Brucellosis

[Undulant fever,
Malta fever,
Mediterranean fever]

1. Identification:

Brucellosis is one of the major bacterial zoonoses. It has an acute or insidious onset, with continued, intermittent, or irregular fever, generalized aching, headache, profuse sweating and arthralgia. The disease may occur in severe manner with complications:

1. Arthritis occur in 20% - 60% of cases; spondylitis is the most frequent.
2. Genitourinary in 2%-10%; orchitis and epidedemitis.
3. Localized suppurative infections of organs as liver and spleen and endocarditis
4. Case-fatality rate in untreated cases is 2% or less and usually from endocarditis.

The course of illness is variable, ranging from a few days, months or occasionally years.

Recovery is usual but disability is often pronounced.

Relapsing illness is common.

5% of patients receiving appropriate therapy have one or more relapses within 3 years of initial onset, and the relapse rate is higher in the absence of appropriate therapy.

The disease in animals may cause abortion, premature labors, infertility but not in human.

Diagnosis:

1. Clinical suspicion
2. Isolation of agent by culture of blood, BM, or synovial fluid (definite diagnosis but it take a time, so not practical).
3. Serological test (most practical but not definite):
   - Brucella (tube) Agglutination Test (BAT).
   - Rose-Bengal plate test.
   - 2- Mercapto-Ethanol test (2ME), {to identify active infection}.
   - ELISA appears to be more useful than BAT in areas of high endemicity.
   - RIA, CFT and PCR.

Interpretation of BAT:

- In developing countries (Iraq):

  Titers of ≥ 1/640 are usually indicative of acute brucellosis. 1/320 is suggestive, but a successive increase in titer is more diagnostic than one high reading (as sub-clinical infection or cross immunity with other febrile illness lead to increase antibodies titer and false +ve results obtained).

  More than one of these serological tests should be used to confirm the diagnosis.

2. Infectious agents:

Four species infect man:

B. abortus → cattle.

B. melitensis → goats and sheep

(most virulent and invasive type).

B. suis → pigs.

B. canis → dogs.

Survival of bacteria

- Gram –ve slow-growing intracellular coccobacilli
- Survive in nature for weeks, or months in favorable conditions of water, urine, feces, damp soil and manure.
- In raw milk → survive for several days (boiling and souring kill M.O), unpasteurized cheese and ice-cream are risky. Fermentation and aging of cheese will increase acidity and kill the microorganism.
- Butter is usually safe.
- Destroyed by heat, acids and common disinfectants.

3. Occurrence:

Worldwide, it is endemic in Mediterranean zones, central Asia and South America.

In Iraq the disease is endemic and in Mosul city the disease is hyper-endemic.

Brucellosis is predominantly an occupational disease of those dealing with infected animals or their tissues (farmers, veterinarians, butchers, lab. workers and slaughter houses workers).

The disease is eradicated in Sweden, Denmark, Norway, Switzerland…

4. Reservoir:

Main reservoir of human infection are cattle, goats, sheep, camels, pigs, buffaloes and horses.

5. Mode of transmission:

Transmission is usually from infected animals to man. No evidence of man-to-man transmission. The routes of spread are:

1. Food-borne infection: transmission of brucella by ingestion of raw milk or dairy products (unboilled or unpasteurized), undercooked meat and meat products is well recorded. Also raw vegetables grown on contaminated soil and contaminated water with excreta of infected animals.
2. Contact infection: direct contact of braded skin, mucosa, or conjunctiva with tissues of infected animals, blood, urine and other discharge (veterinarians, lab. workers and abattoir workers).

Mode of transmission:

3. A small number of cases have resulted from accidental inoculation at laboratories and veterinarians by contaminated needles with blood or brucella vaccine (S19 or Rev-1).

Transmission via whole blood transfusions has been reported but is very rare

6. Incubation period:

1 week - 3 months (wide I.P, but it is usually around 1month).

7. Period of communicability:

No man to man transmission.

8. Susceptibility:

Occupationally → adult males (farmers, shepherds, butchers, veterinarians and lab. workers).

Immunity → uncertain.

9. Method of control:

the control of human brucellosis rests on the elimination of the disease among domestic animals.

A- Preventive measures:

1. Health education of farmers about environmental sanitation of farms (good ventilation, general cleanliness), with high standard hygiene concerning veterinarians, slaughter house workers in dealing with animal tissues (gloves, mask and other protective clothing).
2. Health education of public about risk of untreated milk and its products.
3. Sterilization and pasteurization of milk and its product.

A- Preventive measures:

4. Elimination of disease among animals:

a) Searching for infected animals by serological testing (as that for human) or by “ring test” for milk.

b) Segregation and or slaughter of the infected animals with full compensation to the owners. This is the only satisfactory solution aimed to eradication of disease.

c) Vaccination of animals:

1) **Rev-1** → for sheep and goats (yearly giving).
2) **S19** → for cattle and give protection for 7 years.
3) **RB51** instead of S19 for cattle because its less virulent for human than S19 when accidentally injected.

d) Clean sanitary environment for animals, their places and proper management of aborted animal.

A- Preventive measures:

5. **Human vaccination is dangerous**: living vaccine of *B. abortus* strain [19-BA vaccine] is available (severe hypersensitivity, not used in Iraq with limited use in other countries).

B- Control of patients, contacts and environment:

1) Reporting: Class II.
2) Isolation: none
3) Disinfection of purulent discharges.
4) Quarantine: not applicable.
5) Immunization of contacts: not applicable.

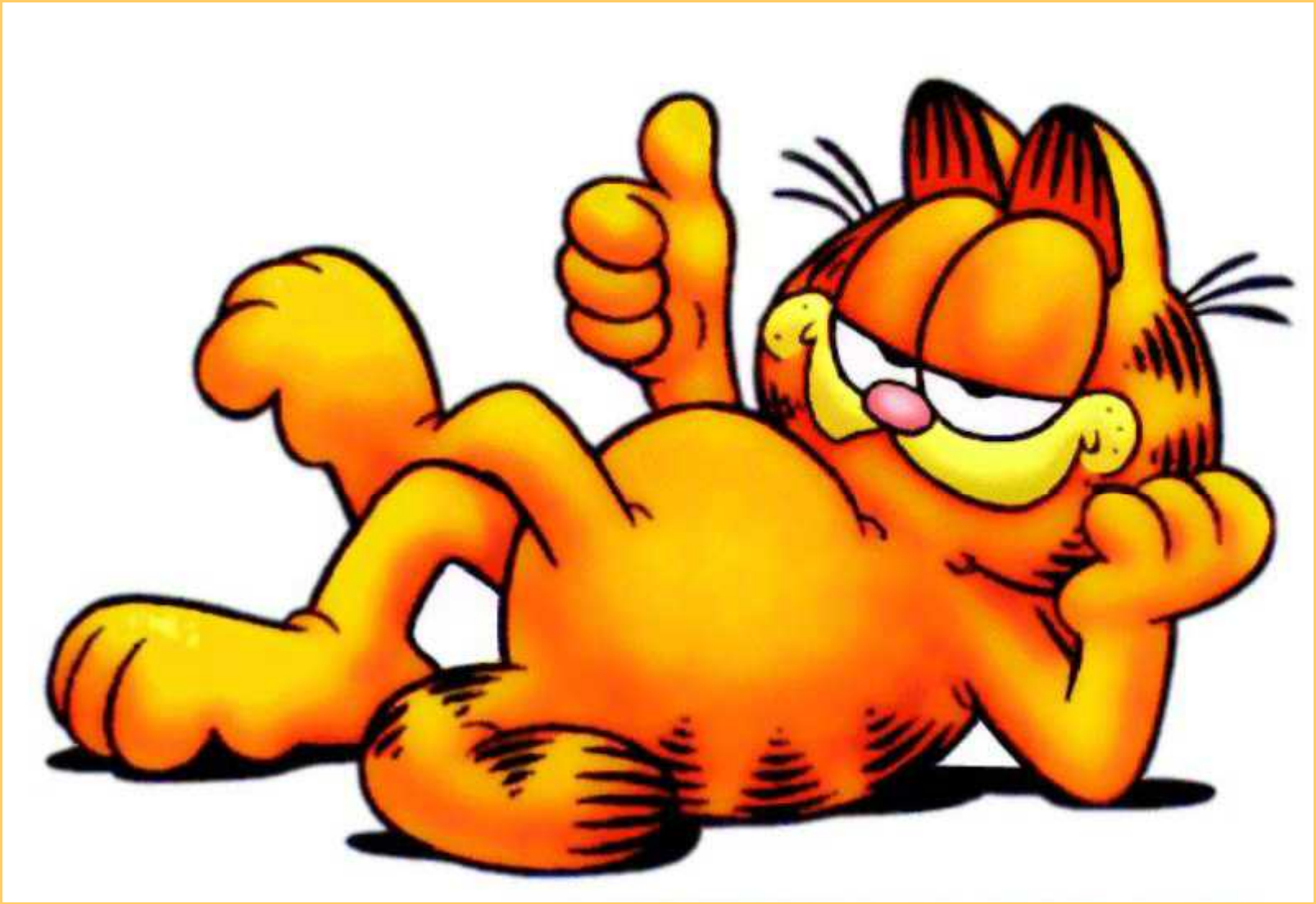
B- Control of patients, contacts and environment:

5) Investigation of contacts and source of infection: trace for infected domestic animal.

6) Specific treatment:

Combination of rifampicin or streptomycin and doxycycline for 6 weeks, and from 3 - 6 months in case of complications. Relapses is common (agent is intracellular and can protect it self from treatment and reappear later on).

TOXOPLASMOSIS



Toxoplasmosis

1. Identification: A systemic protozoan disease; infections are frequently asymptomatic, or present as acute disease with L.N enlargement + fever.

Toxoplasma cyst (containing viable organisms) may remains in tissues for life of the host.

Clinically

Transmission to the fetus occurs almost only when woman acquire infection during pregnancy.

Conversely, women that has been infected before being pregnant have no risk of transmitting the disease to their offspring except in immune-compromised patient.

Approximately 50-60% of fetuses whose mothers acquire the infection during the pregnancy will be affected.

Congenital toxoplasmosis:

A primary infection during early pregnancy may lead to fetal infection with death or manifestations as chorioretinitis, brain damage with intracerebral calcification, hydrocephaly, microcephaly, jaundice, rash and hepatosplenomegaly.

Infection in late pregnancy → mild or sub clinical fetal disease + delayed chronic chorioretinitis. These infants should be observed over a period of up to 10 years for the development of antibodies, or for the development of lesions as delayed chronic chorioretinitis.

Diagnosis

1. Clinical signs.

2. Serological tests:

Serological test is the primary mean of diagnosis, but result must be interpreted carefully.

IgG Ab peak in concentration one to two months after infection & remain positive indefinitely. Direct agglutination test (DAT) detect IgG titer which reached to more than 1:1000 within 3 months of onset then decreased and remain at lower level for life.

Seroconvertion or fourfold increase of IgG Ab suggests recently acquired infection.

Persistence of IgG Ab titer stable exclude recent infection.

IgM-specific Ab can be detected two weeks after infection & reach peak at one month & decline thereafter to disappear within six to nine months.

Diagnosis

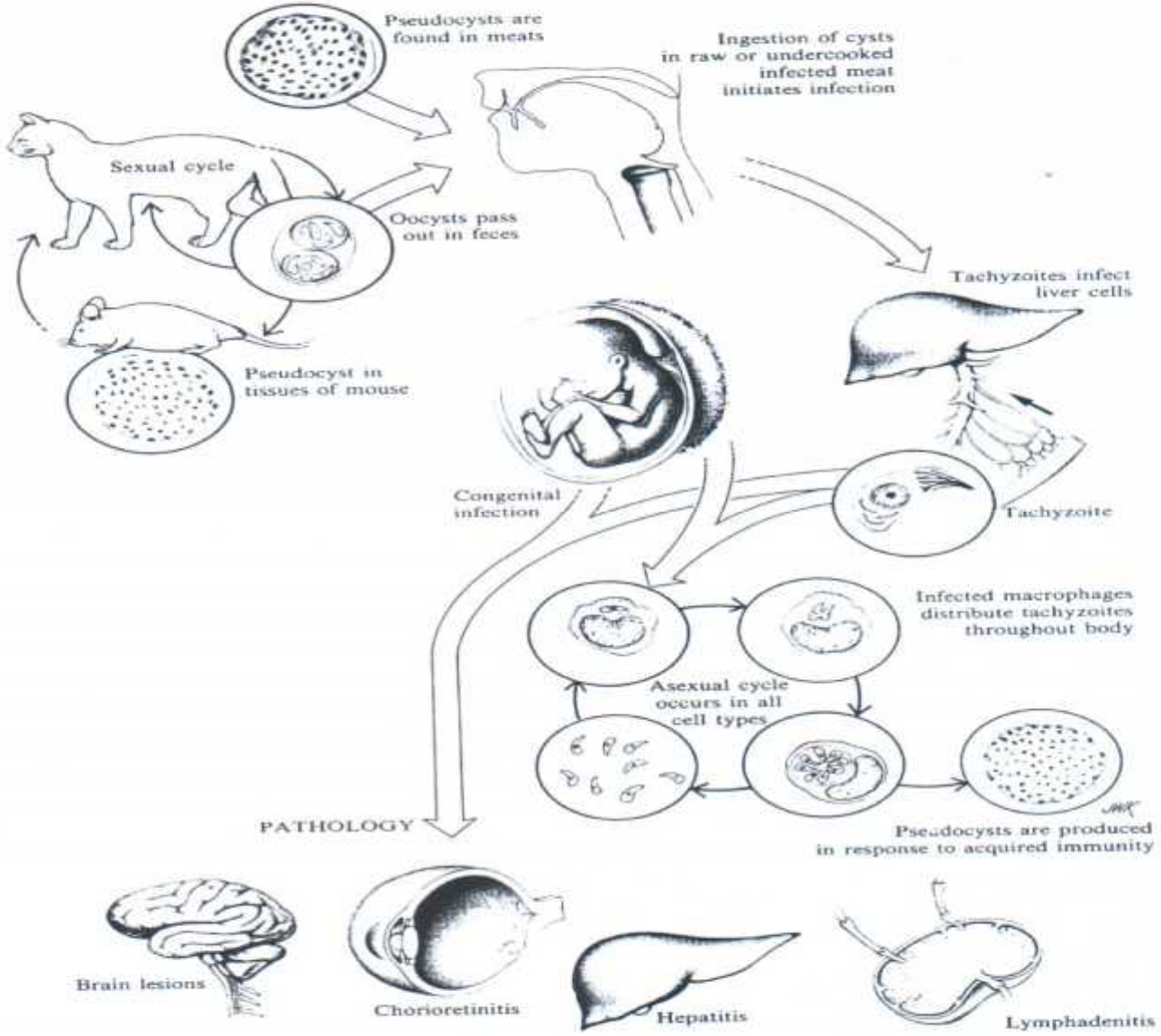
1. Clinical signs.
2. Serological tests

3. Culture (fluid, body tissue).
4. Biopsy.

2. Infectious agents:

Toxoplasma gondii, an intracellular protozoan of cat

Toxoplasma gondii



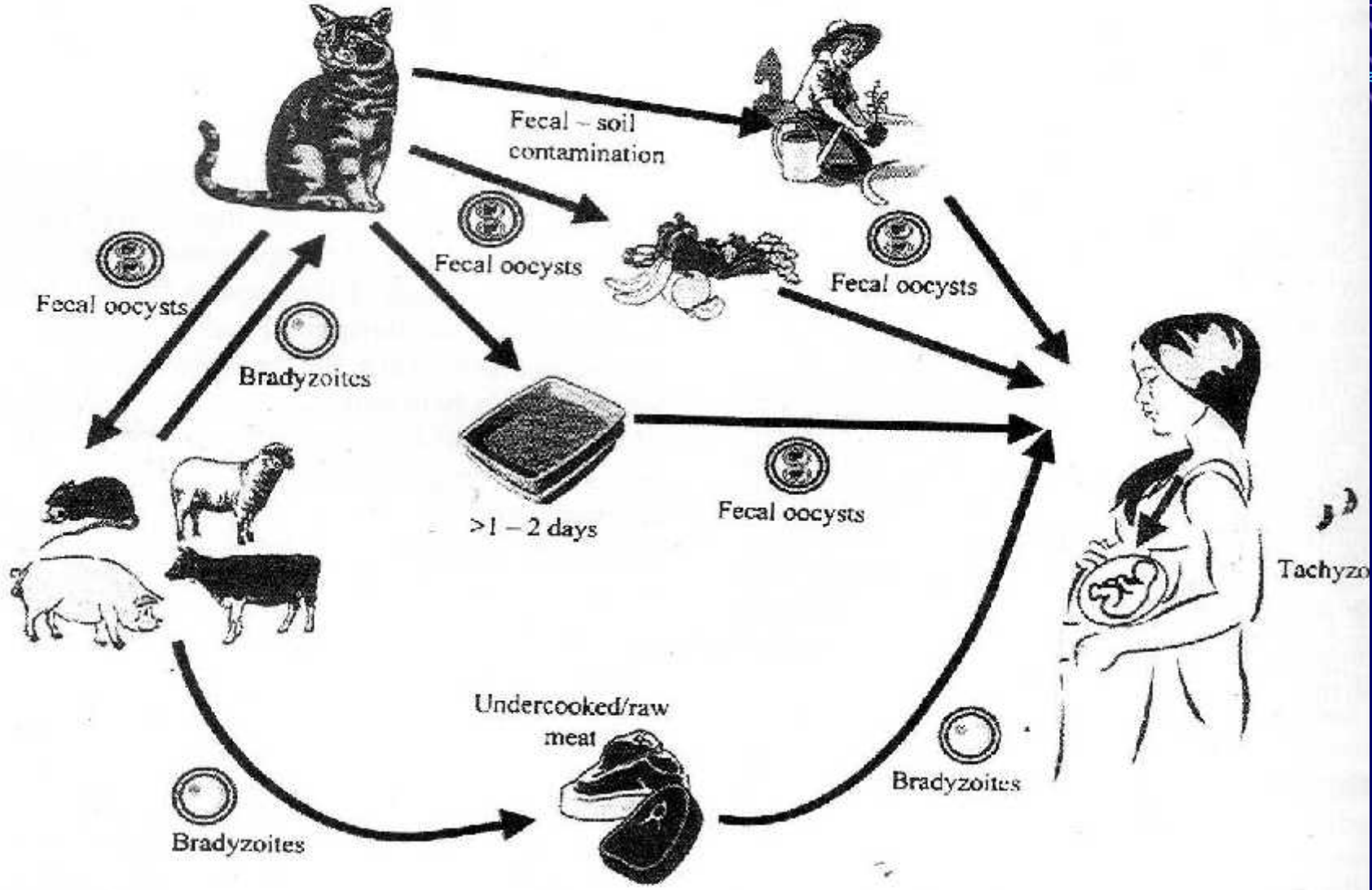
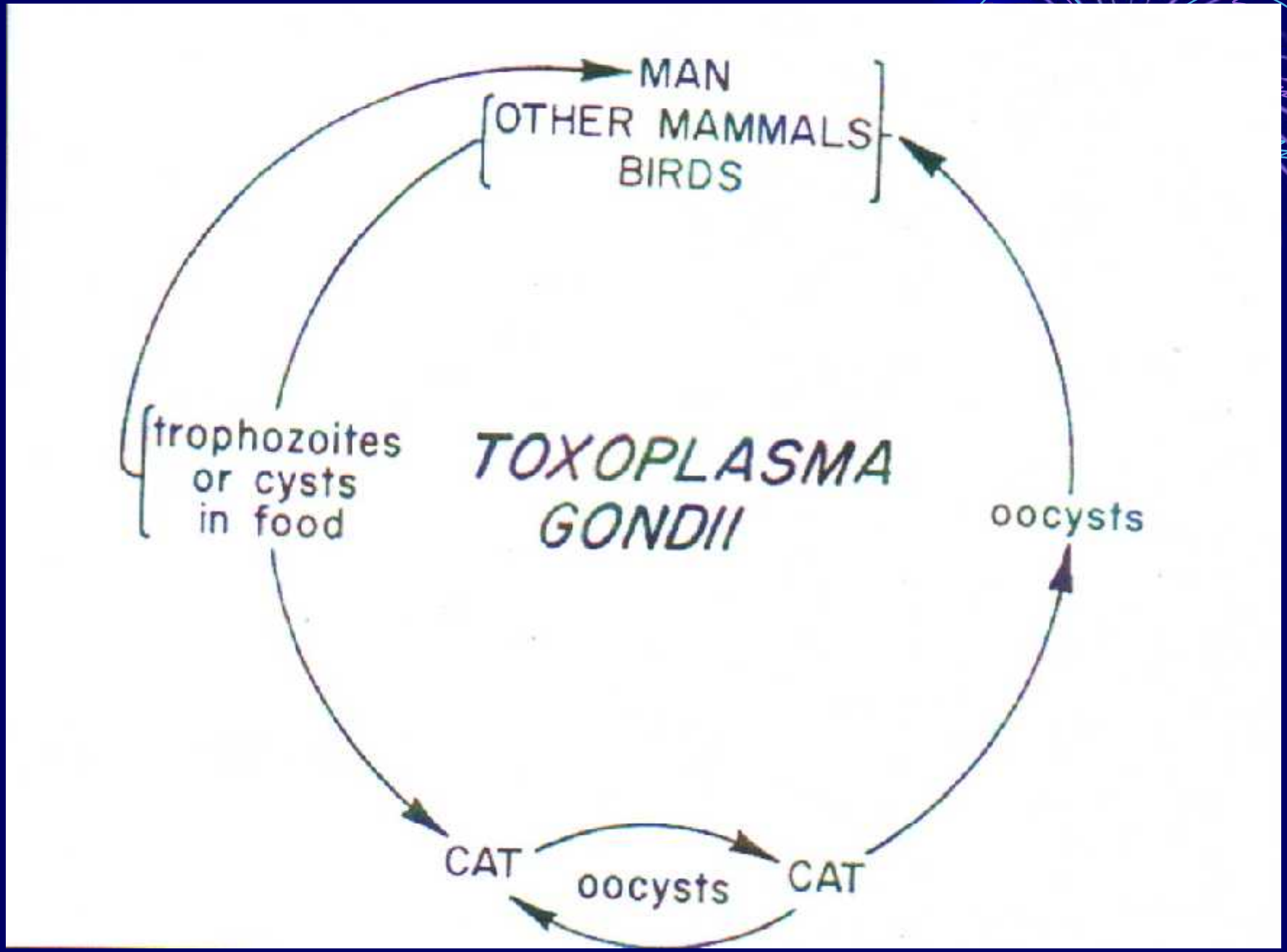


FIG. 19.4. *T. gondii* in trophozoites or proliferative form. (From Jones JL, Lopez A, Wilson M, et al. Congenital toxoplasmosis: a review. *Obstet Gynecol Surv* 2001;50:296–305, with permission.)


MAN
OTHER MAMMALS
BIRDS
trophozoites
or cysts
in food
TOXOPLASMA
GONDII
oocysts
CAT
oocysts
CAT

3. Occurrence: Infection in human is common; its distribution is world wide in mammals & birds.

4. Reservoir:

Definitive hosts are cats (in intestinal tract) which acquire infection from eating infected mammals (rodents and birds).

Intermediate hosts → sheep, goats, rodents, swine, cattle, chickens and birds.

5. Mode of transmission

"No man to man transmission except in utero"

1. Transplacental infection to fetus.
2. Eating raw or undercooked infected meat (pork or mutton, very rarely beef) containing tissue cysts.
3. Ingestion of infected oocysts in food or water contaminated with cat feces. Consumption of raw goat milk.
4. Blood transfusion or organ transplantation.

6. Incubation period: 10 – 20 days

7- Period of communicability:

"No man to man transmission except in utero".

8- Susceptibility: is general

immunity → long lasting or permanent

Ab persist for years, probably for life.

9. Method of control:

A- Preventive measures:

1. Educate pregnant women:
   - Cook meat thoroughly or freeze it well (-20°C).
   - Avoid cleaning litter pans and contact with cats
2. Feed cats dry, canned or boiled food (keep them as indoor pets).
3. Dispose of cat feces.
4. Wash hands thoroughly after handling raw meat and soil.

B- Control of patients, contacts and environment:

1) **Reporting:** none
2) **Isolation:** none
3) **Disinfection** not applicable.
4) **Quarantine:** not applicable.
5) **Immunization of contacts:** not applicable.
6) **Investigation of contacts and source of infection:** none

7) Specific treatment:

combination of **pyrimethamine** (daraprim) + **sulfadiazine** + **folinic acid** for 4 weeks.

Add clindamycine and systemic corticosteroid in ocular toxoplasma.

Treatment of pregnant women → **spiramycine** it prevents placental infection and reduces the frequency of maternal transmission in about 60%. Combination with other drugs might be more effective.

Use triple regime if U.S or other investigations indicate that fetal infection has occurred, but avoid daraprim in 1st 16 weeks of pregnancy because of it's possible teratogenic effect.

In our country where maternal toxoplasmosis is common disease, routine screening during prenatal visits is mandatory.

The best time for serological screening is prior to pregnancy.