

TOXOPLASMA DISEASE AND ITS CAUSATIVE AGENT TOXOPLASMA GONDII**¹Narzullayeva Zarina, ²Norquvatova Iroda, ³Ortiqov Feruz**Research advisor: **Boboqandova Mehriniso Fazliddinovna**^{1,2,3} Students of the Samarkand State Medical University

Abstract: Toxoplasmosis is a zoonotic disease caused by *Toxoplasma gondii*. *Toxoplasma gondii* is a parasite in almost all organ systems of some warm-blooded animals and all domestic animals and humans. The symptoms of the disease depend on the organ where the parasite is located, and usually affects the nervous, sexual, lymphatic systems, and organs of vision. This disease affects children under the age of five and people with weak immunity. Toxoplasmosis is especially dangerous for pregnant women, the parasite can pass through the placenta to the fetus and damage its organ system. Clinical manifestations are diverse: from moderate lymphadenopathy to fever, rash, hepatosplenomegaly, pharyngitis, meningoencephalitis, pneumonia, etc. The latent or chronic period of toxoplasmosis is dangerous due to the mutagenic effect on the infected organism and damage to the autoimmune process.

Key words: Toxoplasmosis, *Toxoplasma gondii*, hepatosplenomegaly, pharyngitis, meningoencephalitis, pneumonia, serological method, allergological method, biopsy. abortion, stillbirth, pyrimethamine sulfonamides.

Disease etiology: Toxoplasmosis is a disease caused by toxoplasmas. The meaning of the word toxoplasma is (toxon-bow, plasma-decorated). This disease is more common in Central Asian countries and Kazakhstan. For the first time, this parasite was found in 1908 by the French scientists Nicole and Manso in Algeria, belonging to the type of ctenodactylus *gondii*, and it was proved that the parasite belongs to the type of simple animals. In 1923, the Czech researcher J. Janku found out that toxoplasma was present in the eyes of a dead child. Toxoplasmosis was first described by Wolf and Page. It was later proven that toxoplasmas parasitize humans and animals and cause toxoplasmosis. In 1970, the *Toxoplasma* parasite was examined under a microscope, and based on its development cycle, *Toxoplasma* was included in the class of spores, the family of coccidia. Toxoplasmosis is a zoonotic disease caused by *Toxoplasma*. This parasite damages the central nervous system, liver, kidneys, lungs, heart, muscles and eyes. In humans, this disease is chronic, and often the initial period passes without symptoms. There are three main forms of this parasite: oocysts, tachyzoites, and bradyzoites. But in addition, toxoplasmosis also shows morphological structures such as pseudocysts and cysts in its life cycle. The morphological structure of toxoplasma is crescent-shaped, and its shape is similar to a slice of lemon or orange. One end of the body is blunt and the other end is elongated, 4-8 μm in length and 2-4 μm in width. The size of the nucleus located in the center of the cytoplasm is around 1-2 μm . When stained by the Romanovsky-Giemsa method, the nucleus is red-violet, and the cytoplasm is blue-gray. When we examine *Toxoplasma* under a microscope, we can see spirally wrapped myofibrils, or conoids, on its tip. This disease is more common in Central Asian countries and Kazakhstan. In 1923, the Czech researcher J. Janku found out that toxoplasma was present in the eyes of a dead child. Toxoplasmosis was first described by Wolf and Page. It was later proven that toxoplasmas parasitize humans and animals and cause toxoplasmosis. In 1970, the *Toxoplasma* parasite was examined under a microscope, and based on its development cycle, *Toxoplasma* was included in the class of spores, the family of coccidia. Toxoplasmosis is a zoonotic disease caused by *Toxoplasma*. This parasite damages the central nervous system, liver, kidneys, lungs, heart, muscles and eyes. In humans, this disease is chronic, and

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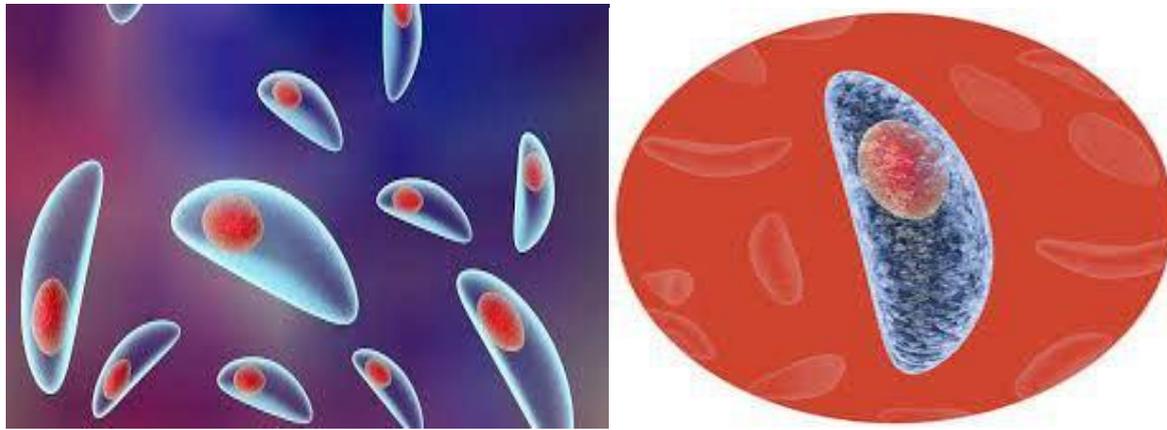


Figure 1. Microscopic view of Toxoplasma.

Toxoplasma is an intracellular parasite, like malaria plasmodium, which is a representative of the spore class. It is fed osmotically because there are no organs that receive special food from the external environment. Until recently, we knew that toxoplasma reproduces only asexually, that is, it divides several times in the tissues of an animal infected with the parasite to form false and true cysts. by feeding mice infected with . So, we can know from this that the main host of toxoplasma is cats and animals belonging to the family of felines, and the intermediate hosts are various birds, almost all mammals and humans. Toxoplasma differs from most representatives of the coccidia family in that their intermediate hosts can be almost all warm-blooded animals. In addition, a new parasite formed asexually can remain in the intermediate host without passing to the main host and cause disease. But most often, the development cycle of toxoplasma passes by changing the host. Primary hosts (usually cats) acquire Toxoplasma by eating cyst-infested intermediate host organs. Rarely, primary hosts can also transmit the parasite through sporocysts. The reason why toxoplasmosis is so common is that intermediate hosts, rodents, feed on the main hosts. Due to this, conditions are created for the survival of the toxoplasma parasite in nature. The symptoms of the disease also depend on the organ in which toxoplasmosis is located, mainly this parasite damages the nervous, lymphatic systems, and organs of vision. Toxoplasmosis is a chronic disease and its specific symptoms are not observed. Even among people, up to 30% of people may not feel the symptoms of the disease at all, such people are carriers.

Life cycle: Toxoplasma forms schizonts in the intestinal epithelial cells of the main host, schizonts reproduce by schizogony. As a result of reproduction by the method of schizogony, crescent-shaped merozoites are formed. Merozoites break through the cell wall and fall into the intestinal cavity, after a certain time, merozoites enter the epithelial cells and turn into schizonts, and schizogony is repeated. After the process of schizogony is repeated several times, the male gametes form microgametes (spermatozoa) or macrogametes (egg cells) from the merazoites that entered the epithelial cells of the intestine. After the maturation of macro and microgametes, they break through the epithelial cells and enter the intestine of the main host, where they unite to form a zygote. A thick membrane forms around the zygote, which is called an oocyst. There are 2 sporocysts in the oocyst, each of which contains 4 sporozoites, the size of which is 2-8 microns. The oocysts are excreted in the cat's feces.

Their viability in the external environment is 3 days. As a result of the process of sporogony, oocysts form 2 spores in the external environment, in the soil. Four sporozoites mature from each spore. Mature oocysts from sporozoites are called sporocysts. Formed sporocysts can be transmitted to an intermediate host or back to the primary host. Sporocysts enter the body of an intermediate host, especially a person, through food products (unwashed vegetables and fruits). There, it multiplies again and forms merozoites. Some sporozoites pass through the wall of the intestine to the cells of the reticuloendothelial system and parasitize, grow, develop, develop asexually. The resulting merozoites live in the cells of various internal organs. The method of asexual reproduction of this parasite in internal organ cells is called endogony. Endogony is closely related to the process of schizogony and includes two periods: first schizogony is observed, then each merozoite formed divides into two more. divided. Toxoplasmas multiply rapidly in the affected animal organ. Tachyzoites (trophozoites) are formed during the multiplication of sporozoites in epithelial cells. They have the characteristic shape of an orange slice or crescent (4-7x1.5-2 microns), with a rounded back end. When stained according to Romanovsky-Gimsa, the cytoplasm is blue and the nucleus is ruby red. Most of the time, tachyzoites are collected from 10-30 people in the cells of macrophages of lymph nodes, liver and lungs. In cells, they are surrounded by a parasitiform vacuole membrane representing pseudocysts. Pseudocysts have no shell; they are formed in affected cells, macrophages, and involve the accumulation of trophozoites (endozoites). They are found in acute infection, like tachyzoites. Intracellular cysts (10-1000 microns in size) are also formed. They have a dense shell and contain more than a hundred parasites (bradyzoites or cystozoites). Cysts last for decades (chronic infection). Tachyzoites and bradyzoites, in addition to common antigens, have different antigens: 5/4C4 (p18) and BSR4 (p36) antigens in bradyzoites, and SAG1, SAG2, etc. in tachyzoites. Cultivation. Toxoplasma develops in chicken embryos and tissue cultures, as well as by infection of white mice and other animals. Resistance. Oocysts can remain viable in the environment throughout the year. Toxoplasma quickly dies at 55 ° C, is very sensitive to 50% alcohol, 5% solution. The life cycle of Toxoplasma increases and the formation of new parasites takes 1-3 weeks in the external environment. The resistance of Toxoplasma to the external environment depends on the stage of the life cycle of the parasite. They are very sensitive to several physical factors such as heating, drying, freezing. 4-6 months in meat, 2 months in brain tissue, 1 year in soil.

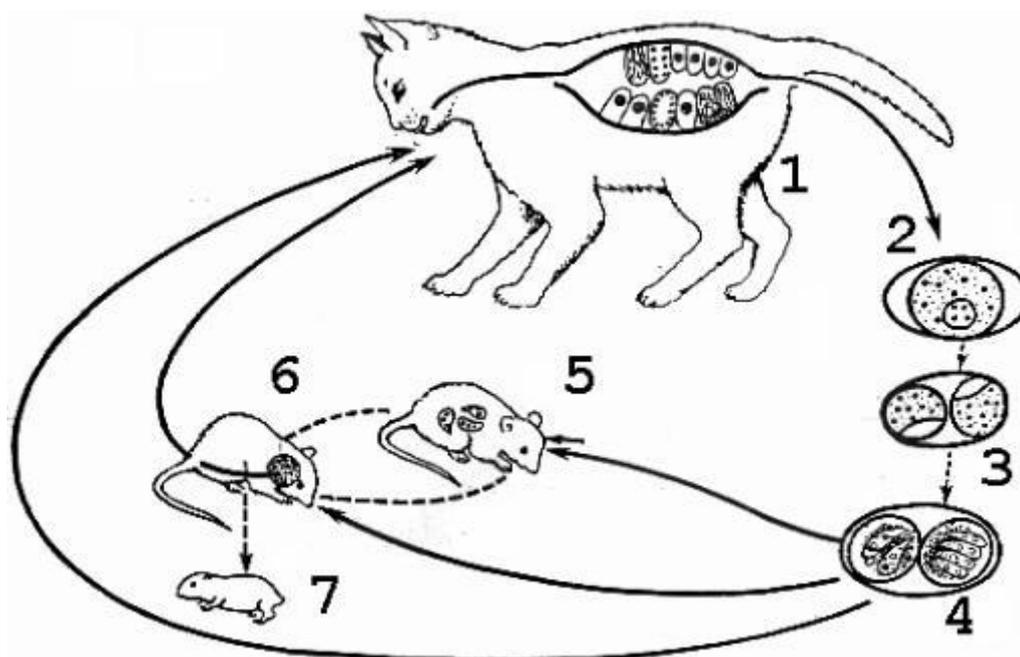


Figure 2. Developmental cycle of Toxoplasma

Epidemiology: Toxoplasmosis is a zoonotic infection with a natural focus. The causative agents of this disease have been found in more than 300 species of animals and more than 150 species of birds. Toxoplasmas are often found in cats, which are pets, so epidemiologic attention is focused on cats. This parasite is transmitted to humans through the alimentary route or thermally unprocessed meat, sometimes from contact with cats, rarely through damaged skin and hemotransfusion, a 'zola can be transmitted by transplanting. A patient suffering from toxoplasmosis is safe for others and does not transmit the disease. Toxoplasmosis is very dangerous for pregnant women. The disease is transmitted from mother to child by transplacental route. In this case, the susceptibility to toxoplasmosis for the fetus is 100%. Often children are sensitive to toxoplasmosis and symptoms are observed. In adults, this disease is reduced in the type of infection without symptoms.

Ways of transmission of toxoplasma to humans:

1. Word of mouth. Vegetables and fruits contaminated with sporocysts are transmitted through unwashed hands or through meat and dairy products infected with toxoplasma cysts.
2. Infection by contact - in hospitals or toxoplasma testing laboratories, when the injured skin and mucous membranes of people touch the injured skin of an animal infected with toxoplasma
3. Transplacental - transfer from mother to child through the placenta. This way is usually observed in pregnant women. It can be fatal for the fetus.
4. Through air drop - pulmonary toxoplasmosis is observed.

Pathogenesis: The causative agent of toxoplasmosis goes to the regional lymph nodes with the lymph flow, multiplies and creates inflammatory reactions in the body. In the clinic, this condition is in the form of mesoadenitis, after reaching the highest concentration in the lymph nodes, the parasites enter the blood and spread throughout the body. It damages the liver, spleen, nervous system, myocardium, skeletal muscles, and retina. Active proliferation of Toxoplasma is accompanied by the release of various toxins and allergens, leading to slow-type hypersensitivity. In many cases, toxoplasmosis causes a primary infection without developing a manifest form of the disease. Clinically unknown, the person remains healthy, but it is considered important for congenital toxoplasmosis. In the formation of the manifest form of the disease, the process can go into a severe generalized form and, due to various effects, it can pass into the type of toxoplasmosis sepsis and lead to severe lethal consequences. There is subfebrile in the attack clinic, in which there may be enlargement of the liver, spleen, and lymph nodes. The pathogenesis of button toxoplasmosis has not been sufficiently studied. However, it is known that a pregnant woman can be harmed by toxoplasmosis. Intrauterine damage to the fetus can lead to miscarriage, stillbirth, or severe damage to internal organs. The disease is acute, subacute and chronic. In the acute phase, the disease begins with a sudden rise in body temperature to 38-39 C, children experience general weakness, severe headache, sometimes muscle and joint stiffness. pain in the limbs is observed. They refuse to eat, their appetite decreases, resulting in a decrease in body weight. Spotted papular rashes spread over the body of patients. These rashes sometimes merge and cover the whole body, but do not appear on the hairy part of the head, feet and palms. Lymph nodes are enlarged mainly in the neck, axillary and inguinal lymph nodes. Enlargement of lymph nodes in the coccyx and between the coccyx is rarely observed. The liver and spleen are enlarged. Heart palpitations, shortness of breath may occur,

sometimes acute myocarditis with disturbances in heart rhythm and conduction occurs. These symptoms are associated with disorders of the CNS in the form of encephalitis and meningoencephalitis. Such children suddenly have a headache, several times vomiting, convulsions, damage to the nerves of the brain, damage to the cerebellum. In addition, mental disorders can occur, and the disease can even lead to death. Severe and mild forms of acquired toxoplasmosis are common. In its mild form, the disease is characterized by general weakness, fever, subfebrile body temperature, muscle soreness and mild dyspeptic disorders. There are lymphnodular, superficial, intestinal, encephalitic, fall, myocarditis and generalized forms of toxoplasmosis. Lymphnodular form. Neck and neck lymph nodes are often enlarged. Enlargement of subclavian, subclavian, mesenteric, paratracheal lymph nodes is rare. Lymph nodes increase in size to 1.5-2 cm and are located under elastic, non-aggressive and unchanged skin. In addition to the lymph nodes, the liver and spleen also enlarge in patients. General weakness, headache, loss of appetite, insomnia are observed in the disease. Encephalitic form. It takes the form of acute and chronic encephalitis, encephalomyelitis, arachnoencephalitis, arachnoiditis. Acute encephalitis is mainly observed in generalized toxoplasmosis. The disease begins acutely, and symptoms of intoxication appear quickly. The condition of children is severe: fever, sudden headache, repeated vomiting, loss of appetite, mood disorders, hallucinations, temptation, convulsions are observed.

Diagnosis: Toxoplasmosis is diagnosed by examining the patient's general condition, fundus examination, EKG, EEG, general X-ray of the head. In order to detect toxoplasma, a sample from lymph nodes, smears of biopsies, and smears taken from palatal brushes are taken and laboratory examination is carried out. The use of immunological examination methods in the clinic shows a positive result. In this, the composition of blood serum is studied, if antibodies against toxoplasma are found in the serum, we can know that a person is infected with toxoplasmosis. Toxoplasmosis can also be diagnosed using an allergic skin test. But we can use this method only 4-5 weeks after the person is infected, which reduces the accuracy of the method.

Treatment: Treatment of toxoplasmosis is carried out by a complex combination of etiotropic agents, immunostimulants, pathogenetic and symptomatic treatment measures. Etiotrope treatment consists of 3 cycles, each cycle is 5-10 days. The break between cycles should be 7-10 days. During the course of treatment, 0.5-1 mg/kg of chloridine is prescribed once a day. Folic acid is prescribed against the side effects of chlorodyne. If there are contraindications to the use of chlorodyne, the patient is prescribed delagil, trichopol or aminoquinolone. Drugs such as erythromycin, lincomycin, methacillin, oleandomycin are also effective in the treatment of acute toxoplasmosis. In chronic toxoplasmosis, etiotropic measures are not effective, in such a situation we mainly focus on improving the functioning of the body's systems. In addition, vaccinotherapy is effective in the treatment of chronic toxoplasmosis. We use toxoplasmin as a vaccine.

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