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REDUCING SUSCEPTIBILITY TO POWDERY MILDEW IN APPLE AND GRAPEVINE THROUGH SILENCING OF *MLO* GENES

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Powdery mildew, grape, resistance gene, MLO, gene silencing

Powdery mildew (PM) is a major fungal disease for apple and grape that requires a huge amount of chemicals to be controlled. Specific homologs of the *MLO* gene family act as PM-susceptibility genes, since their loss-of-function mutations ended up in durable and broad-spectrum resistance in several crops. PM pathogenesis is linked to a pathogen-dependent up-regulation of specific members of the *MLO* gene family during early stages of infection and, since they are negative regulator of plant defense pathways, their up-regulation impair the defenses of the host. The silencing or knock-out of up-regulated *MLO* genes led to resistance in *Arabidopsis*, tomato, pea, pepper, barley and wheat. Pleiotropic phenotypes are sometimes associated to *mlo* mutants, like early senescence-like leaf chlorosis under non-optimal growth condition. Using RNAi, four grape *MLO* genes and two apple *MLO* genes were silenced to obtain resistance respectively to *Erysiphe necator* (grape) and *Podosphaera leucotricha* (apple). Grape and apple transgenic lines have been tested for resistance to PM causal agent, showing variable levels of resistance, from moderate to very high, without deleterious phenotypic effects. The most resistant grape and apple transgenic lines have been selected for further characterization, with a particular focus on gene expression and microscopy.