Myosin 1b regulates actin dynamics upon EphB2/ephrinB1 signaling

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Eph receptors constitute a large subfamily of transmembrane tyrosine kinase receptors that bind to membrane ligands, the ephrins. EphB-ephrinB signaling plays an important role during embryonic development and the maintenance of tissue homeostasis. The gradual activation of EphB receptors and ephrinB ligands induces a gradual adhesion between the epithelial cells and regulate the migration of the different cell populations in a collective manner.

We have found that myosin1b (Myo1b) interacts with EphB2 receptors *via* its tail domain and that both EphB2 and Myo1b are expressed in mouse gut lysate. Furthermore, Myo1b and EphB2 are both expressed in the intestinal crypts where EphB2 has been shown to regulate the distribution of the different cell populations. Our goal is to understand the role of Myo1b in the cell signaling mediated by the interaction of EphB2 receptors with their ligands.

To understand the role of Myo1b upon EphB2 stimulation, we analyzed its behavior upon its stimulation by immunofluorescence labeling and time-lapse microscopy. Stimulation of EphB2 receptor induces distribution of receptors in clusters at plasma membrane and increases the number and size of filopodia. In addition, actin filaments and myosin II redistribute in contractile fibers leading to cell contraction. Myo1b knock-down by siRNA did not alter the formation of EphB2 clusters but inhibits the formation of filopodia and alters the redistribution of myosin II in contractile fibers.

Together with our previous studies and the mechanical properties of myosins I, our observations suggest that Myo1b could exert tension between the EphB2 receptor associated with the plasma membrane and the cortical actin cytoskeleton and thereby regulates cell contraction upon EphB2 stimulation.