Regulation of cell separation during *Candida* hyphal growth by the Ace2 transcription factor and septins

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Candida albicans is able to grow in different morphological states, such as yeast, hyphae or pseudohyphae. Hyphal growth is characterized by continuous apical growth, a change in septin ring dynamics to a hypha-specific state (HSS) and inhibition of septum cleavage after cytokinesis. We have previously shown that the conversion of septin rings to HSS is required to inhibit cell separation of the hyphal compartments, probably by inhibiting the function of Ace2, the transcription factor that activates the expression of genes required for cell separation.

Unexpectedly, we found that *ace2*Δ mutants were unable to convert the septin rings to the HSS, suggesting that Ace2 is also required for this transition. Recent results indicate that two different forms of the transcription factor Ace2 exist in *Candida*, which differ by a 54-amino acid region at the N-terminus. The short form ($Ace2^N$) is nuclear and functions as a transcription factor, while the long form ($Ace2^M$) is membrane-associated due to the presence of a putative transmembrane domain. Analysis of the phenotypes of strains containing either $Ace2^N$ or $Ace2^M$ suggests that the two proteins have different and separate functions: while $Ace2^N$ functions as the transcription factor that controls cell separation genes, $Ace2^M$ directly controls septin ring dynamics in hyphae. Consistent with these observations, we have obtained biochemical evidences indicating that the two forms fractionate in different regions in sucrose density gradients, $Ace2^N$ sedimenting with nuclear markers and $Ace2^M$ with Golgi markers. Our current working hypothesis is that during hyphal growth $Ace2^M$ regulates the conversion of septin ring to the HSS through an unknown mechanism, and that this modification is necessary to inhibit the function of $Ace2^N$ in activating cell separation.