جامعة الانبار

كلية: الصيدلة

قسم: العلوم المختبرية السريرية

اسم المادة باللغة العربية: الاحياء المجهرية

اسم المدة باللغة الإنكليزية: **microbiology**

المرحلة: الثانية

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عنوان المحاضرة باللغة العربية: مقوسات كوندای

عنوان المحاضرة باللغة الإنكليزية: **Toxoplasma gondii**

Tissue coccidian parasite

Toxoplasma gondii (Toxoplasmosis)

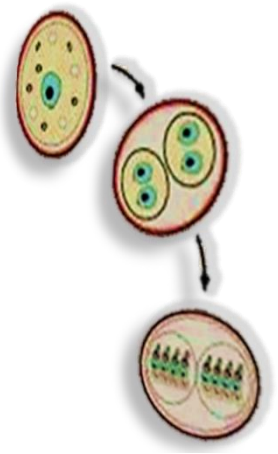
INTRODUCTION

- *Toxoplasma gondii is an obligate intra-cellular parasite that cause Toxoplasmosis*
- *T. gondii is word wide in distribution and infects a large variety of mammals and birds (intermediate host). Human infections can be congenital or acquired at any age after birth. T. gondii infection can be acute or chronic and symptomatic or asymptomatic.*
- *Cat represent the (definitive host) for the sexual stages.*

Morphological stages

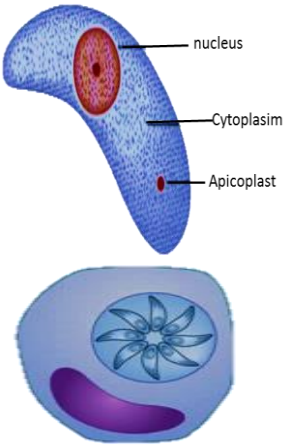
Toxoplasma gondii exists in three morphological forms, and all parasite stages are infectious.

1. Oocyst:



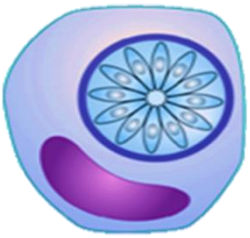
Oocyst is spherical or ovoid, about 10-15 µm × 8-12 µm in size and contain a sporoblast. Oocysts reach the external environment through cat feces. They mature within 2-3 days. During maturation or sporulation, the sporoblast develops into 2 sporocysts, each with 4 sporozoites. These oocysts are relatively resistant to a variety of chemicals and will remain infective in the soil for at least 1 year.

2. Tachyzoites



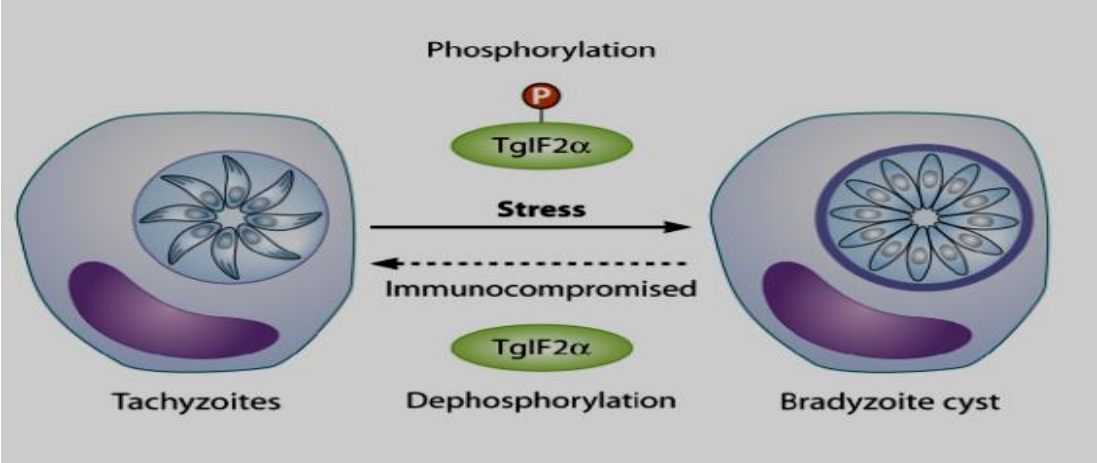
Trophozoite (endozoite, tachyzoites): the intracellular trophozoite or proliferative form usually seen during acute infection. The trophozoites are crescentic in shape, and with one end more pointed than the other. Evident in Giemsa-stained preparation with a delicate azure cytoplasm and a reddish spherical or ovoidal nucleus which is usually nearer the blunter end of the parasite. Trophozoites are either single or in masses (pseudocyst).

3. Bradyzoite



Bradyzoite: slow-growing stage inside the tissue cysts. mark the chronic phase of infection. Intact tissue cysts probably do not cause any harm and can persist for the life of the host without causing a host inflammatory response. Protective cyst wall is finally dissolved and bradyzoites infect tissue and transform into tachyzoites.

- *Pseudocyst : contain tachyzoites and produces only in acute phase.*
- *Tissue cyst (true cyst): contain bradyzoites and produced only in chronic phase.*



Toxoplasmosis

A. Acquired toxoplasmosis

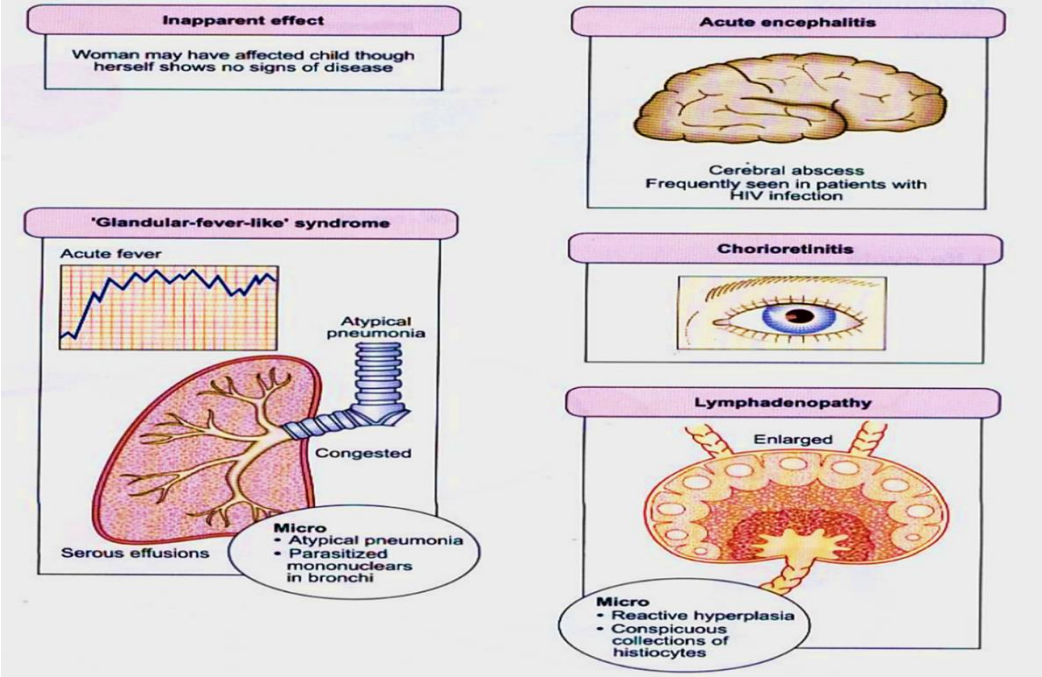
1. majority are **asymptomatic**

2. **acute toxoplasmosis:**

In immunocompetent adults: flu-like symptoms, sometimes associated with fever& lymphadenopathy.

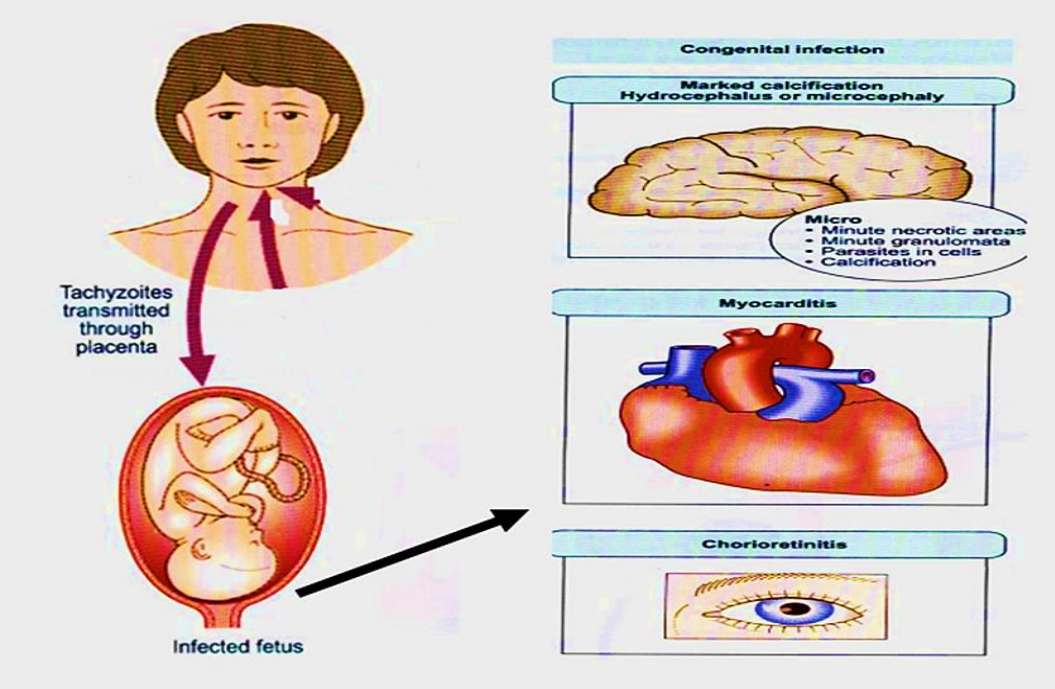
In immunocompromised individuals: (AIDS, transplant and cancer patients): parasitemia, involvement of brain, liver, lung and other organs results in Retinitis, Chorioretinits, Pneumonias, severe neurological disorders, and often death.

B.



Congenital toxoplasmosis.

Choreoretinitis (postnatal toxoplasmosis): occurs later in life of individuals who acquired toxoplasmosis congenitally; focal lesion in retina presenting as decreased visual acuity.

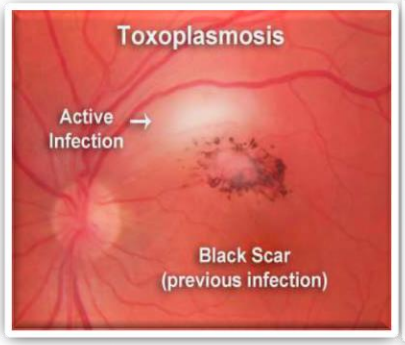


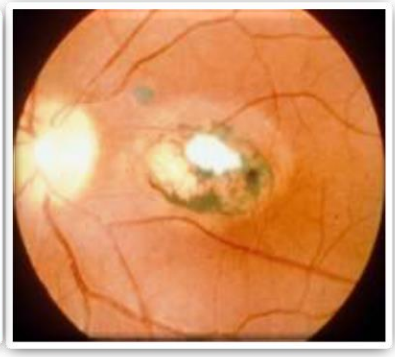
Congenital toxoplasmosis

Clinical manifestation:

Hydrocephalus, lesions in the organs of vision (chorioretinitis), liver cirrhosis and spleen enlargement.

Ocular Toxoplasmosis





DIAGNOSIS

❑ DIRECT EXAMINATION:

- *Microscopy*
- *Antigen Detection*
- *Nucleic Acid Detection Techniques*

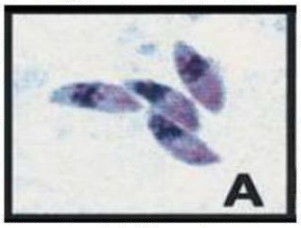
❑ SEROLOGIC TESTS:

- *Determination of Immune Status*
- *Diagnosis of Congenital Infection*
- *Diagnosis of Infection in the Newborn*
- *Diagnosis of Ocular Infection*

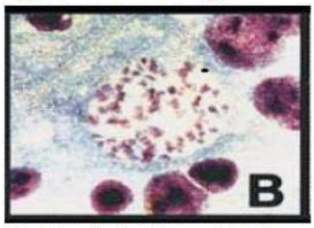
DIRECT EXAMINATION

- ***MICROSCOPY:***
  - *The slides should be air dried, fixed in methanol, and stained with Giemsa for microscopic examination.*
  - *Tachyzoites may be observed as free organisms or within host cells such as leukocytes.*

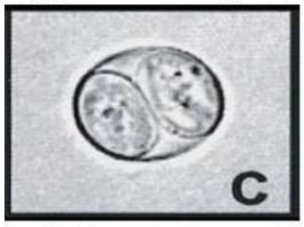
Tachyzoites, Giemsa stain.



Cyst with bradyzoites



Sporulated oocysts

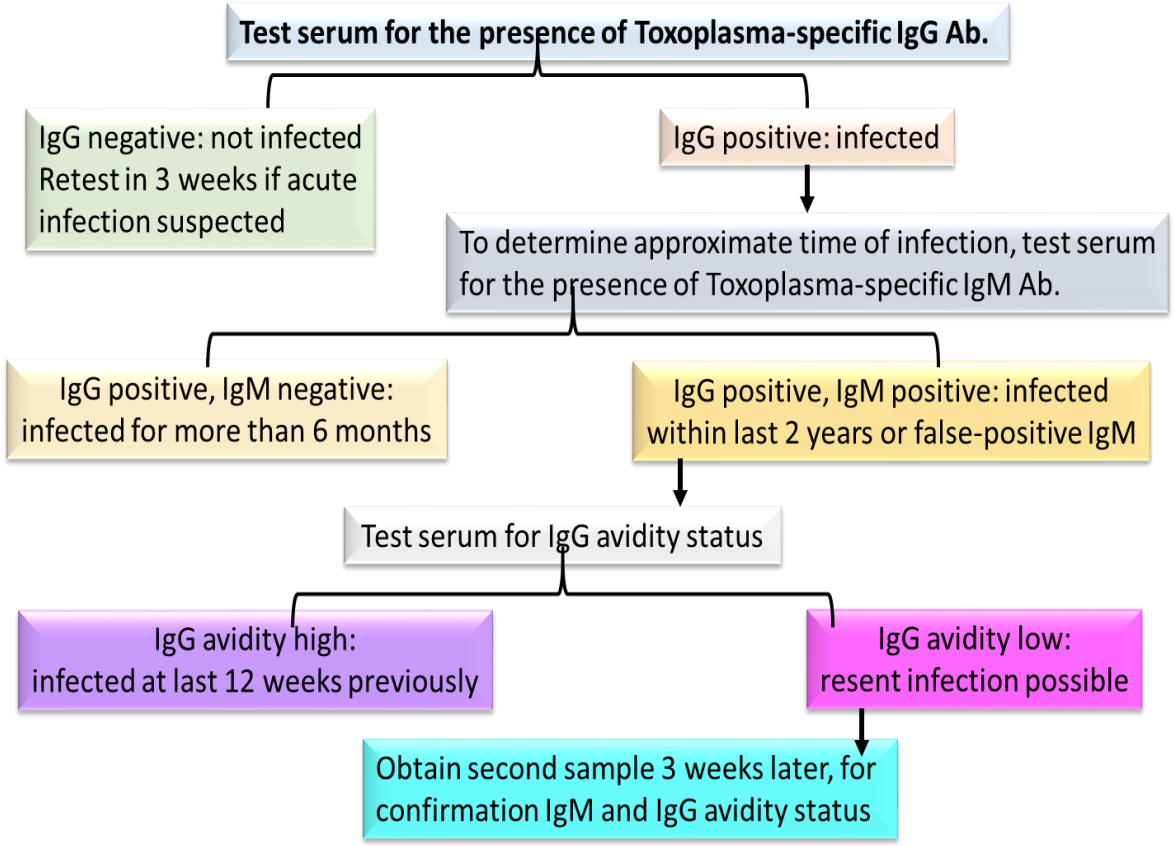


- ***ANTIGEN DETECTION:***
  - *Immunologic methods (immunofluoresceint, EIISA) are used to identify parasites in tissue sections or tissue cultures.*

- ***NUCLEIC ACID DETECTION:***
  - *Important use of PCR appears to be in the prenatal diagnosis of congenital toxoplasmosis.*
  - *PCR of amniotic fluid has been shown to be more sensitive for the confirmation of fetal infection*

SEROLOGIC TESTS

❑ *Determination of Immune Status*



❑ *Diagnosis of Congenital Infection*

- *Diagnosis of congenital toxoplasmosis involves:*
  - *Diagnosing acute infection in a pregnant woman*
  - *Demonstrating infection in the fetus*
- *If collected, fetal blood should be tested for Toxoplasma specific IgG, IgM, and IgA antibodies*

- *Demonstrating Toxoplasma-specific IgM or IgA antibodies in fetal serum or isolating the parasite from fetal leukocytes is a definitive diagnosis of fetal infection.*

❑ ***Diagnosis of congenital toxoplasmosis involves:***

- *Diagnosis is made through a combination of serologic testing, parasite isolation, and nonspecific findings*
- *An attempt should be made to isolate T. gondii from the placenta, amniotic fluid, and cord blood*
- *The child's serum should be tested for Toxoplasma-specific IgG, IgM, and IgA antibodies.*

❑ ***Diagnosis of Ocular Infection***

- *Toxoplasma Chorioretinitis results from both acute infection and congenital infection*
- *IgG antibody to Toxoplasma demonstrating in the serum of a person with compatible eye lesions.*
- *Active ocular toxoplasmosis identified through demonstration of local antibody production and detection of parasite DNA in aqueous humor.*