ARP3, an essential gene, encodes an actin-related proteinthat functions as part of a highly conserved actin-nucleation complex. This complex, termed the Arp2/3 complex, localizes to regions of actin-based motility, such as the actin comet tails of Listeriaand the leading edges of motile amoebaeand fibroblast cells. In S. cerevisiae, the Arp2/3 complex is required for actin-dependent processes such as endocytosis and organelle inheritance. Arp3p localizes to actin cortical patches. At the restrictive temperature, a conditional arp3 mutant allele inhibits actin patch motility and eventually disrupts actin patches, giving rise to aberrant actin structures. The Arp2/3 complex is a seven-protein complex containing two actin-related proteins, Arp2p and Arp3p, and five non-actin related proteins, Arc15p, Arc18p, Arc19p, Arc35p, and Arc40p. The Arp2/3 complex nucleates the formation of branched actin filaments by binding to the side of an existingfilament and nucleating the formation of a newactin filament at a 70 degree angle. Arp2p and Arp3p serve as the first two subunits of the daughter filament, likely mimicking actin monomers due to their structural similarity to actin. However, the Arp2/3 complex does not play a role in the formation of actin cables, which are instead nucleated by the formins Bni1p and Bnr1p. To achieve optimal actin nucleation activity, the Arp2/3 complex interacts with an activator protein, such as Las17p/Bee1p, myosin I, Abp1p, or Pan1p. In vitro studies have shown that the activator protein alters the conformation of the Arp2/3 complex, as to bringing Arp2p and Arp3p together in a \"filamentous\" arrangement to mimic an actin dimer.