Rho

The Rho family of GTPases is a group of small GTP-binding proteins that play important roles in regulating the organization of the actin cytoskeleton and cell motility. The family includes RhoA, Rac1, and Cdc42, among others.

RhoA is involved in the formation of stress fibers and focal adhesions, which are structures that anchor cells to the extracellular matrix. It is also involved in regulating contractility and cell shape.

Rac1 is involved in the formation of lamellipodia, which are thin sheet-like extensions at the leading edge of migrating cells. Rac1 is also involved in the regulation of cell adhesion and the formation of membrane ruffles.

Cdc42 is involved in the formation of filopodia, which are finger-like projections that protrude from the cell surface. Cdc42 is also involved in regulating cell polarity and the organization of the actin cytoskeleton.

The Rho family of GTPases is regulated by a complex network of upstream regulators and downstream effectors. GTP-bound Rho proteins interact with downstream effectors to regulate actin cytoskeleton dynamics and other cellular processes. In addition, several GTPase-activating proteins (GAPs) and guanine nucleotide exchange factors (GEFs) regulate the cycling of Rho proteins between their active GTP-bound and inactive GDP-bound states. Dysregulation of Rho GTPase activity has been implicated in a variety of diseases, including cancer, cardiovascular disease, and neurological disorders.