Mechanical stress sensing in *Epichloë* fungal symbionts during colonization of grasses.

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Epichloëfestucae is an agronomically-important endophytic fungus that grows symbiotically within the intercellular spaces of temperate grass species such as *Loliumperenne* and *L. arundinaceum*. Colonization of host seedlings by *E. festucae* occurs when hyphae in the shoot apex invade developing host leaves and extend via intercalary hyphal growth, a highly unusual mechanism of division and extension in non-apical compartments. We hypothesise that intercalary hyphal growth is stimulated by mechanical stretch imposed by attachment of hyphae to elongating host cells, and that this stress is sensed by mechano-sensors located on the hyphal membranes. Genome analysis revealed that homologues of known mechano-sensors in *Saccharomyces cerevisiae* such as Mid1 (a stretch activated calcium ion channel), Wsc1 and Mid2 (cell wall integrity sensors) are present in the *E. festucae* genome. Gene replacement studies of mid1 and wsc1 in *E. festucae* reduced radial growth rate in axenic culture confirming the role of both genes in hyphal growth. In axenic culture both Δ*wsc1* and Δ*mid1* mutants were sensitive to fungal cell wall modifiers such as Calcofluor White, supporting their role in cell wall integrity. Preliminary plant infection studies with Δ*wsc1* and Δ*mid1* mutants revealed a hyper-branched unsynchronized growth pattern within the host (*Loliumperenne*), and Δ*wsc1* also caused severe stunting in most plants suggesting a disruption in the symbiosis. A technique to stimulate intercalary growth under *in-vitro* conditions through mechanical stretch is being optimised to test the ability of Mid1, Wsc1 and Mid2 to sense mechanical stress and initiate intercalary growth.