Filamentous Growth in budding yeast: a response towards limitation in carbon/nitrogen

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ABSTRACT

In *Saccharomyces cerevisiae*, filamentous growth response is mediated by a family of flocculin genes in which FLO11/MUC1 is crucial for cell-cell adhesion. Nutrient limiting conditions lead to morphological changes, diploid pseudohyphal form is observed during nitrogen stress, while haploid invasive filamentation during glucose limitation. FLO11, a GPI-anchored cell-surface glycoprotein is highly polymorphic in nature and the extent of expression is directly proportional to pseudohyphal filamentation in nitrogen limiting conditions. Initial experiments were carried out to study the phenotypic changes in lower ammonium concentrations in synthetically defined media containing ammonium sulphate as the sole nitrogen source. The experiments revealed an enhanced filamentous form of diploid *Saccharomyces cerevisiae*. Here our focus is on the pseudohyphal mode of elongation of diploid *Saccharomyces cerevisiae* which is characterized by elongated morphology and unipolar budding. Our studies indicate having ammonium sulphate as sole nitrogen source and glucose in abundance, bistable response of FLO11 protein is expressed in the range of 50-300 micro moles ammonium sulphate. However, when both carbon and nitrogen are limiting, the cells showed hyper filamentous form and sporulating response in extreme limiting conditions. When carbon and nitrogen levels are simultaneously perturbed, FLO11 expression depends on carbon/nitrogen signals transmitted from the cellular environment. The dynamics of FLO11 expression in response to these nutrient signals will be presented by quantifying the expression of fusion Flo11 promoter with a reporter gene like Lac Z or GFP.