Sensing and signalling intercalary growth in *Epichloë*endophytes: A transcriptomics approach to mechanosensing.

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Although fungal hyphae normally extend at apical tips, exceptions to polar growth characterise the ecology of many important species. We are investigating the physiology of intercalary growth in *Epichloëfestucae*, a seed-transmitted symbiont that colonises the aerial parts of grasses. Developing leaves are initially invaded by hyphaltips, however continued hyphalcolonisation occurs through expansion of intercalary compartments. We recently tested the hypothesis that intercalary growth is stimulated by mechanical forces imposed on hyphae through their attachment to expanding host cells. *E. festucae* hyphae were grown *in vitro* on silicon membranes and stretching forces were shown to induce intercalary compartment extension and division, as observed in developing leaves. The aim of this study was to identify the cellular responses that induce intercalary hyphal growth after stretch. *E. festucae* cultures were grown on silicon membranes fitted to a custom-designed stretching frame, stretched by 8%, and then harvested either 5 min or 3 h later. The transcriptomes of stretched hyphae were compared against controls grown on the same devices with no stretch applied. Over 100 genes were differentially expressed in cultures harvested 5 min after stretch, whereas after 3 h over 400 genes were differentially regulated. The results suggest that reprogramming of primary metabolism and plasma membrane organisation occurs almost immediately in response to mechanical stress, and mobilisation of cell wall enzymes and secondary metabolism is observed in the cultures harvested later. These findings will assist in determining the role of mechanical stress in regulating *E. festucae* physiology and growth in plants.