ARG82encodes an inositol polyphosphate multikinase involved in inositol phosphorylation. Soluble inositol polyphosphates have emerged as important signaling molecules for regulating processes such as transcription, mRNA export, DNA repair, chromatin remodeling, glucose-induced calcium signaling, and telomere elongation. Arg82p is able to phosphorylate inositol 1,4,5-trisphosphateon both the carbon-3 and carbon-6 positions to synthesize inositol 1,3,4,5-tetrakisphosphate and inositol 1,4,5,6-tetrakisphosphate, and then to subsequently phosphorylate and convert either isomer of IP4 to inositol 1,3,4,5,6-pentakisphosphate. Arg82p is also able to use IP5 as a substrate and act as a diphosphoinositol polyphosphate synthase to generate two isomers of PP-IP4. Additionally, Arg82p is able to phosphorylate inositol molecules that are part of the lipid phophatidylinositol. ARG82 was initially identified as an important regulator of arginine metabolism. Arg82p is involved in regulating this process by stabilizing the transcription factors Mcm1p and Arg80p. Together with Arg81p, Mcm1p and Arg80p form a complex that binds to \"arginine boxes\" in the promoters of arginine anabolic and catabolic genes. Arg82p kinase activity is not required for its protein chaperoning function, however the kinase activity of Arg82p may still be required for other aspects of arginine metabolism regulation. An ipk2 null mutant strain displays pleiotropic defects which include temperature sensitivity, sterility, defective sporulation, arginine and ornithine auxotrophy, and impaired mRN A export. Inositol polyphosphate multikinase activity is conserved from yeast to humans, and expression of either the D. melanogaster or A. thaliana homolog, Ipk2p, phenotypically rescues an arg82 null mutant. Knockouts of the mouse ortholog of yeast IPK2 result in developmental defects and early embryonic lethality, implicating the importance of inositol polyphosphates in the development of higher organisms.