Colletotrichum higginsianum extracellular LysM proteins play dual roles in appressorial function and suppression of chitin-triggered plant immunity

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The genome of the hemibiotrophic fungus, *Colletotrichum higginsianum*, encodes a large repertoire of secreted effectors (10) containing LysM domains, but the role of such proteins in pathogenicity is unknown for any *Colletotrichum* species. We characterized two effectors, ChELP1 and ChELP2, that are transcriptionally activated during the early biotrophic phase of infection. Immunocytochemistry showed ChELP2 is concentrated on the surface of bulbous biotrophic hyphae at the interface with living host cells but is absent from filamentous necrotrophic hyphae. In co-localization experiments with wheatgerm agglutinin, the presence of ChELP2 was correlated with the absence of surface-accessible chitin, and *vice versa*. Recombinant ChELP1 and ChELP2 bound chitin and chitin oligomers *in vitro* with high affinity and specificity and both proteins suppress the chitin-triggered activation of two immune-related plant MAP kinases. Using RNAi-mediated gene silencing, we found *ChELP1* and *ChELP2* are essential for fungal virulence and appressorium-mediated penetration of both *Arabidopsis* epidermal cells and cellophane membranes *in vitro*. The data suggest a dual role for these LysM proteins as effectors for suppressing chitin-triggered immunity and as proteins required for appressorium function.