

Recognition of DHN-melanin by a C-type lectin receptor is required for immunity to *Aspergillus*.

Stappers MHT, Clark AE, Aimaniananda V, Bidula S, Reid DM, Asamaphan P, Hardison SE, Dambuza IM, Valsecchi I, Kerscher B, Plato A, Wallace CA, Yuecel R, Hebecker B, da Glória Teixeira Sousa M, Cunha C, Liu Y, Feizi T, Brakhage AA, Kwon-Chung KJ, Gow NAR, Zanda M, Piras M, Zanato C, Jaeger M, Netea MG, van de Veerdonk FL, Lacerda JF, Campos A, Carvalho A, Willment JA, Latgé JP, Brown GD (2018) Recognition of DHN-melanin by a C-type lectin receptor is required for immunity to *Aspergillus*. *Nature* 555(7696), 382-386.

[Details](#)



Abstract

Resistance to infection is critically dependent on the ability of pattern recognition receptors to recognize microbial invasion and induce protective immune responses. One such family of receptors are the C-type lectins, which are central to antifungal immunity. These receptors activate key effector mechanisms upon recognition of conserved fungal cell-wall carbohydrates. However, several other immunologically active fungal ligands have been described; these include melanin, for which the mechanism of recognition is hitherto undefined. Here we identify a C-type lectin receptor, melanin-sensing C-type lectin receptor (MelLec), that has an essential role in antifungal

immunity through recognition of the naphthalene-diol unit of 1,8-dihydroxynaphthalene (DHN)-melanin. MelLec recognizes melanin in conidial spores of *Aspergillus fumigatus* as well as in other DHN-melanized fungi. MelLec is ubiquitously expressed by CD31+endothelial cells in mice, and is also expressed by a sub-population of these cells that co-express epithelial cell adhesion molecule and are detected only in the lung and the liver. In mouse models, MelLec was required for protection against disseminated infection with *A. fumigatus*. In humans, MelLec is also expressed by myeloid cells, and we identified a single nucleotide polymorphism of this receptor that negatively affected myeloid inflammatory responses and significantly increased the susceptibility of stem-cell transplant recipients to disseminated *Aspergillus* infections. MelLec therefore recognizes an immunologically active component commonly found on fungi and has an essential role in protective antifungal immunity in both mice and humans.

Involved units

[Molecular and Applied Microbiology Axel Brakhage](#) [Read more](#)

Leibniz-HKI-Authors



Axel A. Brakhage

[Details](#)

Identifier

doi: 10.1038/nature25974

PMID: 29489751