

Protocol on the dialog between plants and fungi

Endophytic fungus produces signals to protect the plant

Amplifying the host immunity is a different concept of the signals exchanged between plants and fungi than the well-studied pathogen-associated molecular pattern and effector concepts. The plant pathogen *Eutypa lata* is an endophytic fungus linked with grapevine trunk diseases (GTDs) which can secrete compounds that act as amplifiers of basal plant immunity. This helps *E. lata* to control and conquer the plant.

State-of-the Art

The outcome of a pathogen–host encounter depends on chemical signals that are secreted by the invader and these are modulating the host or the hosts immune system. O-methylmellein is the secondary metabolite of *E. lata* that acts as a weapon in interspecies competition by amplifying the basal immune response activated by bacterial elicitors.

Identify fungal amplifiers of plant immunity

The search for fungal amplifiers was conducted by screening the effect on grapevine defence of culture filtrates from fungi involved in GTDs, based on the assumption that these extracts have abundant general elicitors, and that a strong induction of defence will indicate the presence of amplifiers. A bioactivity-guided fractionation strategy leading to the identification of O-methylmellein. O-methylmellein was identified as a candidate modulator of grapevine immunity since the natural compound could not induce immune responses by itself (i.e. does not act as an elicitor), but could amplify some of the defence responses in the plant. Using the bacterial PAMP flg22 as a platform to trigger plant immunity, it was shown that O-methylmellein qualifies as an amplifier in the context of flg22-triggered immunity response.

Applications

Grapevine trunk diseases (GTDs) are progressively affecting vineyard longevity and productivity worldwide. To be able to understand and combat these diseases, we need a different concept of the signals exchanged between the grapevine and fungi. The fungal amplifiers of plant immunity could serve as promising novel targets for plant protection.

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