Extrinsic extracellular DNA leads to biofilm formation and colocalizes with matrix polysaccharides in the human pathogenic fungus *Aspergillus fumigatus*.

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Abstract

The environmentally acquired fungal pathogen Aspergillus fumigatus causes a variety of severe diseases. Furthermore, it is often found colonizing the respiratory tract of patients suffering from cystic fibrosis. Conidia of this filamentous fungus adhere to substrate surfaces and germinate to form biofilms comprised of dense hyphal networks embedded in an adhesive extracellular matrix (ECM), built predominantly of polysaccharides. These fungal microconsortia are likely to be of clinical relevance, as they have also been observed during growth in the host and they confer drastically reduced susceptibility to antifungals. Little is known about environmental factors or signals contributing to the formation and structural organization of this polysaccharide matrix. Extracellular DNA (eDNA) is an abundant molecule in the mucus-rich surfaces in the lungs of cystic fibrosis patients. Here, we studied its influence on the biofilm establishment and progression of A. fumigatus. Using an in vitro biofilm model eDNA was identified as an efficient biofilm inducer promoting conidial surface adhesion and polysaccharide ECM production. Confocal laser scanning microscopy revealed entirely different ECM architectures depending on the substrates used for biofilm induction. In the presence of serum, adhesive polysaccharides were mainly localized to the hyphal tips appearing as cohesive threads or

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