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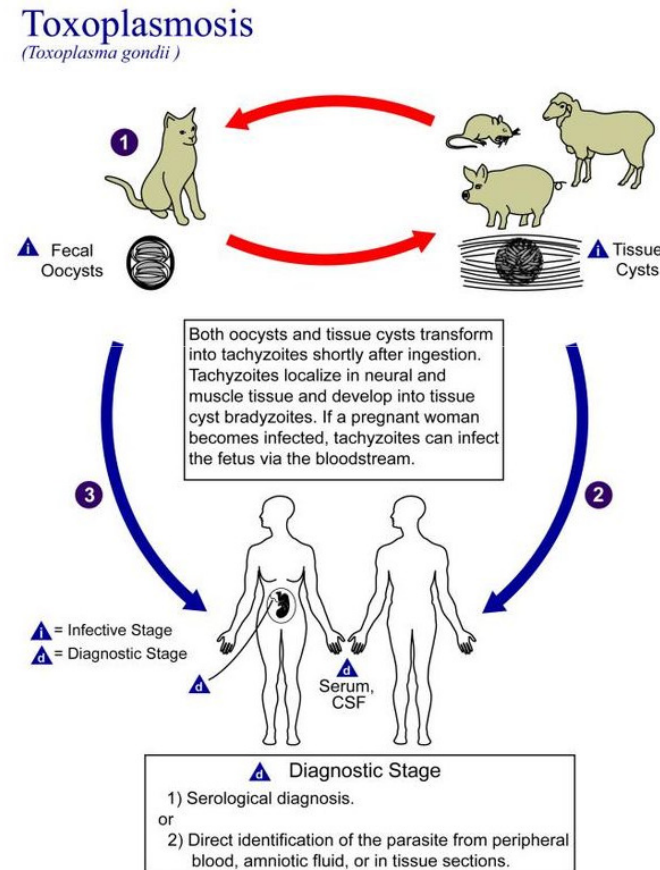
# **Toxoplasmosis in immunocompetent and immunocompromised population of Constanta, Romania**

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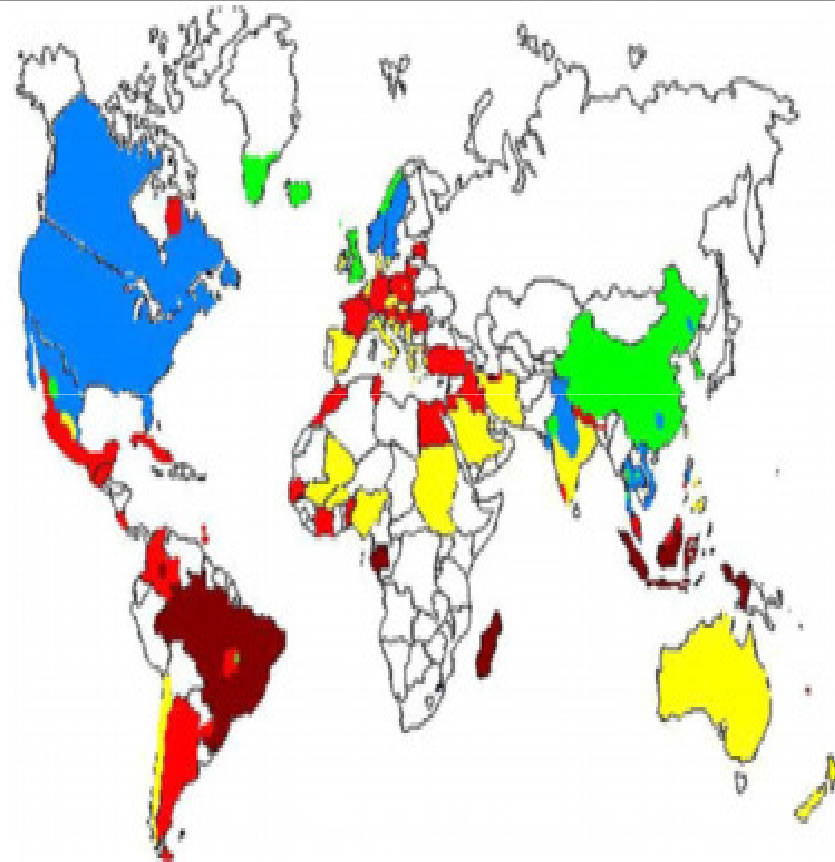
# Background

- Toxoplasmosis is a parasitic disease caused by the protozoan *Toxoplasma gondii*.
- The parasite infects most animals, including humans, but the **primary host is the felid (cat) family**
- Toxoplasma may be transmitted via mouth-to-hand contact from improper handling or ingestion of raw meat or undercooked meat containing cyst from cat feces.



# Geographical spread

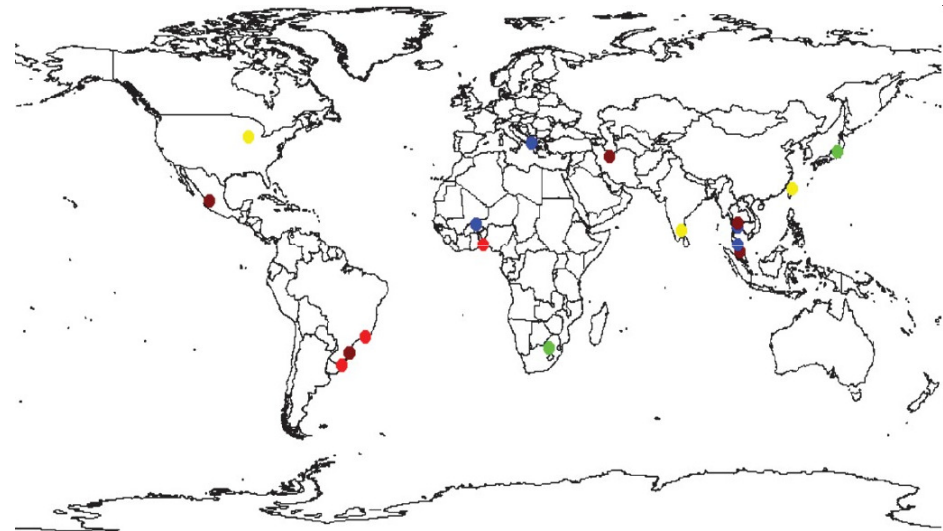
- Up to a third of the world's human population is estimated to carry a *Toxoplasma* infection.
- Some studies show that in the world is very different seroprevalence
  - USA: 22.5%
  - Latin America: 50–80%
  - Eastern and Central Europe: 20–60%
  - Middle East: 30-50%
  - Southeast Asia: 20–60%
  - Africa: 20–55%



Global status of *Toxoplasma gondii* seroprevalence. Dark red equals prevalence above 60%, light red equals 40–60%, yellow 20–40%, blue 10–20% and green equals prevalence <10%. White equals absence of data. Adapted from [52].

# HIV population

- Findings on the association of HIV and toxoplasmosis seroprevalence are varied in different parts of the world.
  - some authors found **higher prevalence of *T. gondii* specific IgG** in HIV-infected patients (>70%) compared to non-infected individuals
  - others **did not find any differences** between the two groups



**Seroprevalence of toxoplasmosis in HIV-infected patients.**  
Light red equals prevalence above 60%, brown equals 40-60%, blue 20-40%, yellow 10-20% green equals prevalence <10%, White equals absence of data.

# Acute toxoplasmosis

- **Immunocompetent** persons with primary infection are usually asymptomatic (90%), but latent infection can persist for the rest of the hosts life.
- The most common signs in acute infection are:
  - **influenza-like** symptoms
  - **enlarged lymph nodes**, especially around the neck in adults, but in children multiple sites may be more common

# Latent toxoplasmosis

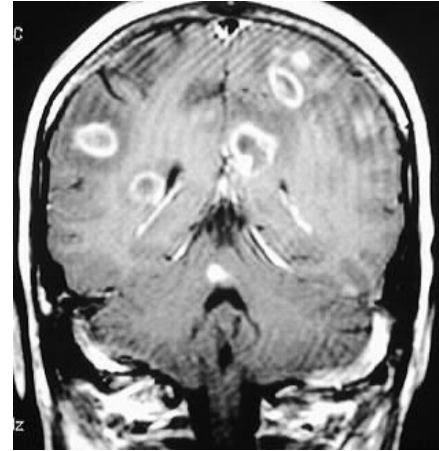
- Recent research has also linked toxoplasmosis with attention deficit hyperactivity disorder, obsessive compulsive disorder, and schizophrenia.
- Numerous studies found a positive correlation between latent toxoplasmosis and suicidal behavior in humans.
- “Crazy cat lady syndrome” is a term coined by news organizations to describe scientific findings that link the parasite *Toxoplasma gondii* to several mental disorders and behavioral problems.
- Jaroslav Flegr (biologist) is a proponent of the theory that toxoplasmosis affects human behavior

Weiss LM, Dubey JP (2009). "Toxoplasmosis: A history of clinical observations". International Journal for Parasitology 39 (8): 895–901. doi:10.1016/j.ijpara.2009.02.004. PMC 2704023. PMID 1921790

- Toxoplasma gondii can sometimes cause or contribute to **Chronic Fatigue Syndrome**
  - is a neurological condition characterized by cognitive dysfunction, mood disorders, fatigue

# Immunosuppressed persons

- More serious disease can develop due to *Toxoplasma* reactivation in AIDS, especially when the lymphocyte CD4 cell count drops below 100 cells / mm<sup>3</sup>
  - cerebral toxoplasmosis (Fig.1)
  - chorioretinitis (Fig.2)
- Toxoplasmosis is the most common parasitic CNS opportunistic infection in AIDS patients
- The HLA-DQ3 antigen is associated with susceptibility to toxoplasmic encephalitis in HIV-infected patients



**Fig. 1. Cerebral toxoplasmosis**

Multiple ring enhancing lesions are present throughout both cerebral hemispheres, with associated marked edema.



**Fig. 2. Toxo chorioretinitis**



# Cutaneous toxoplasmosis

- **Skin lesions** may occur in the acquired form of the disease, including
  - roseola
  - erythema multiforme-like eruptions,
  - prurigo-like nodules,
  - urticaria, and
  - maculopapular lesions.



Fig. After bone Marrow transplant

- Chemotherapy patients can develop eye, heart (myocarditis), lung or brain involvement when parasites become reactivated.
- In transplant patients, Toxoplasmosis
  - may result from reactivation of latent infection or from primary infection and
  - involve febrile myocarditis, encephalitis or pneumonitis.

# Aim

- The aim of the study was to evaluate:
  - prevalence of toxoplasmosis
  - clinical manifestations in immunocompetent and immunocompromised persons.
  - risk factors for toxoplasma infection

# Material and methods

- Were analyzed a total of 386 adult patients diagnosed with toxoplasmosis in the Clinical Infectious Diseases Hospital Constanta in the last 5 years.
- The reported acute toxoplasmosis cases were considered when serologic assays indicated an acute infection in according with clinical manifestation
  - IgM Toxo – positive
  - Low IgG Toxo avidity

# Results

- Of these 386 adult patients
  - 173 were diagnosed with acute infection based on laboratory protocol (44.8%).
  - most of them were female, majority aged between 30-49 years, 85% from urban area
  - 3% were diagnosed with HIV infection (12 patients),
    - in 3 patients, toxoplasmosis was the primary clinical manifestation.

Gender F/B (pts)	297 / 89
Age (median) (years)	32
Urban/rural area (pts)	328 / 58
Immunocompetent pts (No)	374
HIV infected pts (No)	12
Pregnant female (No)	56
Toxocara positive (pts)	43

- The most common clinical manifestation in nonHIV infected patients was **painless cervical adenopathy**
- **Cerebral toxoplasmosis** (mass lesions) only in a female with chronic hepatitis B and nonHodgkin lymphoma, after chemotherapy
- **Pulmonary involmment** – after chemotherapy or renal transplantation (1 patient) - PCR assay for T. gondii

<b>Cervical adenopathy</b>	<b>102 pts</b>	<b>27.3%</b>
Flulike symptoms and generalized lymphadenopathy	36 pts	9.6%
Retroperitoneal and mesenteric lymphadenopathy	30 pts	8.1%
<b>Seizures, persistent headache</b>	<b>62 pts</b>	<b>16.6%</b>
<b>Retinochoroiditis</b>	<b>42 pts</b>	<b>11.2%</b>
Pulmonary involvement	4 pts	1.1%
Cerebral toxoplasmosis	1 pt	0.3%
<b>Skin itching and rash (<i>Toxocara canis</i> positive)</b>	<b>43pts</b>	<b>11.5%</b>
<b>Pregnant women (acute/chronic)</b>	<b>56 pts (5/51)</b>	<b>14.9%</b>

**Total =374 nonHIV infected patients**

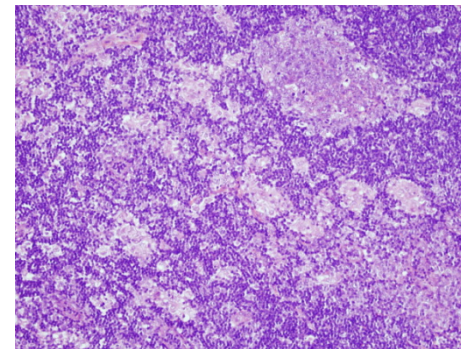
# Acute toxoplasmosis

- 173 were diagnosed with acute infection (44.8%)
  - **Cervical adenopathy – 102 pts**
  - Flulike symptoms and generalized lymphadenopathy – 36 pts
  - Retroperitoneal and mesenteric lymphadenopathy – 30 pts
  - **Pregnant women with** Flulike symptoms – 5 pts

\*Note - other possible etiologies were excluded by pathological examination of the lymph nodes (67 pts)



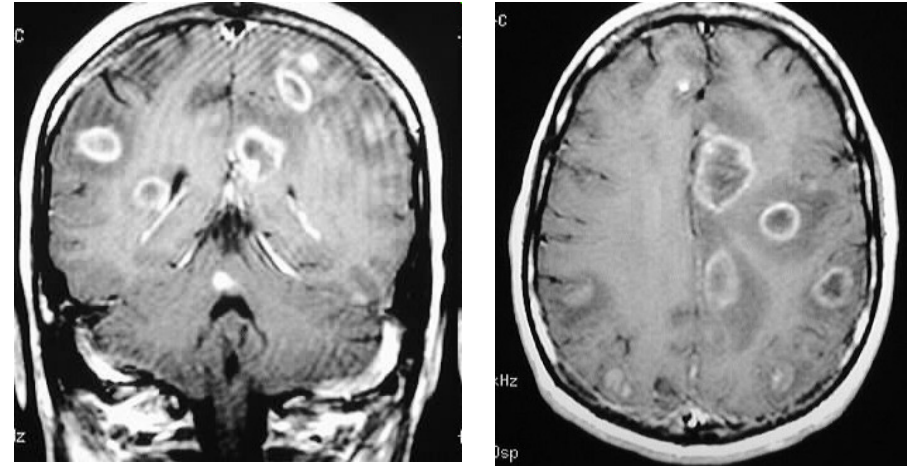
**Fig.3 Cervical adenopathy**



**Fig.4 Toxoplasmic adenopathy**

A microscopic examination of the specimens of cervical and axillary lymph node shows marked follicular hyperplasia with prominent small granulomas composed almost entirely of epithelioid cells.

- In **HIV infected** patients prevailed **cerebral toxoplasmosis**
  - toxoplasmic encephalitis, +/- focal CNS lesions

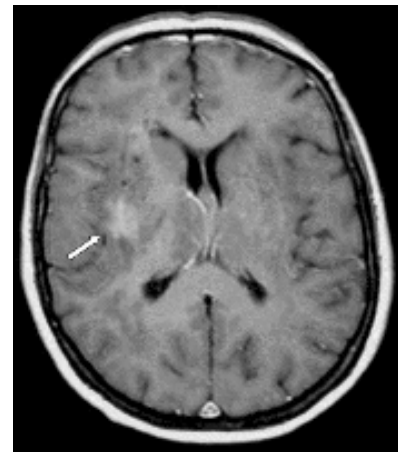


**Fig. 5.6 Cerebral toxoplasmosis**

Multiple ring enhancing lesions are present throughout both cerebral hemispheres, with associated marked edema.



<b>Cerebral toxoplasmosis</b>	<b>11 pts</b>
<b>Generalized lymphadenopathy and pulmonary involvement</b>	<b>1pt</b>



**Fig.7. Toxoplasmic encefalitis**

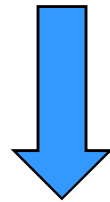


**Fig.8. Toxo pneumonia**



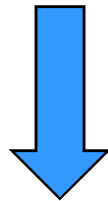
# TOXO Seroprevalence in HIV infected patients

- 1024 patients under the supervision of the HIV/AIDS Regional Center Constanta,



We tested for Toxo all patients

- 798 (78%) have positive ToxoIgG (latent toxoplasmosis)



12 patients with AIDS ( $CD4 = 2 - 62 \text{ cel/mm}^3$ ) were developed symptomatic toxoplasmosis in the last 5 years

# Risk factors

- in all 386 patients we applied a standardized [questionnaire on risk factors](#) for infection with toxoplasma and compared the responses of these patients with another 200 noninfected patients.

Risk factor (Yes/No}	Toxoplasma positive pts	Toxoplasma negative pts	95 % CI	P
Contact with cat	95/291	49/151	0.6765 - 1.4961	0.9763
Living on farm, working with animals	58/308	33/167	0.5974 to 1.5202	0.8398
Contact with soil	64/312	41/184	0.5974 to 1.4185	0.7075
<b>Raw/undercooked meet (pork, lamb, sheep)</b>	<b>102/284</b>	<b>22/178</b>	<b>1.7671 to 4.7785</b>	<b>0.0001</b>
<b>Taste meat cooking</b>	<b>153/233</b>	<b>48/152</b>	<b>1.4174 to 3.0507</b>	<b>0.0002</b>
Unpasteurised milk	24/362	12/188	1.0390 to 2.9101	0.5382
Untreated water	14/372	9/191	0.6412 to 2.0875	0.5944
Travel outside Europe	22/364	10/190	0.5329 to 2.4748	0.7240

Risk factors for infection with Toxoplasma in our county were: **Raw / undercooked meat, taste meat cooking**

# Conclusion

- Reporting the number of cases of toxoplasma infection in Constanta population (254.693 inhabitants), we obtained a prevalence of **151.5 cases/100.000 inhabitants = patients with symptomatic toxoplasmosis**
- Most patients were female and their supervision is required for possible implications in pregnancy.
- Risk factors for infection with Toxoplasma in our county were:
  - raw/ undercooked meat,
  - taste meat cooking

# Conclusions

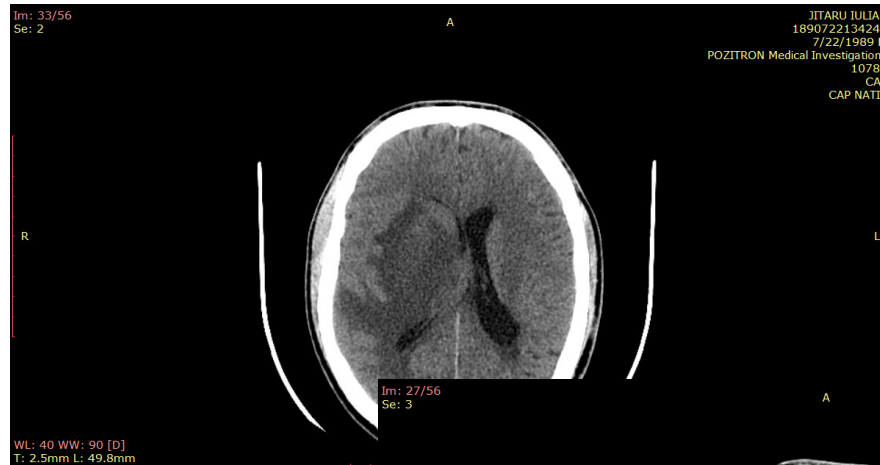
- Because in the general population 90% of people infected with Toxoplasma are asymptomatic and **TOXO Seroprevalence in HIV infected patients is 78%**
  - we believe that **Toxoplasma infection is underdiagnosed in our county.**
- It requires a **screening study**
  - to establish real seroprevalence
  - to prevent developing complications

# Last case (11.09.2014)

- male, 25 years old
- admitted to hospital with
  - seizures, persistent headache
  - severe labial herpes simplex
  - oftalmic herpez zoster
  - wasting syndrome
- **HIV positive**
- **Cerebral Toxoplasmosis**



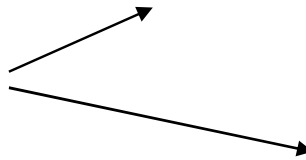
# Cerebral Toxoplasmosis



← Associated marked edema



Ring enhancing lesion



# Constanta



# The best in communicable disease surveillance programs



Thank you for your attention!