

Lysosome Fusion Maintains Phagosome Integrity during Fungal Infection.

Westman J, Walpole GFW, Kasper L, Xue BY, Elshafee O, Hube B, Grinstein S (2020) Lysosome Fusion Maintains Phagosome Integrity during Fungal Infection. *Cell Host Microbe* 28(6), 798-812.e6. [PubMed](#)

ILRS Authors

[Osama Elshafee](#)

Projects

Dissection of the *Candida albicans* lipase gene family and its role in commensalism and pathogenicity
[Details](#)

Abstract

Phagosomes must maintain membrane integrity to exert their microbicidal function. Some microorganisms, however, survive and grow within phagosomes. In such instances, phagosomes must expand to avoid rupture and microbial escape. We studied whether phagosomes regulate their size to preserve integrity during infection with the fungal pathogen *Candida albicans*. Phagosomes release calcium as *C. albicans* hyphae elongate, inducing lysosome recruitment and insertion, thereby increasing the phagosomal surface area. As hyphae grow, the expanding phagosome consumes the majority of free lysosomes. Simultaneously, lysosome biosynthesis is stimulated by activation of TFEB, a transcriptional regulator of lysosomal biogenesis. Preventing lysosomal insertion causes phagosomal rupture, NLRP3 inflammasome activation, IL-1 β secretion and host-cell death. Whole-genome transcriptomic analysis demonstrate that stress responses elicited in *C. albicans* upon engulfment are reversed if phagosome expansion is prevented. Our findings reveal a mechanism whereby phagosomes maintain integrity while expanding, ensuring that growing pathogens remain entrapped within this microbicidal compartment.

Identifier

doi: S1931-3128(20)30505-9 PMID: 33022213