The fungal pathogen *Candida glabrata* does not depend on surface ferric reductases for iron acquisition.

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Details



Abstract

Iron acquisition is a crucial virulence determinant for many bacteria and fungi, including the opportunistic fungal pathogens Candida albicans and C. glabrata. While the diverse strategies used by C. albicans for obtaining iron from the host are well-described, much less is known about the acquisition of this micronutrient from host sources by C. glabrata - a distant relative of C. albicans with closer evolutionary ties to Saccharomyces cerevisiae, which nonetheless causes severe clinical symptoms in humans. Here we show that C. glabrata is much more restricted than C. albicans in using host iron sources, lacking, for example, the ability to grow on transferrin and hemin/hemoglobin. Instead, C. glabrata is able to use ferritin and non-protein-bound iron (FeCl3) as iron sources in a pH-dependent manner. As in other fungal pathogens, iron-dependent growth requires the reductive high affinity (HA) iron uptake system. Typically highly conserved, this uptake mechanism normally relies on initial ferric reduction by cell-surface ferric reductases. The C. glabrata genome contains only three such putative ferric reductases, which were found to be

dispensable for iron-dependent growth. In addition and in contrast to C. albicans and S. cerevisiae, we also detected no surface ferric reductase activity in C. glabrata. Instead, extracellular ferric reduction was found in this and the two other fungal species, which was largely dependent on an excreted low-molecular weight, non-protein ferric reductant. We therefore propose an iron acquisition strategy of C. glabrata which differs from other pathogenic fungi, such as C. albicans, in that it depends on a limited set of host iron sources and that it lacks the need for surface ferric reductases. Extracellular ferric reduction by a secreted molecule possibly compensates for the loss of surface ferric reductase activity in the HA iron uptake system.

Involved units

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