

# Human neutrophil-like cells demonstrate antimicrobial responses to the chronic cyst form of *Toxoplasma gondii*

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## Abstract

The protozoan parasite *Toxoplasma gondii* infects approximately 2.5 billion people worldwide. Infection induces a rapid dissemination of parasites throughout the body followed by the formation of lifelong cysts within neurons of the host brain. Both stages require a dynamic immune response comprised of both innate and adaptive cells. Neutrophils are a primary responding cell to acute infection and have been observed in the brain during murine chronic infection. Previous studies investigating human neutrophils found that invasion by *Toxoplasma* tachyzoites inhibits apoptosis of neutrophils, prolonging their survival under inflammatory conditions. Here, we demonstrate the differentiation of two distinct subsets following exposure of human neutrophil-like-cells (HNLC) to *Toxoplasma* cysts. *In vitro* stimulation and imaging studies show cyst-specific induction of cytokines and cyst clearance by HNLCs. Further testing demonstrates that aged HNLCs perform less phagocytosis of cysts compared to non-aged HNLCs. In conclusion, this study identifies a novel response of HNLCs to *Toxoplasma* cysts and may indicate a role for neutrophils in the clearance of cysts during human infection with *Toxoplasma*.

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