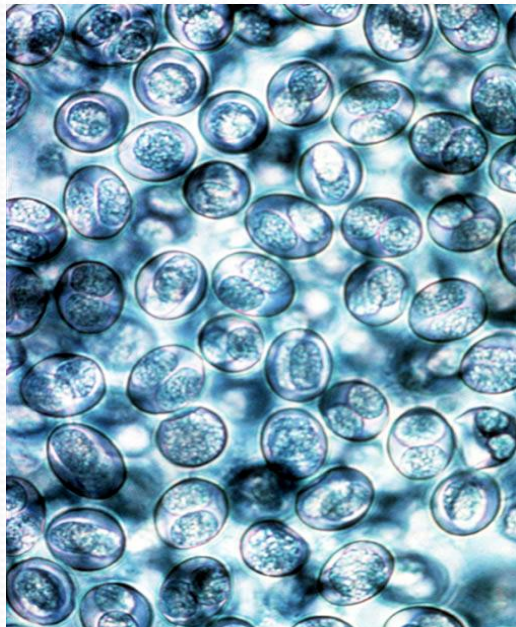


Detection of *Toxoplasma gondii* and surrogate microspheres in water

A new tool for investigating a waterborne zoonosis



Results removed due to pending publication

Presentation in full will become available after publication

Karen Shapiro DVM
University of California, Davis, USA

Background: Waterborne Disease

- A leading cause of death world-wide
 - Developing nations
 - 3.4 Million deaths annually
 - 1.8 Million children
- Ingestion of pathogens in contaminated water
 - Viruses
 - Bacteria
 - Parasites



Introduction: Toxo

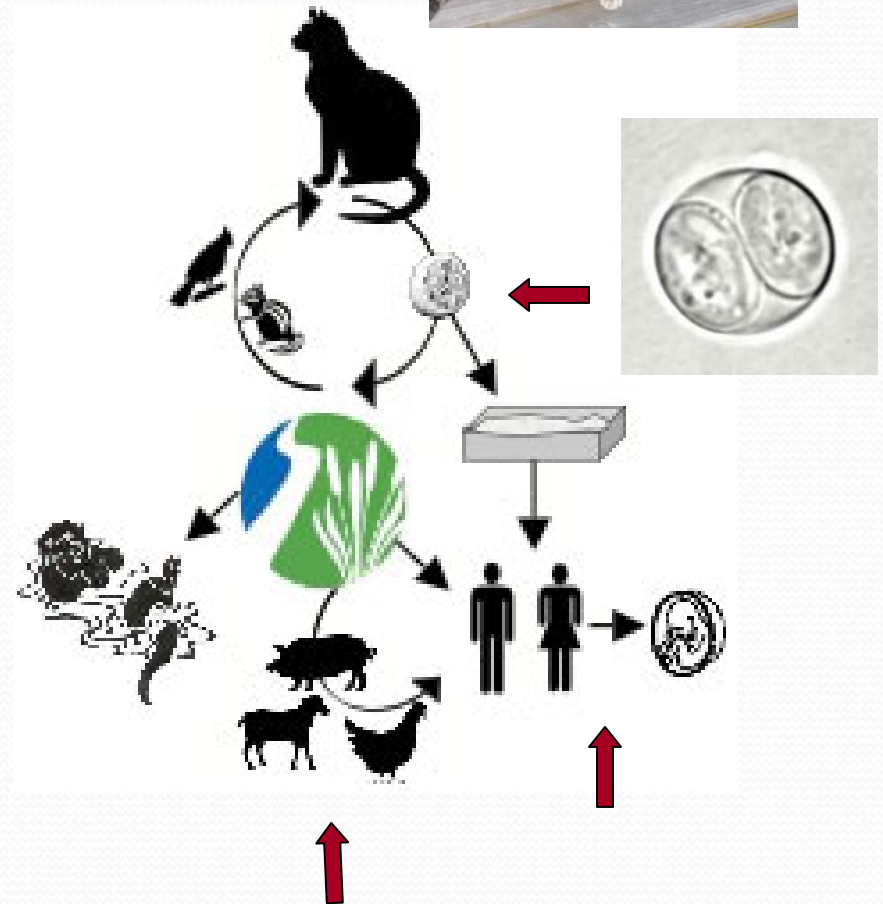
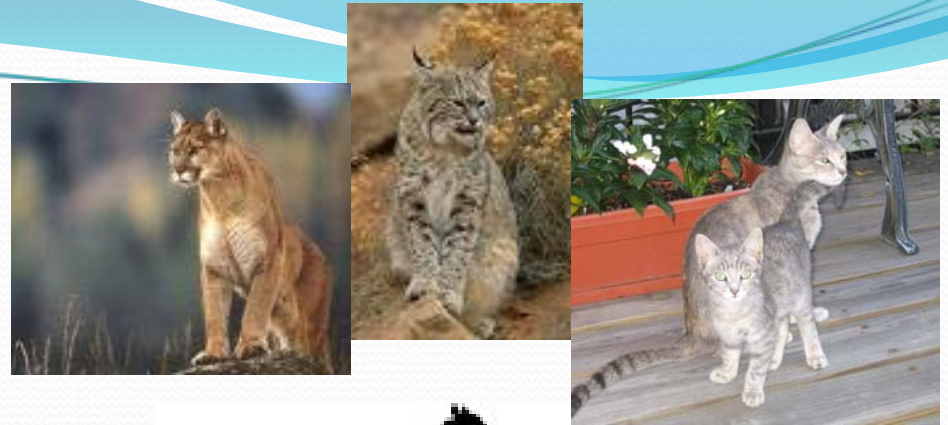
- *Toxoplasma gondii* (Toxo)
 - Zoonotic protozoan parasite
 - Infects humans and animals
 - Agent of toxoplasmosis
 - Global distribution



Toxo oocyst

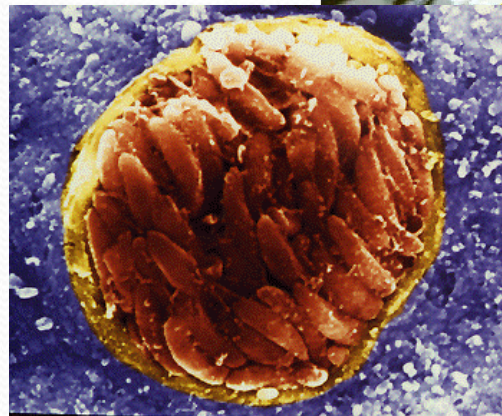
Introduction

- *Toxo* – Life cycle
 - Cats definitive hosts
 - Many warm blooded animals as intermediate hosts
- Transmission routes
 - Oocyst ingestion
 - Undercooked meat
 - Congenital



Toxo in People

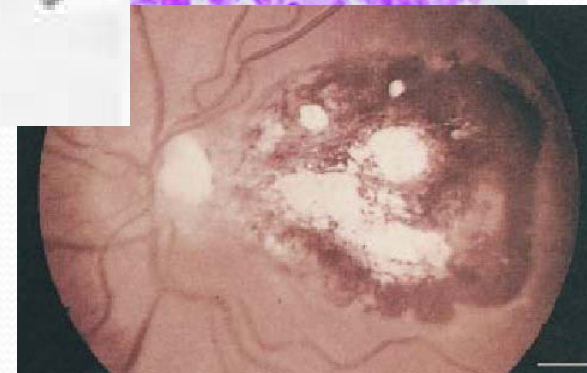
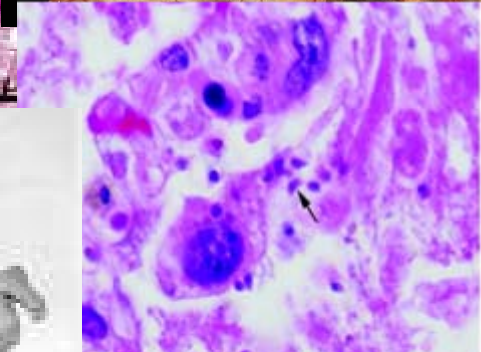
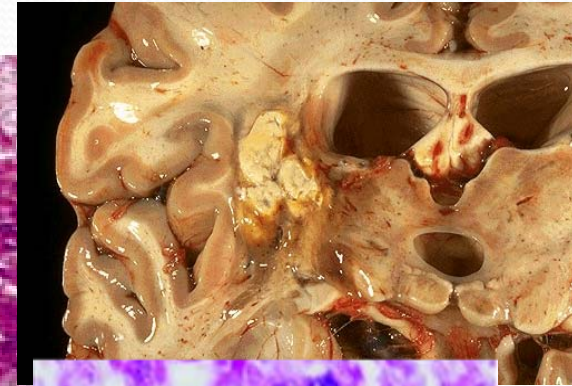
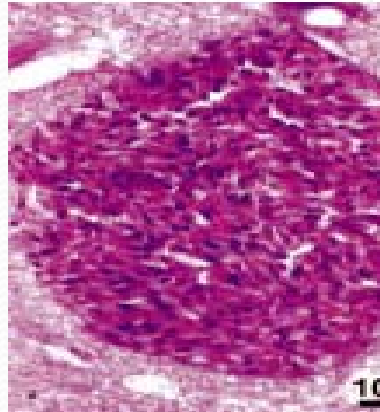
- Infection subclinical in 90% of healthy adults
- Life long infection
- Human exposure
 - US: 20%
 - Israel: 40-75%
 - France: 70%
 - Brazil: >90%



David Ferguson, Oxford University

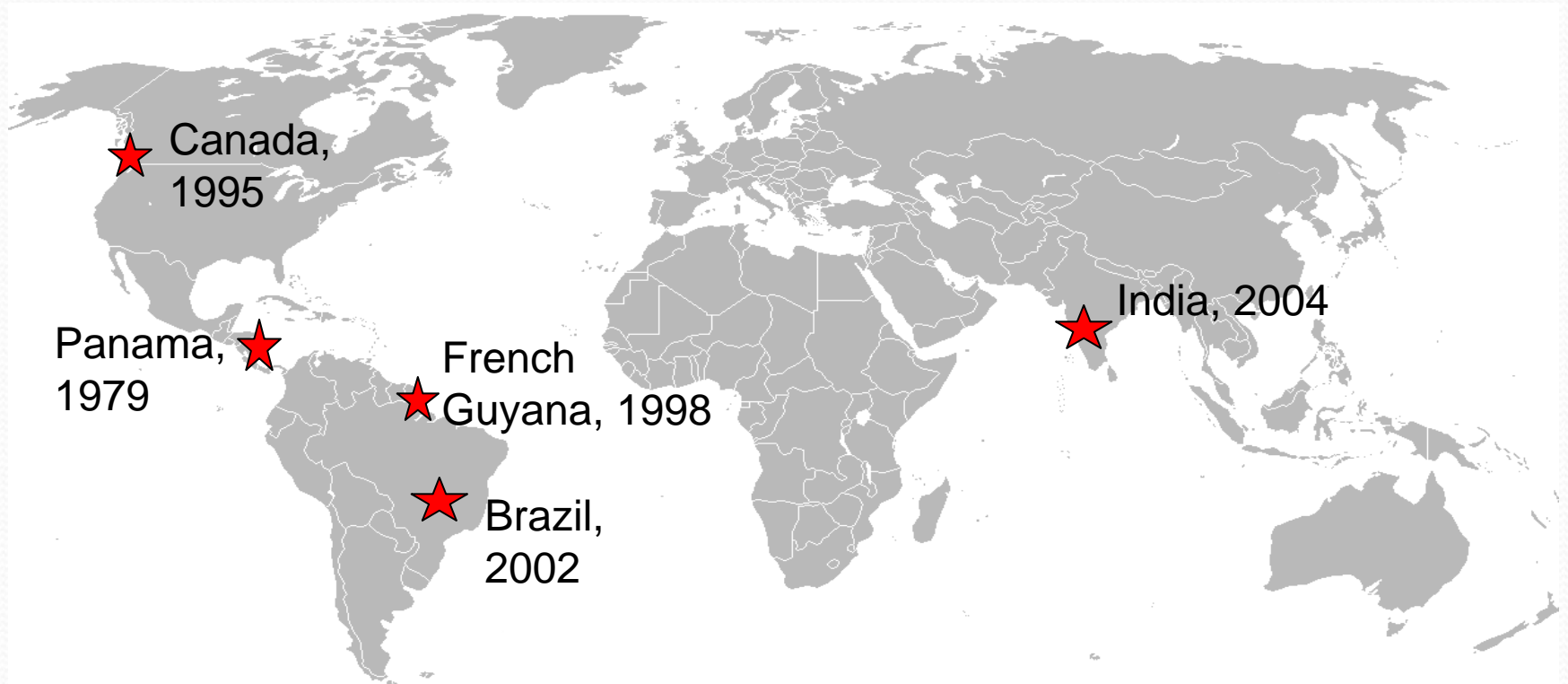
Human Toxoplasmosis

- Healthy adults – 10%
- Fatal disease in Immunocompromised
- Children of women infected during pregnancy
 - Myeloencephalitis
 - Birth defects
 - Retardation
 - Pneumonia
 - Blindness
 - Schizophrenia



Healthy adults at risk from waterborne infection

Waterborne Toxoplasmosis Outbreaks



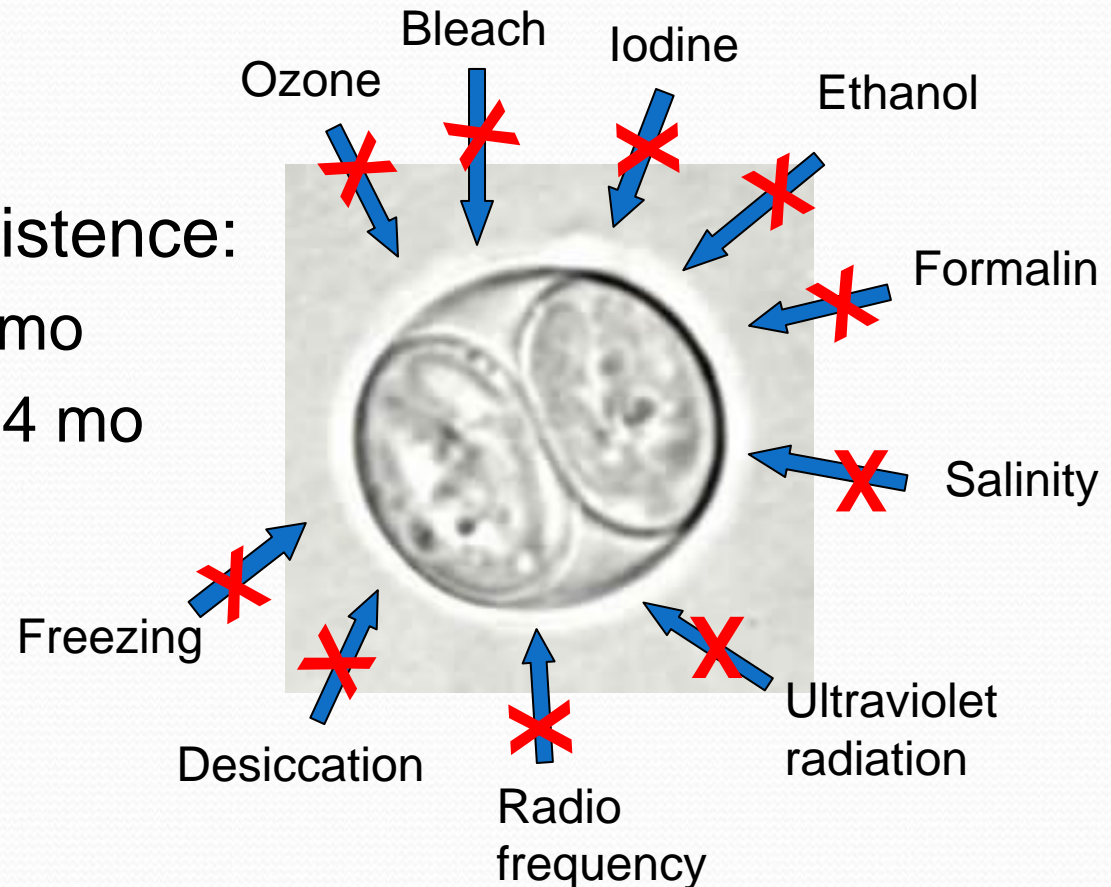
Waterborne Toxoplasmosis: Oocyst Transmission

- Contamination of waterways with cat feces
 - Sewage
 - Point source: Storm drains
 - Runoff: Non-point source pollution



Waterborne Toxoplasmosis: Oocyst Resistance

- Chemical
- Physical
- Environmental persistence:
 - Survival in soil 18 mo
 - Survival in water 54 mo



Waterborne Toxoplasmosis: Prevention

- Lack of effective chemical disinfectants
- Prevention measures:
 - Identify high risk zones
 - Where do oocysts enter the watershed?
 - Where do oocysts accumulate?
 - Remove Toxo oocysts
 - Filtration
 - Coagulation
 - Wetlands

Classic transport and fate questions... BUT HOW?

Does urbanization lead to increased contamination of waterways with Toxo?

- Increased domestic cat population
- Increased impervious surfaces
- Storm drains
- **Reduction of natural wetland habitats**



Thank You



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Our team:

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Environmental Engineering:

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Chemistry:

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Hydrology:

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