

Sobko, A., H. Ma, and R A. Firtel (2002). Regulated SUMOylation and ubiquitination of DdMEK1 is required for proper chemotaxis. *Devel. Cell* 2:745–756.

MEK1, which is required for aggregation and chemotaxis in *Dictyostelium*, is rapidly and transiently SUMOylated in response to chemoattractant stimulation. SUMOylation is required for MEK1's function and its translocation from the nucleus to the cytosol and cortex, including the leading edge of chemotaxing cells. MEK1 in which the site of SUMOylation is mutated is retained in the nucleus and does not complement the *mek1* null phenotype. Constitutively active MEK1 is cytosolic and is constitutively SUMOylated, whereas the corresponding nonactivatable MEK1 is not SUMOylated and nuclear. MEK1 is also ubiquitinated in response to signaling. A MEK1-interacting, ubiquitin E3 ligase RING domain-containing protein controls nuclear localization and MEK1 ubiquitination. These studies provide a pathway regulating the localization and function of MEK1.