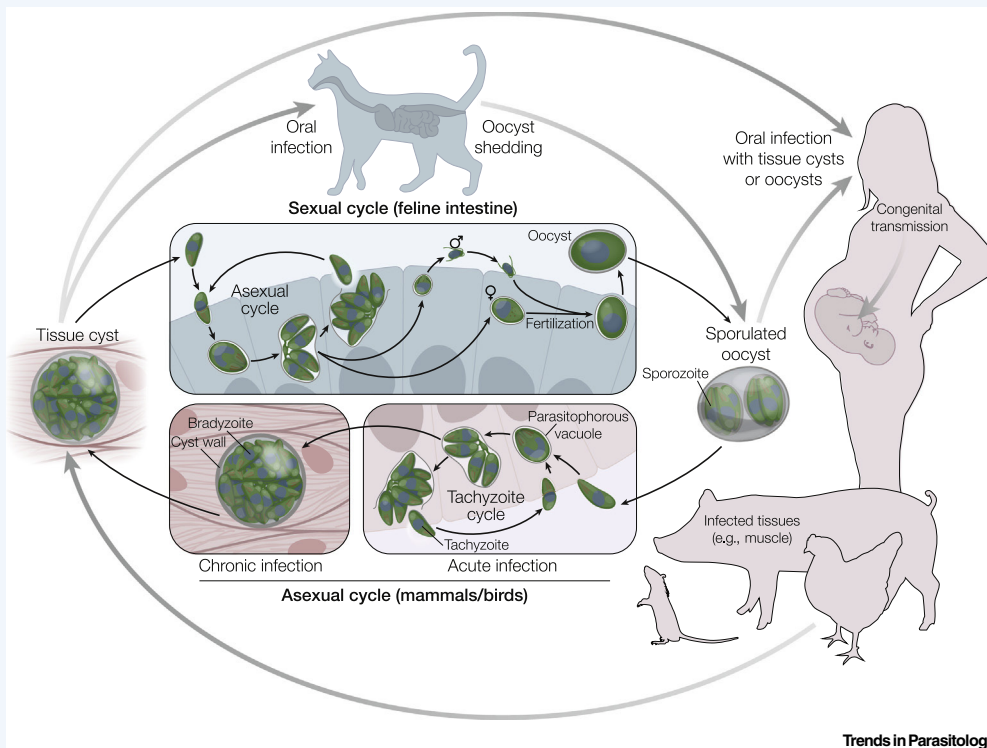


Toxoplasma gondii

Sebastian Lourido^{1,2,*}

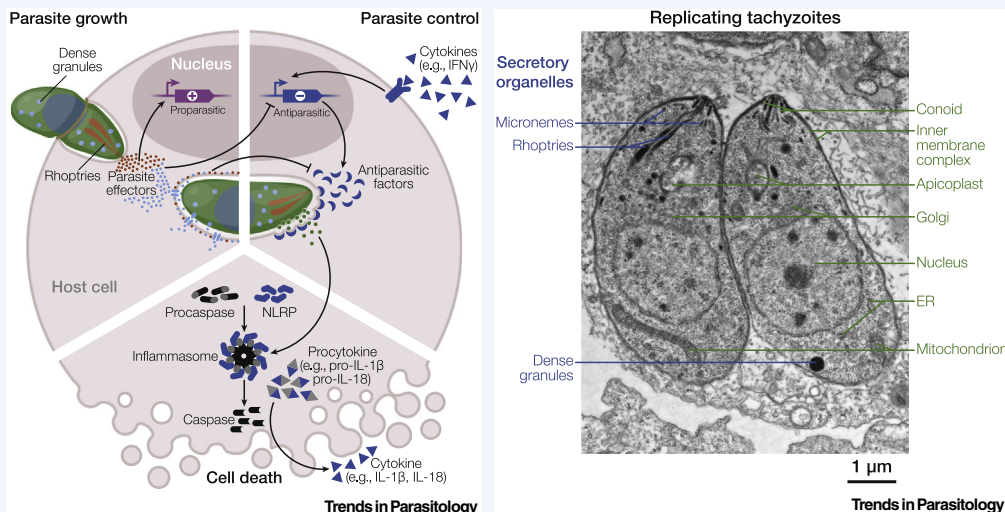
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Trends in Parasitology

Toxoplasma gondii is an obligate intracellular eukaryotic parasite from the phylum Apicomplexa that infects up to one-third of the global population. Although most infections are asymptomatic, some cause retinal lesions and, in immunocompromised individuals or when contracted congenitally, can lead to life-threatening disseminated infections involving the central nervous system. Parasites can enter a chronic state, resistant to current therapies, which can be a reservoir for recrudescence. Felines are the strict definitive hosts for *T. gondii*, in which the parasite can sexually develop, forming highly infectious, environmentally resistant oocysts. Virtually all warm-blooded animals can act as intermediate hosts, acquiring the infection from consuming oocysts or tissues of chronically infected animals. A variety of specialized organelles release proteins that mediate motility and invasion and modulate host pathways. Extensive genetic tools make *T. gondii* a tractable model to dissect the biology of the phylum.



Trends in Parasitology

KEY FACTS:

Broad host range, infecting warm-blooded animals from birds to humans, with sexual recombination restricted to felines.

Following infection of the intestine from consumption of oocysts or tissue cysts, parasites disseminate systemically to replicate in a variety of nucleated cell types.

Slow-replicating chronic stages may persist life-long as tissue cysts within neurons and muscle cells.

Three genomes in the nucleus (66 Mb encoding ~8320 genes), mitochondrion, and apicoplast.

Continuous asexual culture and extensive genetic approaches enable the study of physiology, cell biology, and host-parasite interactions.

DISEASE FACTS:

Most infections are asymptomatic, although ocular lesions can occur in immunocompetent individuals and are frequently associated with recrudescence.

Parasites can enter immunologically privileged sites by crossing biologically restrictive barriers like the blood-brain and placental barriers.

Reactivation of chronic infection in immunocompromised individuals can cause life-threatening infections of the central nervous system.

Congenital transmission can occur during an untreated primary infection of the mother, commonly resulting in chorioretinitis and hydrocephalus in the newborn.

Chemotherapy is effective against the acute disease but fails to clear chronic stages.

TAXONOMY AND CLASSIFICATION:

PHYLUM: Apicomplexa
CLASS: Conoidasida
ORDER: Eucoccidiorida
FAMILY: Sarcocystidae
GENUS: *Toxoplasma*
SPECIES: *T. gondii*

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Acknowledgments

Jeroen Saeij, Vern Carruthers, and members of the Lourido laboratory provided helpful discussions and comments. Wandy Beatty at the Washington University Molecular Microbiology Imaging Facility performed the electron microscopy. This work was supported by the National Institutes of Health (NIH) Director's Early Independence Award (1DP5OD017892) and a grant from the Mathers Foundation (1706-00164) to S.L.

Resources

www.toxodb.org
www.cdc.gov/parasites/toxoplasmosis/
www.llamp.net

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