ARP2, 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 the motility and integrity of actin cortical patches, and for actin-dependent processes such as endocytosis and organelle inheritance. In cells bearing a temperature-sensitive allele of ARP2, arp2-1, endocytosis is inhibited at the non-permissive temperature. 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. In addition, Arp2p may interact with the actin-binding protein, profilin, to recruit actin monomers to the branch site. 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, bringing Arp2p and Arp3p together in a \"filamentous\" arrangement to mimic an actin dimer. Recently, coroninhas been found to be an inhibitor of the Arp2/3 complex, acting via a direct interaction with Arp2p to restrict complex activity to the sides of filaments.