Abstract

The phytohormone ethylene plays an important role in several aspects of plant physiology, including response to various biotic (e.g., microbial infection) and abiotic (e.g., drought and salinity) stresses. Ethylene has been implicated in conferring resistance in rice to the severe disease rice blast, caused by the fungus *Magnaporthe oryzae*. However, signaling crosstalk with the hormone abscisic acid, a negative regulator of resistance to rice blast may alter this response. In order to fine-tune the plant's responses to specific stresses, ethylene biosynthesis is tightly controlled at the level of ACC synthase (ACS) gene expression and posttranscriptional modification. Gene expression studies in rice have detected a significant upregulation of one of the members of the rice ACS gene family, OsACS2, after inoculation with *M. oryzae*. OsACS2 displays a conserved amino acid sequence at the C-terminus, Ser-Pro, making it a potential substrate for phosphorylation by a mitogen-activated protein (MAP) kinase. Previous work has shown that a stress-inducible rice MAP kinase, OsMPK5, negatively regulates resistance to rice blast. The purpose of the proposed project is to elucidate how OsMPK5 may regulate OsACS2 and ethylene biosynthesis and to determine the role of ethylene in rice disease resistance.