers and/or crosslinkers and F-actins can turn over. We found that a finite amount of crosslinkers is significant for motor-induced contractility [1]. We also investigated how turnovers of crosslinkers and F-actins influence the motor-induced stress [1]. The details will be presented on the day.

[1] T. Hiraiwa and G. Salbreux, "Role of turnover in active stress generation in a filament network", arXiv:1507.06182.