Dectin-1 Signaling Controls Protective TH17 Cell Differentiation

Primary T-cell; coculture fungal-primed DCs	
Index	IM16
Standardization	X
Counting	X
Viability	
Volume	

Gringhuis et al. (2022) Fungal sensing by dectin-1 directs the non-pathogenic polarization of T_H 17 cells through balanced type I IFN responses in human DCs; **Nature Immunology**; Volume 23; December 2022; 1735–1748

The Challenge:

Dendritic cells (DCs) must precisely orchestrate the differentiation of T_H17 cells during fungal infections. While non-pathogenic T_H17 cells are essential for clearing infections without causing harm, pathogenic T_H17 cells drive chronic inflammation and tissue damage. The specific mechanisms and pattern-recognition receptors (PRRs) that dendritic cells use to instruct these distinct phenotypes in humans have remained poorly defined.

CASY's Contribution:

The CASY cell counter and analyzer was utilized to perform high-precision automated cell counts every other day during long-term in vitro T_H17 cell outgrowth assays. These measurements were used to monitor the proliferation and survival of T cells co-cultured with fungal-primed DCs for up to 14 days.

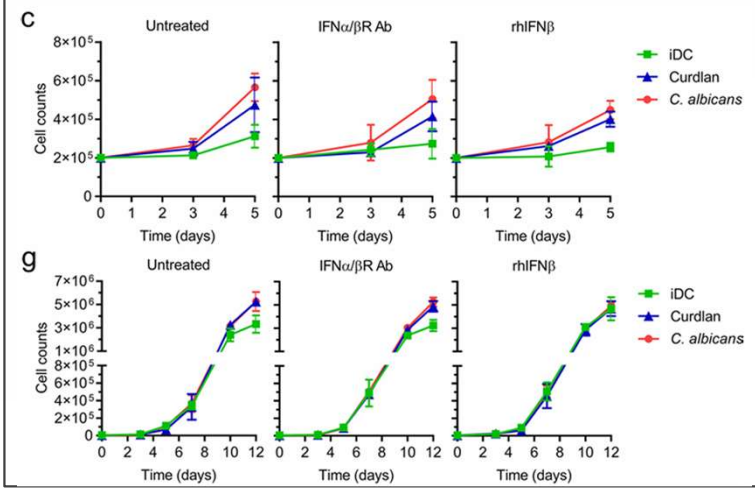
Key Benefits to Researchers:

High-Resolution Proliferation Tracking: Provided accurate, longitudinal monitoring of T cell population doublings, which was essential for evaluating the impact of different cytokine environments on cell expansion.

Methodological Standardization: Enabled researchers to maintain consistent cell densities across complex experimental setups involving various blocking antibodies and recombinant cytokines.

Decoupling Growth from Differentiation: Provided the objective quantitative data necessary to prove that alterations in type I IFN signaling affected the functional phenotype of T_H17 cells without compromising their overall proliferation or survival.

Primary T cell proliferation data generated by the CASY system. They demonstrate that while Dectin-1-induced IFN-β signaling profoundly dictates whether T_H17 cells become pathogenic or non-pathogenic, it does not alter the actual proliferation kinetics or survival of the cells



Extended Data Fig. 2 | Proliferation and survival during co-culture of curdlan- or *C. albicans*-primed DCs with naive or memory CD4+ T cells are not altered by either attenuated or enhanced type I IFN responses. … **c,g,** T cell counts at indicated time points after T cells were outgrown in vitro by co-culture of either naive (c) or memory (g) CD4+ T cells with immature DCs (iDC) or primed DCs,