Lab. 8 :

Toxoplasma gondii

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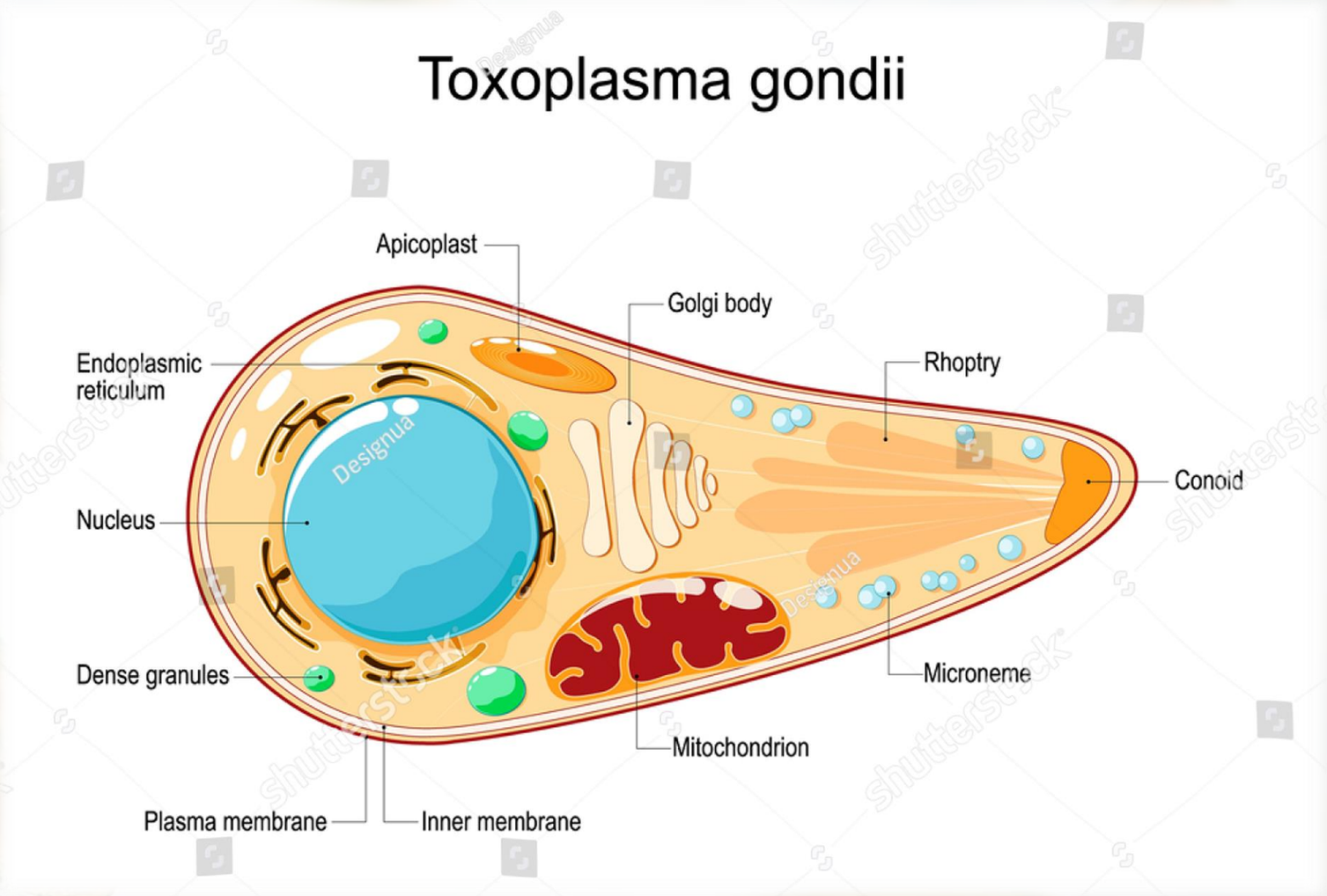
Introduction

Toxoplasma gondii is a widespread, microscopic, intracellular protozoan parasite that causes the infection toxoplasmosis. It infects most warm-blooded animals, including humans, but only reproduces sexually within cats, its definitive host while humans and other animals act as intermediate hosts. Humans usually contract it via undercooked meat, contaminated water/soil, or cat feces.

Classification

- Kingdom: Protista
- Phylum: Apicomplexa
- Class: Conoidasida
- Order: Eucoccidiorida
- Family: Sarcocystidae
- Genus: *Toxoplasma*
- Species: *T. gondii*



Geographical Distribution

T. gondii is distributed worldwide. Infection rates vary depending on climate, hygiene, and dietary habits. Higher prevalence is seen in warm, humid regions and areas where raw or undercooked meat is consumed.

Habitat

- Definitive host (cats): intestinal epithelial cells
- Intermediate hosts (humans, animals): tissues such as brain, muscles, and eyes

Morphology

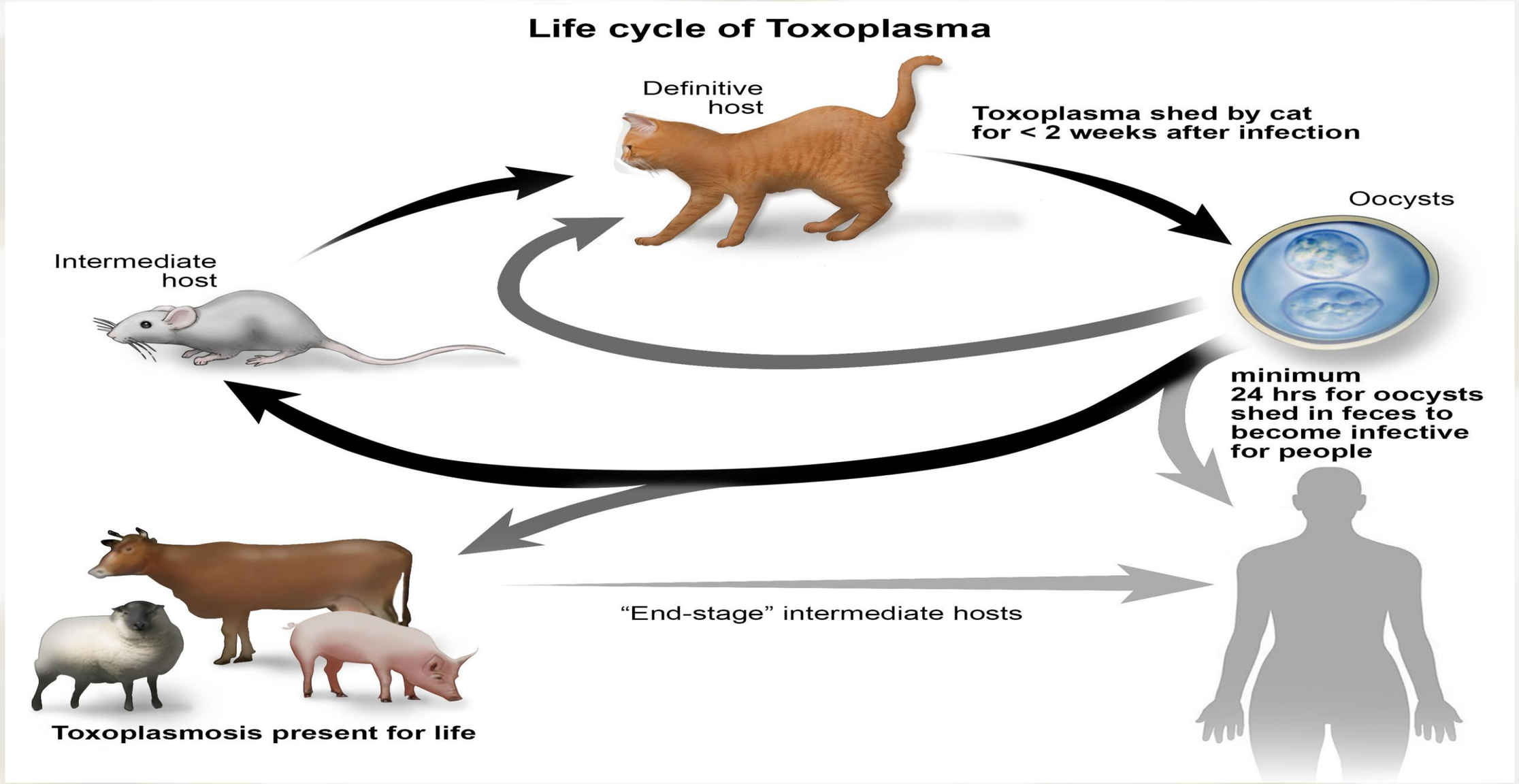
T. gondii exists in three main forms:

1. **Tachyzoites** – rapidly multiplying, crescent-shaped
2. **Bradyzoites** – slow-growing, found in tissue cysts
3. **Oocysts** – shed in cat feces, environmentally resistant

Life Cycle

The life cycle includes:

- Sexual reproduction in cats (definitive host)
- Oocysts excreted in feces
- Humans infected via:
  - ingestion of contaminated food/water
  - undercooked meat
  - Congenita Al transmission


Life cycle of Toxoplasma
Definitive host
Toxoplasma shed by cat for < 2 weeks after infection
Oocysts
Intermediate host
minimum 24 hrs for oocysts shed in feces to become infective for people
"End-stage" intermediate hosts
Toxoplasmosis present for life

Pathogenesis

The parasite invades host cells and multiplies, causing cell destruction. It can form latent cysts, especially in brain and muscle tissues.

Disease (Toxoplasmosis)

- Usually asymptomatic in healthy individuals.
- Symptoms: mild fever, lymphadenopathy.
- Severe in:

- immunocompromised patients (encephalitis)
- congenital infection (miscarriage, fetal abnormalities).

Diagnosis

- Serological tests (IgG, IgM antibodies).
- PCR detection.
- Microscopic examination (rarely).

Prevention

- Cook meat thoroughly.
- Wash fruits and vegetables.
- Avoid contact with cat feces.
- Pregnant women should take extra precautions.

Conclusion

Toxoplasma gondii is a globally important parasite with significant health impacts, especially in pregnant women and immunocompromised individuals.