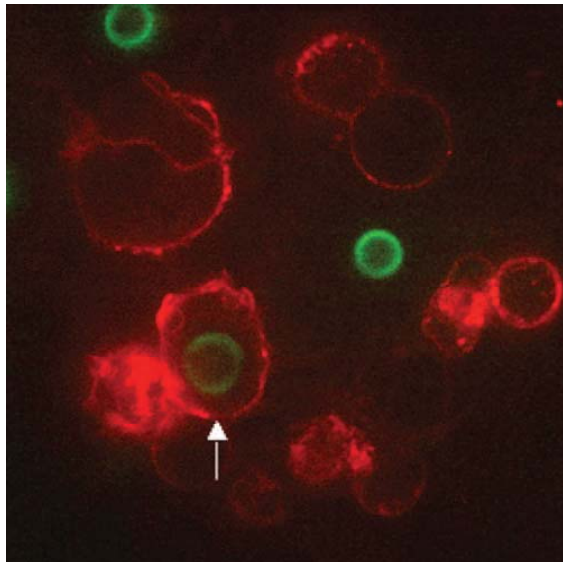


***In Vivo* Role of Dendritic Cells in a Murine Model of Pulmonary Cryptococcosis**



Confocal microscopy showing a live *C. neoformans* cell (Oregon green) internalized by a pulmonary DC stained with phycoerythrin-labeled antibody to CD11c (red) (arrow) at 24 h post-inoculation.

The laboratory of Dr Levitz focuses upon the study of host defenses against *Cryptococcus neoformans* and other opportunistic fungal pathogens. Dendritic cells (DC) have been shown to phagocytose and kill *Cryptococcus neoformans in vitro* and are believed to be important for inducing protective immunity against this organism. However it is not known whether DC in the lung phagocytose *C. neoformans* and are capable of inducing protective immunity in an *in vivo* infection model. In this study researchers examined the *in vivo* interactions of *C. neoformans* with DC in the lung to understand the mechanisms by which human phagocytes inhibit and kill *C. neoformans*.

In order to verify that *C. neoformans* cells were internalized by the DC, live samples were imaged using the PerkinElmer **UltraVIEW** RS spinning disk system in the lab of Hidde Ploegh, Cambridge, MA. DC were stained with CD11c phycoerythrin antibody and Z stacks of images from mice lung DC containing phagocytosed *C. neoformans* cells were quickly and easily acquired. The **UltraVIEW** generated this high resolution image which clearly shows that the pathogen is internalized by the DC.

The next step to better understand DC mechanisms of defense was to determine whether infection caused any DC expansion or infiltration. This can be monitored by measuring an increase of the expression of the dendritic cell marker CD11c at time intervals post-inoculation. Results showed that at 1, 3 and 7 days post-inoculation, the percentage of lung cells expressing the DC marker CD11c increased significantly.

In a final set of experiments, Dr Levitz, Dr Wozniak and Dr Vyas determined whether lung DC from infected animals acquired the capacity to present cryptococcal antigen to T cells. Results proved that DC from infected mice at 1, 3 and 7 days post-infection were able to induce T-cell activation, as measured by IL-2 production, indicating that there is cryptococcal antigen presentation by lung DC.

This study demonstrated that DC in the lung are capable of phagocytosing *Cryptococcus in vivo* suggesting that these cells have a role in innate and adaptive pulmonary defences against cryptococcosis.