

# Differentially expressed genes in response to pathogens in *Physcomitrella patens*

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Our group has focused on studying the molecular mechanisms involved in plant defense response against pathogens. A longterm goal is to develop new strategies for disease control involving intrinsic defense mechanisms of plants in order to reduce the use of pesticides and insecticides.

We have recently shown that *Erwinia carotovora* subsp. *carotovora* (Ecc), *Botrytis cinerea* and *Pythium irregulare* can infect and activate a defense response in *Physcomitrella patens* (Ponce de León *et al.*, 2007; Oliver *et al.*, 2009). After infection with these pathogens we have observed induction of defense genes and activation of hormonal signaling pathways involved in defense. We have identified an alpha-dioxygenase (alpha-DOX) gene that is induced in response to pathogens. By generating a knockout mutant we are analyzing the role played by alpha-DOX in the defense response of *Physcomitrella*.

In order to identify more genes involved in defense against pathogens, we applied the technology of suppression-subtractive hybridization and obtained a cDNA library enriched in transcripts induced in *P. patens* after treatment with a culture filtrate (CF) of Ecc. A total of 400 clones were identified, including genes involved in cell growth, defense, signaling, oxidative stress as well as genes of unknown function. Among genes of unknown function, we have selected 2 genes whose transcripts were differentially expressed in response to pathogens in the *alpha-dox* knockout mutant compared to wild type control plants. Candidate genes will be knocked out in *Physcomitrella* or over-expressed in *Arabidopsis* to investigate if they could play a role in enhancing resistance against plant pathogens.

Oliver JP, Castro A, Gaggero C, Cascón T, Schmelz EA, Castresana C, Ponce de León I. *Pythium* infection activates conserved plant defense responses in mosses . *Planta*, v. 230 , p. 569-579, 2009.

Ponce de León I, Oliver JP, Castro A, Gaggero C, Bentancor M, Vidal S (2007) *Erwinia carotovora* elicitors and *Botrytis cinerea* activate defense responses in *Physcomitrella patens*. *BMC Plant Biology* (e-resource), v. 8 , p. 52-, 2007.