

TOXOPLASMOSIS (T.)

Identification. Zoonotic disease caused by an obligate endocellular parasite *Toxoplasma gondii*, characteristic by chronic current, lymphadeno-pathy, increase of a liver and spleen, damage of the nervous system, cross-striated muscles, myocardium, eyes and often infection of a fetus in acute period of illness for the pregnant woman

Historic reference.

- 1908** J.Nicolas and L. Manseaux in Tunis detected of the infectious agent for a local rodent **Ctenodactylus gondii**.
The infectious agent has received name under of the form body (**toxon - arc, plasma - form**)
- 1914** –Castellani A. detected of the infectious agent in body the soldier which died on Ceylon, **confirmed pathogenic operation T.** on the man
- 1823** -Yankee - was described by the first case **congenital T.**
- 1937-1955** гг. A.Sabin and the co-authors - had described cycle of **endocellular reproduction T.** and had applied **Sabin-Feldman dye test** to its diagnosis

The actuality of illness is determined by the following factors:

- **T.** infects a large proportion of the world`s population – from **4% to 68 %**
- possibility prenatal of infection of a fetus (**at primary infection during pregnancy**)
- absence of legible clinical signs, characteristic only for the that infection as in acute as chronic stage of disease
- selection its in group **AIDS-INDICATOR** diseases (1981)

- absence for the doctors of common practice sufficient knowledge and watchfulness concerning that disease
- appearance of precise methods of diagnosis permitting to define a phase of current of the infectious process and to assign adequate treatment as at acute as the chronic forms of disease

ETIOLOGY

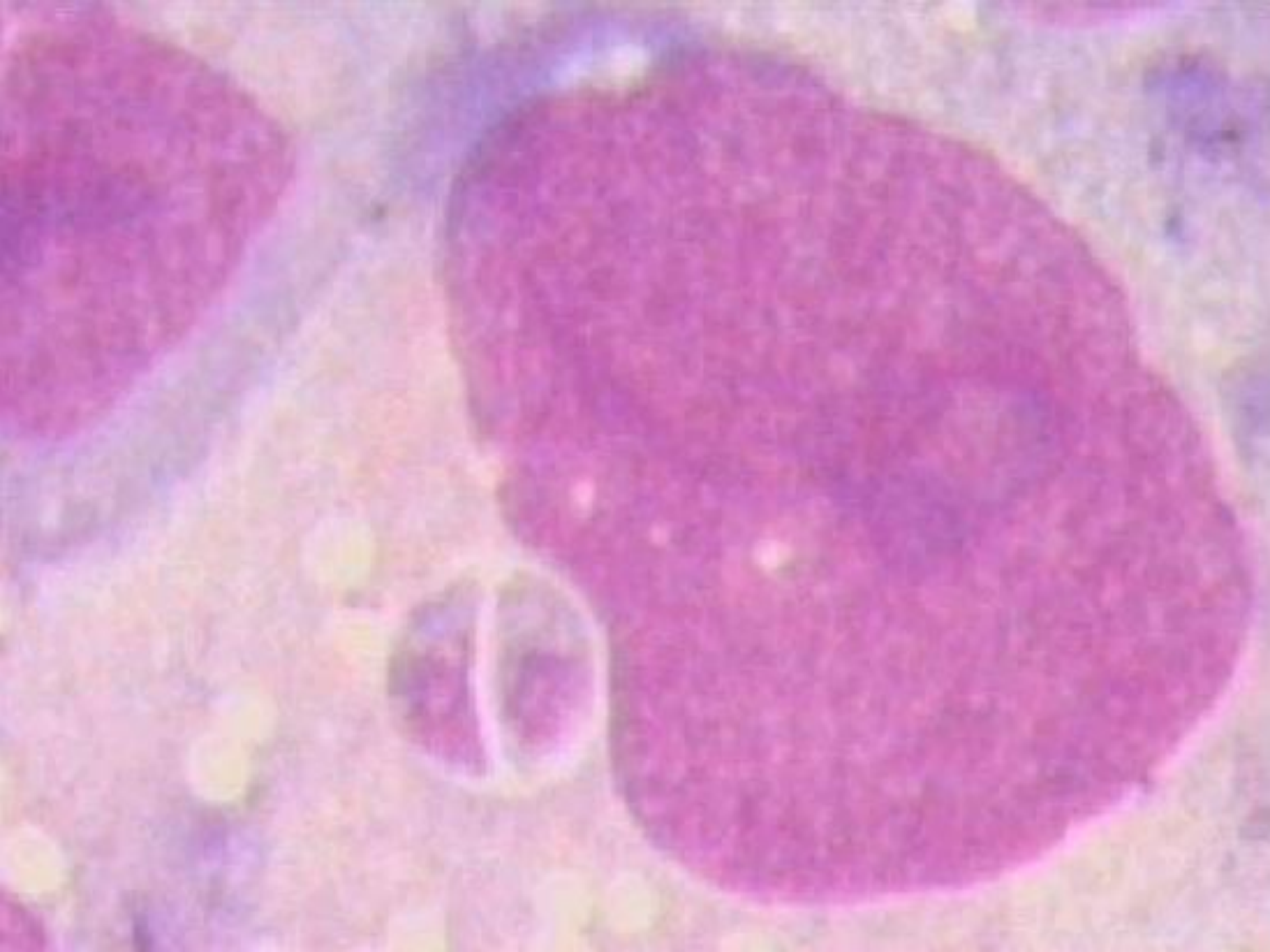
The infectious agent - **Toxoplasma gondii**:

- type **Apicomplexa**,
- class **Sporozoa** (generator spores),
- group **Eucoccidiida** (alternating sexual and asexual cycles reproduction),
- sort **Toxoplasma gondii**

It is size from 2- 4 microns of width and to 4 - 7 microns of length and remind **segment of an orange** at a microscopy.

At a staining on Giemsa cytoplasm gains **blue** colour, and core **red-violet**.

T. - **endocellular parasite** having low pathogenic, therefore infection more often proceeds **without** clinical manifestations, coming nearer to “**a ideal**” parasite from opportunistic of infections, but at expressed immuno-deficiency **can cause severe diseases** both for animals and for the man



The biotic cycle **T.** consists from **sexual and asexual** reproduction

The sexual reproduction occurs in an organism animals of **breed felidae** (wild and home cats, tigers, lynx etc.) At their absence - circulation **T.** in a nature **stops!!**

The primary infection of the cats occurs via **tissue cysts** (**eating rodents or crude meat**) or via **oocysts** (**at contact** by the sick cat or with subjects from its of environment)

The envelope cyst or oocyst destroys in a stomach or intestine of the cats. **Sporozoites** penetrate into enterocytes and are transmuted in **trophozoites**.

Mature trophozoite is divided on **merozoites**, which part again penetrate into enterocytes, prolonging an asexual reproduction (**schizogony**).

Others - are transmuted into macro- and microgameto-cytes.
The heterosexual gametocytes merge into **zygote**.

The zygote then become encapsulated within a rigid wall and are shed as **oocyst**. The zygote sporulates and divides to form **sporozoites**.

During further development the **zygote** is enlarged up to 10 - 12 microns and is coated with the bilayer envelope.

Oocyst together with feces of the cat gets in the external environment, where within 1- 5 days ripens and is divided into 2 **sporocysts, each of which contains on 4 **sporo-zoites**..**

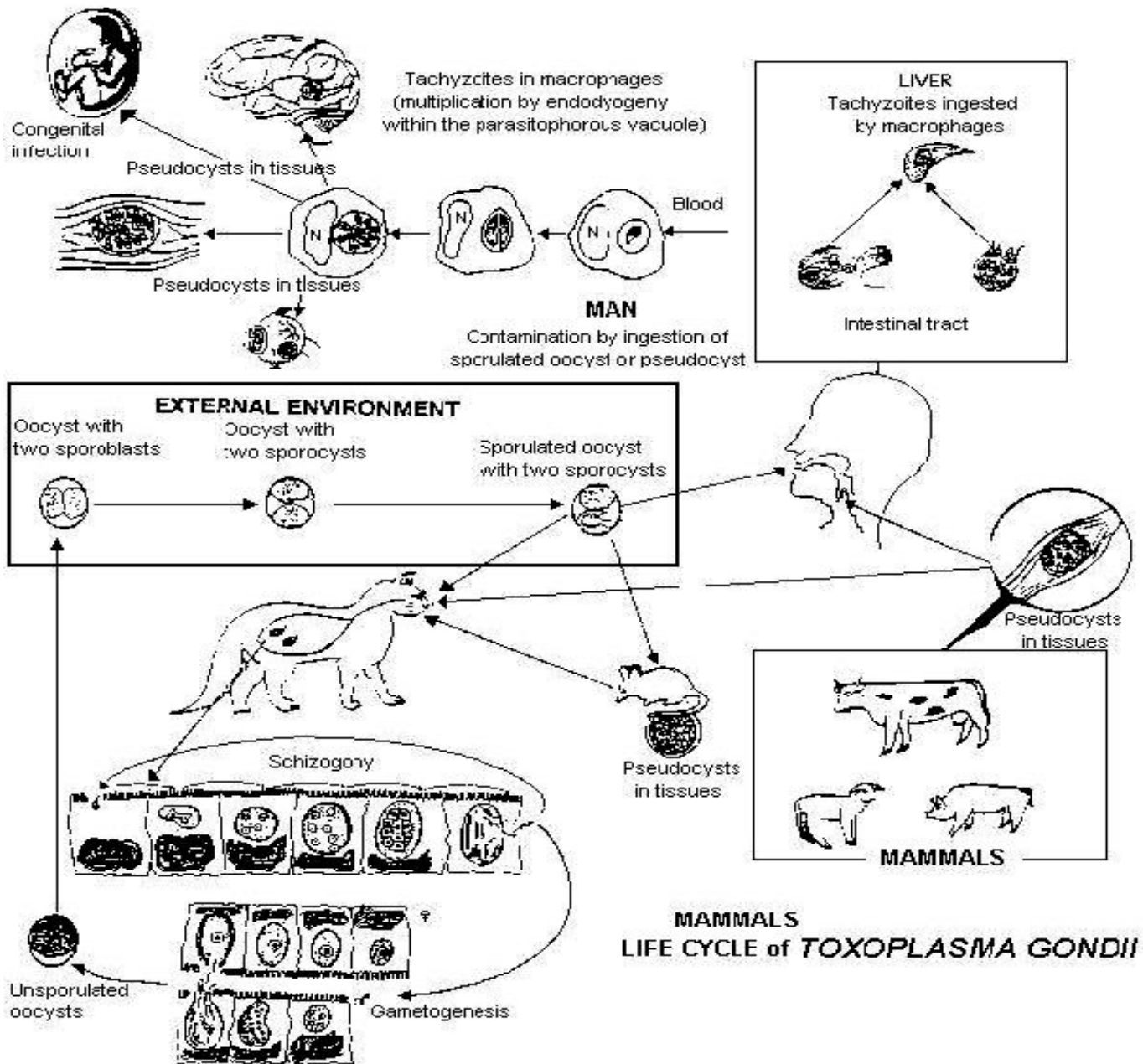
The duration of cycle of a reproduction in an organism the cat occupies **1 - 3 weeks.**

The cat can excretes of millions oocysts dayly.

The oocysts in the external environment **are saved till **2 years!!!****

The oocysts destroy at desiccation, boiling, at effect concentrated disinfectants.

Derivation of oocysts - ending stage in a body of the main host T.



The main intermediate hosts - rats and mice, which some time can support circulation **Toxoplasmae**, were engaged a cannibalism and transmitting **T.** to descendants.

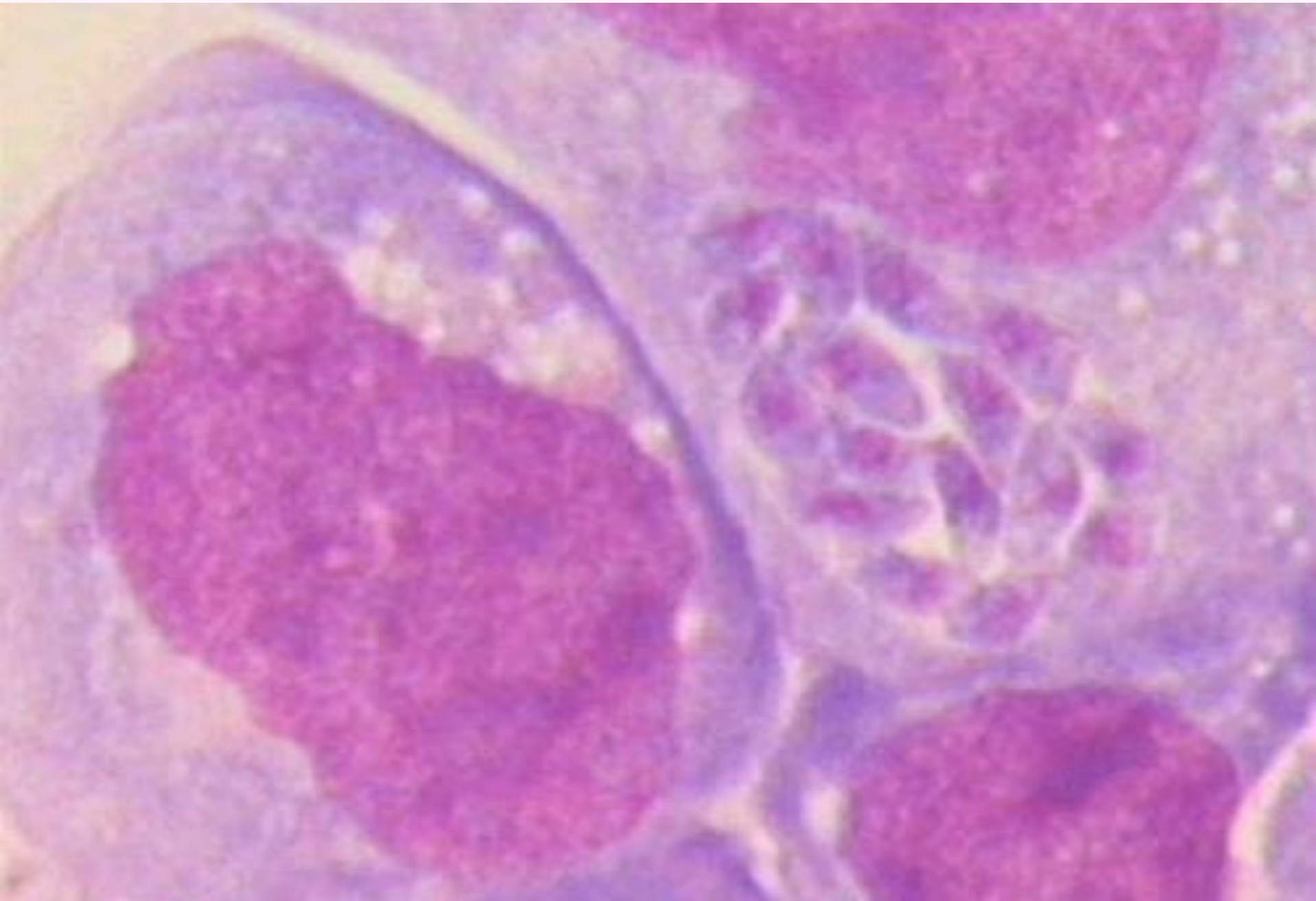
Other intermediate hosts (300 sorts mammals and 150 sorts of birds, reptile and man) - are **"the dead lock" host** (on definition of epidemiologists)

Cycle of development in an organism of the intermediate host

From the swallowed oocysts quit sporozoites, which penetrate into macrophages, is active in them are multiplied and are spread on lymphatic paths

At destroy a macrophage **T.** get in a blood (**tachyzoites**) also penetrate into **any nuclear** cell and initiate with reproduction

A nuclear cell before destroy (“false cyst”)

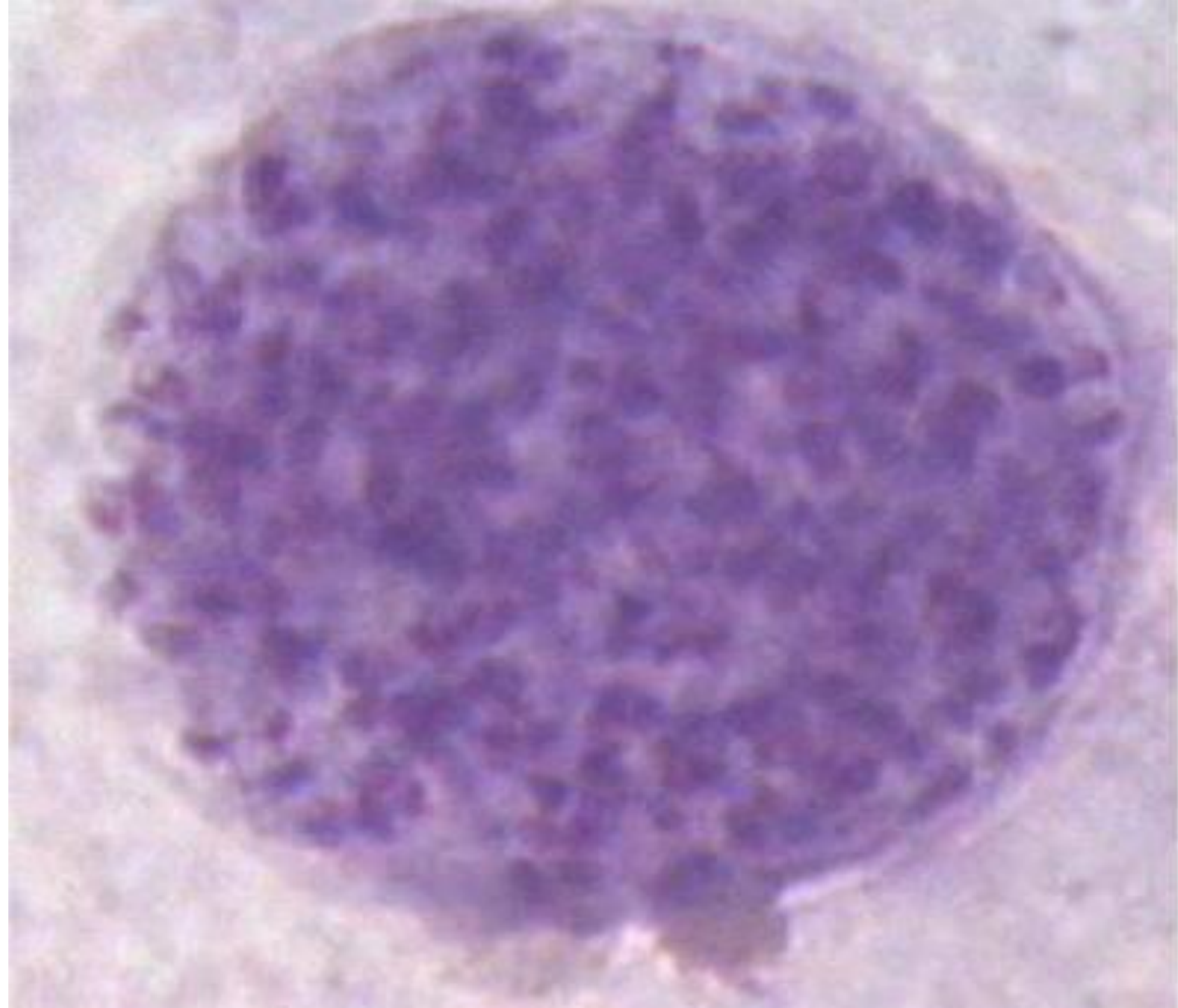


After destroy a cell **T.** penetrate into other cell recycling developments. **Only at this stage of the parasitemia develops which allows them through a placenta a fetus!!**

The cycle of an asexual reproduction is **prolonged before creation of immunity**, that carries on to termination of a parasitemia and creation **tissue cysts** in a skeletal muscles, eyes, brain, cardiac muscle. A size cyst up to 100 microns with a dense sheath. **T.** in its are as **bradyzoites**.

Derivation tissue cysts - ending stage biotic cycle T. in a body of the intermediate host. At this stage the parasitemia is not observed.

At a stage **trophozoites T.** are very unstable and fast perish at warming up to 50 d.C., at effect 50 % of alcohol and anyone disinfectants through 5-10 minutes



PATHOMORPHOLOGY

The pathological changes are found out in all bodies both at congenital and at the acquired toxoplasmosis.

Congenital **T. CNS** - is accompanied by damage retinas and of the choroidinal membranes of the eyes (**99 %**)

Infectious agents find out as **tissue cysts** is more often in muscles.

The inflammation around of them misses or is expressed insignificantly.

Tachyzoites in a blood it are found out only **at primary infection.**

It is possible to detect granulomas, centers of a necrosis and fibrosis more often in muscles, myocardium, lungs, liver, spleen, lymphatic nodi.

The sites calcification in a brain find **only at congenital as **semilunars** in the field of a **striatal body**.**

The lingering character of an infection results in various allergic manifestations.

The alive **T. can **will be saved** In cysts **all life!****

EPIDEMIOLOGY

(zoonosis with peroral and vertical mode of infection)

Infection of the man occurs at:

- **contact** to the cats and subjects enclosing them
- the **use** it is not **enough heat** treated or **crude meat**
- through a **placenta** (frequency congenital **T.** – **1 : 2,700 labors**)
- **hemotransfusions** and the **transplantations** of donor organs

From the man to the man at contact - **does not transmit!!!**

The proportion infectious of the people coincides with frequency of **infection T.** for animals. More often meets in the **countries a hot and wet climate**

CLINIC (incubation interval about 2 weeks)

Distinguish 2 forms **T.** – **congenital** and **acquired**

Acquired **T.** - **acute**, **chronic**, **primary** or **secondary latent**)

Acute acquired T. – it is **generalized infection**

- acute beginning, fever, intoxication, pain in muscles
the increase of a liver and spleen (**rare**) is
- polymorphic exanthema by duration 3 - 4 days
- generalized lymphadenopathy
- encephalitis with form of parasite abscesses (**CT-scan**
or MRI
- pneumonia
- myocarditis
- one-sided chorioretinitis (**1 %**)



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To frequency there is a combination of numbered manifestations by an extent of several days or weeks spontaneous convalescence. The frequency of lethal outcomes is **unknown**. The exact diagnosis more often is installed **only immunological methods**.

Chronic acquired T. It is long-lived flaccid disease

- subfebrile condition long-lived (**months**) sometimes with by periods normal temperature
- chronic intoxication
- damage of many bodies and systems:
- complains: common weakness, lowering of appetite, dryness in an oral cavity, nausea,
- irritability, disturbance of dream, headache, lowering of memory,
- pain in heart and palpitation, pain in muscles and joints, disorder of vision

Objective:

- generalized lymphadenopathy
- increase of a liver (**50 %**) and spleen
- specific myosites with calcifications
- arthralgias
- tachycardia, hypotension, the phenomena of a myocarditis with focal changes a ECG
- **GIT** of dull pains in epigastriums, abdominal distention, constipations, weight loss
- **NS** - emotional lability, lowering of capacity for work, irritability, cancerophobia etc.

Sometimes severe neurosises, diencephalic syndrome, the symptomatic epilepsy (**rare**) is and for all vegeto-vascular disorders

- **eyes** - chorioretinitis (1 %), uveitis, progressing myopia
- **ES** - disorders of menstrual cycle, impotence, secondary adrenal insufficiency, the depression of function of thyroid glands (**rare**)
- **WBC** - leukopenia, lymphocytosis, rise eosinocytes at normal values ESR

The most often form of disease is primary latent T:

- is not present and was not in the past of clinic **T**.

Diagnosis only by detection of antibodies against **T**. the class Ig G.

Peakings more often only immunological with appearance IgM

The secondary latent T. - residual phenomena after transferred **T**. as calcifications, seams after a chorioretinitis, **lowering of vision**, scleroses of lymphatic nodi.

CONGENITAL T. - arises **only** at **primary** infection by the **pregnant woman**.

The gravity of current depends on a duration of gestation in period infection - **the less age of a fetus, the heavy the current T.**

Though infection during pregnancy not always results in a congenital toxoplasmosis.

The long-lived overseeing by **176** pregnant woman **with primary infection without clinical manifestations** has not detected signs **T** in **110** children (**63 %**), **6** - has perished prenatal or during labors and **congenital T.** is detected for **30** children, and for **11** children the infection was doubtful.

At severe current **T.** the fetus perishes or is born prematurely (**31 %**). The lethality among newborn thus **in 2 times was higher** in matching with children is born in time.

Signs of disease is possible to detect for child at once or **after many days after labors** as:

- fever, lowering of mass of a body
- spotty - papular eruptions on a skin
- generalized lymphadenopathy
- increase of a liver and spleen, appearance of an icterus
- hydrocephalia, microcephalia (**50 %**), microphthalmia
- psychomotor disability (**56 %**)
- cramps both common or separate groups of muscles
- chorioretinitis for **99 %** (bilateral for **85 %**)
- the detection of intracranial calcifications - is more often in a striatal body of a brain as of **semilunar** lines.

The acute infection **T.** usually results in **lethal outcome** within the first days or weeks after labors

But it can pass in the **chronic** or **secondary - latent** forms **T.**,
having left after itself:

- microphthalmia, hydrocephalus
- chorioretinitis, paralyses of eye's muscles
- psychosomatic or motive disability, cramps.

These children are needed in medical observation and constant control, **as the true damage to health** newborn is possible to estimate more often only **after some weeks** or **months** etc.

DIFFERENTIAL DIAGNOSTICS will be carried out by :

- **Catscratch disease**
- **Herpes simplex**
- **Histoplasmosis**
- **Listeriosis**
- **Cytomegalovirus**
- **HIV-infection, Pneumocytosis**
- **Infectious mononucleosis,**
- **Lymphoreticulosis, lymphogranulomatosis, sarcoidosis, Lymphoma**
- **Sepsis,**
- **Thyrotoxicosis, chronic tonsillitis etc.**
- **Rheumatic disease, myocardites,**
- **Syphilis,**
- **Mesadenitis**
- **Hemolytic illness (at congenital T.),**
- **Tuberculosis**

LABORATORY DIAGNOSIS.

1. **Microscopy smears CSF (at congenital T.)** – xanthochromatic, rise eosinocytes and protein
2. **Microscopy smears of a blood, bioptates of lymphatic nodi, tonsils, placenta, membranes of a fetus, amniotic fluid (search cysts and T.)**
3. **Biological test** with the same material with the subsequent search cysts in sections of tissues animal
4. **PCR - CSF**, amniotic waters, tissues of the perished fetus, placenta etc.
5. **Immunological** methods – ELISA, CFt, IHAt

The IC test with toxoplasmin now will not be used

TREATMENT

The antiparasitic therapy

Will not be carried out:

- at chronic T. outside of peaking,
- at is primary also secondary - latent T.

Will be carried out:

- at acute T.,
- chronic toxoplasmosis with clinical manifestations,
- at a damage of a brain and eyes. using:
 - Pyrimethamine 50 - 100 mg 1 po- first day-main drug
then on 25 –50mg 1 po - 29 days
 - Sulfadiazine 1-1.5 gm po q6h

for strengthen operation of pyrimethaminum:

- clindamycin 300 mg po/IV q6h
- claritromycin 1 gm po bid
- azithromycin 1.2-1.5 gm po qd

- Spiramycine 1gm po q8h (for the pregnant women) - is less effective of pyrimethaminum

- Leucovorin 10mg 1 po or 1gm of fresh beer yeast po (for elimination of a side effect of medicines: leukopenia, thrombocytopenia, anemia)

For the pregnant woman at immunological peaking **without clinical manifestations** - drugs "of the «HEEL" corporation of Germany now will be used

They have no contraindications and do not render terato-genic of operation under the particular scheme with usage: **Echinacea-composite, Coenzyme - composite, Nozode of a toxoplasmosis, Lymphomyosote, Galium or Psorinoheel etc.**

The drugs should be selected by a method of medicamental testing. The efficiency of treatment makes 93 %
(**disappearance of Ig M from of blood of pregnant woman**)

Besides the symptomatic and pathogenetic therapy will be carried out.

PROPHYLAXIS

The special attention accesses on group of hazard among the pregnant woman (**absence in plasma of antibodies against T.**) They should interrupt **contacts to the cats**, and also use **meat** a past valuable **heat treatment**, carefully wash hands before eating etc.)

Group of hazard in a population owes revealed among the girls since 16 years and before pregnancy - valuable inspection on **TORCH-** of an infection here should be carried out and during pregnancy to carry out definition of antibodies **only Ig M** to the detected earlier infections from group TORCH (**HSH, CMV, TOXO, rubella**)

Woman, which up to pregnancy have antibodies against T. – **give birth to healthy children.**

Other measures because of a wide circulation of a toxoplasmosis - **have small efficiency!!**

