Global identification of biofilm-specific proteolysis in *Candida albicans*.

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Details



Abstract

Candida albicans is a fungal species that is part of the normal human microbiota and also an opportunistic pathogen capable of causing mucosal and systemic infections. C. albicans cells proliferate in a planktonic (suspension) state, but they also form biofilms, organized and tightly packed communities of cells attached to a solid surface. Biofilms colonize many niches of the human body and persist on implanted medical devices, where they are a major source of new C. albicans infections. Here, we used an unbiased and global substrate-profiling approach to discover proteolytic activities produced specifically by C. albicans biofilms, compared to planktonic cells, with the goal of identifying potential biofilm-specific diagnostic markers and targets for therapeutic intervention. This activity-based profiling approach, coupled with proteomics, identified Sap5 (Candidapepsin-5) and Sap6 (Candidapepsin-6) as major biofilm-specific proteases secreted by C. albicans Fluorogenic peptide substrates with selectivity for Sap5 or Sap6 confirmed that their activities are highly upregulated in C. albicans biofilms; we also show that

these activities are upregulated in other Candida clade pathogens. Deletion of the SAP5 and SAP6 genes in C. albicans compromised biofilm development in vitro in standard biofilm assays and in vivo in a rat central venous catheter biofilm model. This work establishes secreted proteolysis as a promising enzymatic marker and potential therapeutic target for Candida biofilm formation.

Involved units

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