



Journal homepage: [www.sciencearchives.org](http://www.sciencearchives.org)

ISSN: 2582-6697



Review Article

<http://dx.doi.org/10.47587/SA.2021.2202>



## ***Trichomonas vaginalis*: a review on pathogenicity, diagnosis and treatment**

**Luma Foad Manher Al-Ethafa**

*Environmental Health Department., College of Environmental Science, Al-Qasim Green University, Iraq*

\*Corresponding author: [dr.lumafoad@environ.uoqasim.edu.iq](mailto:dr.lumafoad@environ.uoqasim.edu.iq)

Received: April 18, 2021 / Revised: May 8 , 2021/ Accepted: June 6, 2020

### **Abstract**

The parasite *Trichomonas vaginalis* is one of the primary parasites that cause vaginitis and causes Trichomoniasis and is considered a sexually transmitted disease, and it is widespread all over the world. This parasite is an anaerobic flagellar parasite that affects the urinary genital tract in humans and the symptoms associated with it vary between the sexes, and severe infection may cause infertility or delayed childbearing for both sexes. According to WHO reports, there are about 170 million annual cases of this parasite around the world. Due to the risks posed by venereal diseases to society and the lack of studies on such. Diseases This study was conducted to increase knowledge and methods of prevention and treatment of this parasite.

**Keywords** *Trichomonas vaginalis*, pathogenicity and methods of prevention

### **Introduction**

The parasite *Trichomonas vaginalis* is one of the primary parasites causing vaginitis in women, and it is classified under the group of sexually transmitted diseases (Soper,2004). Trichomoniasis is widespread in all parts of the world (Harp et al.,2011) and it was the first observation of the emergence and emergence of this disease at the beginning of the twentieth century by the researcher (Hook, 1999) 1837 in Donn.

*Trichomonas vaginalis* is a protozoan flagellar parasite that infects the human urogenital tract (Donné,1936). It invades the vagina, the urinary system, and the cervix, in women, the bladder, the seminal vesicle, and the prostate in men (Johnston and Mabey, 2008). The symptoms caused by this parasite are more pronounced in women than in men. A woman's reproductive system is exposed to several causes of inflammation and microbial infections Lutfism, where a woman's vagina is a dynamic environment that contains two stages, the first stage is the regeneration and growth of the phenotypic cells of the mucous wall lining the vagina, and the second stage the menstrual cycle, and in each of them is controlled by changes in the position of hormones under Controlling the regulation of the estrogen hormone, the phenotypic cells, and the normal internal bacteria, the vagina secretes a normal fluid in all women from puberty to the

menopause period, and it is a defensive and protective fluid against microbes, and its acidic pH ranges between 4.2 -3.8, where it is considered the appropriate medium. For bacterial growth, in addition to the presence of large amounts of lactic acid (Ash and Orihel,2007).

Vaginal infections recur continuously in a woman's life; Because of the hormonal imbalance between the microorganisms present in the vagina and the increase of a certain type of that revival higher than its normal level on the one hand and the reduction of the number of members of the genus Lactobacillus on the other hand, as well as other factors such as the excessive intake of antibiotics, steroidal hormone therapy, and immunosuppressive drugs, as well as Physiological imbalance, such as pregnancy, infertility, abortion, or diabetes and immunodeficiency (Nanda et al., 2007).

Several factors lead to an imbalance in the natural balance of the vagina, the most prominent of which are: Progress Age, tension, and hormonal changes that occur to the body, such as menstruation, pregnancy, menopause, sexual intercourse, antibiotics, and spermicide drugs, in addition to the vaginal "shower", which overuse of it leads to the elimination of the

natural secretions of the reproductive system, in addition to the resulting causes Of living organisms such as bacteria, yeasts, viruses and parasites (Swygard et al., 2004).

Estimates of the World Health Organization (WHO) for 2007 indicate that every year there are 448 million new cases of treatable sexually transmitted infections, such as syphilis, gonorrhea, and trichomoniasis among the 15-49 age group throughout the world. This number does not include cases of HIV and other sexually transmitted infections that continue to negatively affect the lives of individuals and communities around the world, and sexually transmitted infections and their complications in developing countries fall into the most important disease categories. The five that adults seek health care services for, and the *Trichomonas vaginalis* parasite that causes diseases of the human reproductive system was initially named Trick and then changed to the name and throughout 1936 in the year Ehrenberg, this as mentioned by the scientist P. *Trichomonas vaginalis*, years ago it was known as social parasites before it was known to It is a disease, which was installed in 1940, and this division of vaginal *trichomonas* is due to what it is now to the world of Burgass in the year 1998 (Petrin et al., 1998).

### Classification

The classification of *trichomonas* is largely dependent on the number and arrangement of flagella, as most are parasites *Trichomonas vaginalis* belongs to the family of *Trichomonas* flagella (Tricomonedadae). There are three types among the human hairs are:

1. *Trichomonas vaginalis* lives in the vagina.
2. *Trichomonas hominis* lives in the intestine.
3. *Trichomonas tenax* is found in the mouth.

These types can be differentiated by the difference in the injury site and the morphological and structural variation. The *Trichomonas vaginalis* parasite is one of the largest of these types and the only one that causes the disease. This parasite is classified:

Kingdom:	Animalia
Phylum:	Protozoa
Subphylum:	Sarcomastigophora
Superclass:	Mastigophora
Class:	Zoomastigophora
Order:	Trichomonadida
Family:	Trichomonadidae
Genus:	Trichomonas
Species:	T. vaginalis

### Morphology and structure

The parasite has a pear or oval shape (Fig.1), a length of 15-5 microns, and a width of 10-7 microns. The front part of the parasite's body has a nuclear particle located in its center. The parasite also has multiple digestive vacuoles (Garber, 2005). The parasite moves in the middle in which it lives using five flagella, four of which are of equal length. It is located in the

anterior part of the parasite's body, and the fifth flagellum is lateral, attached from its anterior and posterior ends to the Costa rib, forming the outer boundary of the (undulating) membrane in which there are fine particles that help adhesion and exchange of nutrients between the host cells. The membrane is except when the traverse movement, which is characterized by its active, progressive, vibrational movement, is reduced thanks to the front flaps and the rotational movement around itself, thanks to the undulating membrane. There is also a pair of Axostyle needles that extend from front to back and protrude at the posterior end of the parasite's body. The parasite also has fine, parallel, longitudinally arranged microscopic tubes that accentuate the end of the parasite and end with a thin spine that originates outside the body of the parasite, and appears outside from the backside clearly and it is not moving, as they noticed there are two forms of the parasite, a rounded shape and another similar to the amoebic phase, where they found that The amoebic form usually appears in acute infection with the parasite, and its effect changes according to the special conditions surrounding the vagina, the cause may be a hormonal allergy or other causes, and through other studies, it has been found that the *Trichomonas vaginalis* parasite is not much different from the rest of the other types that are found in the mouth, the large intestine. And the bladder, and in a comparison between two of these types, it was found that the backward flagellum forming the corrugated membrane ends before the end of the parasite in the vaginal trichomoniasis, while in the middle of the end of the parasite in the human *trichomonas* located in the intestine, and is distinguished from the *Trichomonas* parasite present in the mouth, but some differ Something in size as well as in the wavy membrane is relatively short. (Schwebke and Burgess, 2004) In prepared prepared samples, the *Trichomonas vaginalis* parasite appears spherical with a size of 18-15 microns, but it is smaller when it is attached to the slide.

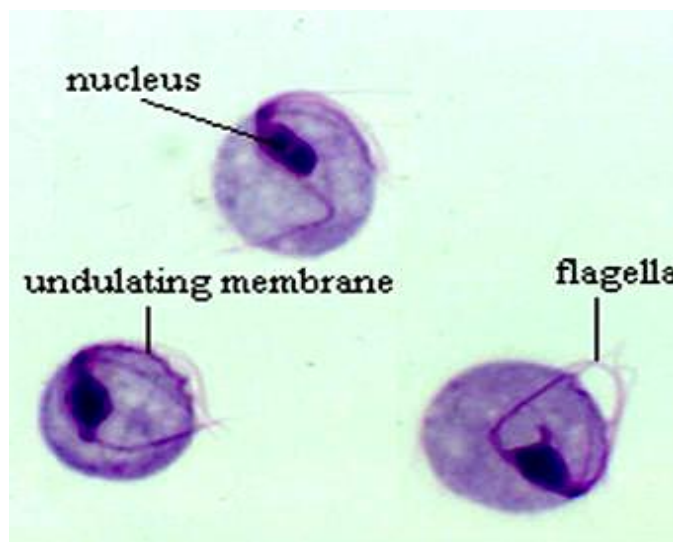


Fig.1 Morphology of *T. Vaginalis*

## Pathogenicity and clinical symptoms

The incubation period for this disease ranges from 4 days to 3 weeks, and the symptoms differ between women and men, in men the infection is in most cases without any symptoms and often unclear and less dangerous, which is observed in women and in cases of severe infection the symptoms are as follows:

- Itching and disturbance of the urethra, in addition to dysuria and sexual intercourse, due to inflammation of the urethra, bladder and epididymis.
- Permanent inflammation of the bladder, which includes inflammation of the seminal vesicles and the upper regions of the genitourinary system, with urinary secretions (Caini et al.,2014). This inflammation is accompanied by an enlarged prostate and may cause infertility (Cudomre et al., 2004) In women, the infection is rarely asymptomatic, with a rate ranging between 10-15%. These symptoms are as follows:
  - Abundant vaginal secretions with a foul odor (fishy odor, foamy and creamy-colored in both moderate and severe cases).
  - Inflammation of the vagina with burning and itching accompanied by yellow or greenish secretions, and the labia and the area surrounding them become red and inflamed (Powers and Celeste,1998).
  - Common symptoms are frequent urination, which is accompanied by pain and dysuria, as well as urethntis and cystitis (Ohlemeyer et al., 1998).
  - Local itching and burning in the vulvar region, the urethra, cervix, and bartolin gland may become inflamed, and this inflammation may move to the ureter and the vesicle, sometimes causing dyspareunia, and the vagina appears red due to the hemorrhage that it is exposed to (Sood et al., 2007).
  - Itching in the inner upper part of the thigh, the labia may become slightly swollen, and the vaginal secretions come out continuously, especially during or after menstruation, forming what is known as hematuria.
  - Some experiments have shown that the symptoms of vaginal *Trichomonas* infection affect the concentration of a hormone. Estrogen in the vagina, so that the higher the concentration of this hormone, the fewer symptoms associated with the disease

## Life cycle

Flagellates, including *Trichomonas vaginalis*, reproduce by simple binary division with a direct life cycle, you do not need any mediator. The natural pH of the vagina from 4.5 (pH 4) When the acidity of the vagina changes or abnormal occurs, the environment becomes ready to proliferate in the reproduction of *Trichomonas vaginalis*. The path of direct infection with the larvae, where there is no cystic phase or any other phases in the parasite's life cycle, and the larvae are divided directly longitudinally without passing through transitional stages (Huppert et al., 2007).

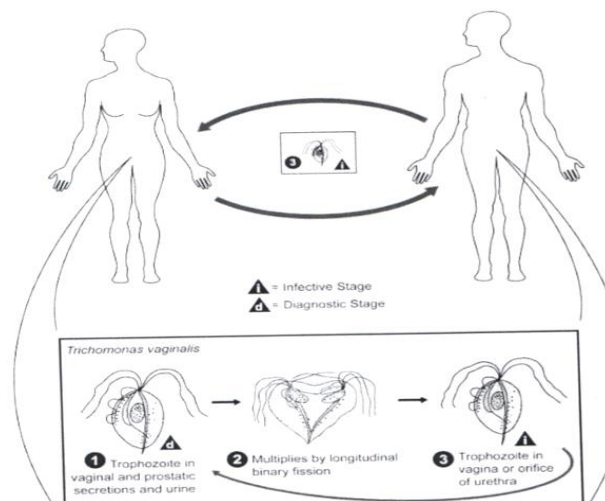


Fig.2 Life cycle of *T. Vaginalis*

## Mode of infection

The active phase (Trophozoite) is the infectious phase in humans, and the infection is transmitted from one person to another in several ways:

- Direct sexual contact

The parasite *Trichomonas vaginalis* dies quickly in the external environment because it is very sensitive to drought. It can only be transmitted in a moist environment and this can only be achieved through sexual contact. The infected woman is considered the reservoir of infection, while the man is considered a vector for it.

- Multiple sexual partners.
- Low levels of personal hygiene

Scientists have shown that personal hygiene has a role in the transmission of infection, as they concluded from their studies that the rates of infection are almost equal between the two sexes, so that this percentage among women is between 10-25% and that the rates of this percentage vary according to personal hygiene (Schirm et al., 2007), while this percentage in men was from 10-20%. (Kengne et al., 2004).

- The use of underwear for injured persons (Cudmore et al., 2004).
- Childbirth

In rare cases, the *Trichomonas vaginalis* parasite can be isolated from the respiratory system of infants, in cases of respiratory tract infection and conjunctivitis, which gave evidence that infection of newborns may be during the birth stage in the vaginal region of the infected mother (Ryan et al., 2004).

- Use of public toilets.

## Diagnosis

Diagnosis is made in women in several ways, including:

- Clinical diagnosis

Women infected with *T. vaginalis* develop infections characterized by small red spots on the wall of the vagina, and the cervix resembling strawberries, and this is examined using the vaginal speculum.

- Laboratory diagnosis includes:

### Direct microscopy

The urinary sediment is examined to detect the presence of the parasite and the vaginal secretions are examined (Mielczarek and Blaszkowska, 2015).

### Culture. Implantation

*Trichomonas vaginalis* implantation is currently considered the most sensitive method for diagnosis, and it is recommended to perform it when there is a suspicion of vaginal infection with *Trichomonas* even if the direct examination is negative. These parasites reproduce 2-4 days after cultivation (Hussein and Atwa, 2008).

- Immunological methods

These methods depend on detecting Trichomoniasis vaginal antigens in the serum and are represented by: agglutination of latex, agglutination of the latex molecules Immunofluorescence and exceed the sensitivity of ELISA (Enzyme Immunosorbent) and particles of these immune methods (Verges, 1979).

- Taking a swab from the cervix.
- PCR examination to detect vaginal *trichomonas* DNA (Upcroft and Upcroft, 2001)

## Treatment

One of the most commonly used drugs is metronidazole (Flagyl) Metronidazol. Trichomoniasis, in which a person with *Trichomonas vaginalis* parasite is treated with the use of metronidazole compounds by mouth, in an adult person one tablet at a concentration of 250-200 mg three times a day for one week or for ten days and in children 100 mg three times a day from 12 years and over 50 mg three Twice a day, 12 years and over 100 mg / 3 times a day (AL-Naely et al., 2021) taking into account not to give it to pregnant women, especially during the first months of pregnancy (Gowhari et al., 2021). It is important to examine the partner and give him the same treatment even in the absence of Micro-organisms, in order to avoid the risk of recurring infection, and when the infection recurs, a distinction must be made between this recurrence and the failure of treatment, in the case of recurrence the aforementioned treatment is used for both partners together, while in the failure of treatment resort to increasing the dose, or increasing the length of the treatment period, or changing the drug This, and we must emphasize

the treatment of both spouses together, not just the patient, with abstinence from sexual intercourse for the duration of the treatment (Mousa and Qasim, 2015; Qasim and Al-Mayali, 2019; Tahmasebi et al., 2021)

12 of other treatments are the use of an acid vaginal wash such as a solution of lactic acid or dilute vinegar to preserve the acidic environment of the vagina, which does not help *trichomonas* life (Mohammed and Qasim, 2021), while in newborns after the fourth week who have symptoms of inflammation and Infection with *T. vaginalis* can be treated with metronidazole 30-10 mg / kg daily for five to eight days.

## Conflict of Interest

The author hereby declares no conflict of interest.

## Consent for publication

The author declares that the work has consent for publication.

## Funding support

The author declares that they have no funding support for this study.

## References

- AL-Naely, AJ, Qasim, MT, & Al-Hamadawi, HA (2021). Transfusion of blood components in the Newborn Service of the Hospital. Annals of the Romanian Society for Cell Biology, 952-958.
- Arroyo, R., Engbring, J., & Alderete, J. F. (1992). Molecular basis of host epithelial cell recognition by *Trichomonas vaginalis*. Molecular microbiology, 6(7), 853-862. doi:10.1111/j.1365-2958.1992.tb01536.x.
- Ash, L. R., & Orihel, T. C. (1990). Atlas of human parasitology (pp. 103-111). Chicago: ASCP Press.
- Caini, Saverio; Gandini, Sara; Dudas, Maria; Bremer, Viviane; Severi, Ettore; Gherasim, Alin (2014). "Sexually transmitted infections and prostate cancer risk: A systematic review and meta-analysis". Cancer Epidemiology. 38 (4):329-338. doi:10.1016/j.canep.2014.06.002. ISSN 1877-7821.
- Carlton, J. M., Hirt, R. P., Silva, J. C., Delcher, A. L., Schatz, M., Zhao, Q., ... & Johnson, P. J. (2007). Draft genome sequence of the sexually transmitted pathogen *Trichomonas vaginalis*. Science, 315(5809), 207-212. doi:10.1126/science.1132894.
- Cudmore, S. L., Delgaty, K. L., Hayward-McClelland, S. F., Petrin, D. P., & Garber, G. E. (2004). Treatment of infections caused by metronidazole-resistant *Trichomonas vaginalis*. Clinical microbiology reviews, 17(4), 783-793. doi:10.1128/CMR.17.4.783-793.2004. PMC 523556.
- Donné, A. (1836). Animacules observes dans les matieres purulentes et le produit des secretions des organes genitaux de l'homme et de la femme. CR Acad Sci, 3, 385-386.
- Garber, G. E. (2005). The laboratory diagnosis of *Trichomonas vaginalis*. Canadian Journal of Infectious Diseases and Medical Microbiology, 16(1), 35-38. doi:10.1155/2005/373920. PMC 2095007.
- Gowhari Shabgah, A. G., Qasim, M. T., Mostafavi, S. M., Zekiy, A. O., Ezzatifar, F., Ahmadi, M., ... & Navashenaq, J. G. (2021). CXCL chemokine ligand 16: a Swiss army knife chemokine in cancer. Expert
- Harp, DF, & Chowdhury, I. (2011). Trichomoniasis: evaluation to execution. European Journal of Obstetrics & Gynecology and Reproductive Biology, 157 (1), 3-9. doi:10.1016/j.ejogrb.2011.02.024. PMC 4888369.
- Hook III, E. W. (1999). *Trichomonas vaginalis*-no longer a minor STD. Sexually transmitted diseases, 26(7), 388-389. doi:10.1097/00007435-199908000-00004.
- Huppert, J. S., Mortensen, J. E., Reed, J. L., Kahn, J. A., Rich, K. D., Miller, W. C., & Hobbs, M. M. (2007). Rapid antigen testing compares



- favorably with transcription-mediated amplification assay for the detection of *Trichomonas vaginalis* in young women. *Clinical Infectious Diseases*, 45(2), 194-198. doi:10.1086/518851.
- Hussein, E. M., & Atwa, M. M. (2008). Infectivity of *Trichomonas vaginalis* pseudocysts inoculated intra-vaginally in mice. *Journal of the Egyptian Society of Parasitology*, 38(3), 749-762.
- Johnston, V. J., & Mabey, D. C. (2008). Global epidemiology and control of *Trichomonas vaginalis*. *Current opinion in infectious diseases*, 21(1), 56-64. doi:10.1097/QCO.0b013e3282f3d999. PMID 18192787.
- Kengne, P., Veas, F., Vidal, N., Rey, J. L., & CUNY, G. (1994). Specific polymerase chain reaction diagnosis. *Cellular and molecular biology*, 40(6), 819-831.
- Mendoza-López, M. R., Becerril-García, C., Fattel-Facenda, L. V., Avila-Gonzalez, L., Ruíz-Tachiquín, M. E., Ortega-Lopez, J., & Arroyo, R. (2000). CP30, a Cysteine proteinase involved in *Trichomonas vaginalis* cytoadherence. *Infection and immunity*, 68(9), 4907-4912. doi:10.1128/IAI.68.9.4907-4912.2000.
- Mielczarek, E., & Blazkowska, J. (2016). *Trichomonas vaginalis*: pathogenicity and potential role in human reproductive failure. *Infection*, 44(4), 447-458. doi:10.1007/s15010-015-0860-0.
- Mohammed, Z. I., & Qasim, M. T. (2021). Correlation of AMH and LH Levels in PCOS Patients with Pregnancy Rate. *Annals of the Romanian Society for Cell Biology*, 945-951.
- Mousa, H. M., & Qasim, M. T. (2015). Microbial Infection and IL-6 Urine Levels for Pregnant women in Thi-Qar Province. *World J. Pharma. Res*, 4(05), 358-365.
- Nanda, N., Michel, R. G., Kurdgelashvili, G., & Wendel, K. A. (2006). Trichomoniasis and its treatment. *Expert review of anti-infective therapy*, 4(1), 125-135. doi:10.1586/14787210.4.1.125.
- Ohlemeyer, C. L., Hornberger, L. L., Lynch, D. A., & Swierkosz, E. M. (1998). Diagnosis of *Trichomonas vaginalis* in adolescent females: InPouch TV® culture versus wet-mount microscopy. *Journal of adolescent health*, 22(3), 205-208. doi:10.1016/S1054-139X(97)00214-0.
- Petrin, D., Delgaty, K., Bhatt, R., & Garber, G. (1998). Clinical and microbiological aspects of *Trichomonas vaginalis*. *Clinical microbiology reviews*, 11(2), 300-317. doi:10.1128/CMR.11.2.300.
- Powers, C. N. (1998). Diagnosis of infectious diseases: a cytopathologist's perspective. *Clinical microbiology reviews*, 11(2), 341-365. doi:10.1128/CMR.11.2.341.
- Qasim, M. T., & Al-Mayali, H. K. (2019). Investigate the relation between Baicalin effect and Gene expression of LH, FSH, Testosterone in male rats treated with Gemcitabine drug. *Research Journal of Pharmacy and Technology*, 12(9), 4135-4141.
- Qasim, MT, & Al-Mayali, HK (2019, July). The immunological and protective role of Baicalin in male rats treated with chemotherapy (Gemcitabine). In *Journal of Physics: Conference Series* (Vol. 1234, No. 1, p. 012065). IOP Publishing.
- Ryan, K. J., & Ray, C. G. John C., (2004). *Medical microbiology*. McGraw Hill, 4, 370. ISBN 978-0-8385-8529-0
- Schirm, J., Bos, P. A., Roozeboom-Roelfsema, I. K., Luijt, D. S., & Möller, L. V. (2007). *Trichomonas vaginalis* detection using real-time TaqMan PCR. *Journal of microbiological methods*, 68(2), 243-247.
- Schwebke, J. R. Burgess D(2004). Trichomoniasis. *Clin. Microbiol. Rev*, 17(4), 794-803.
- Sood, S., Mohanty, S., Kapil, A., Tolosa, J., & Mittal, S. (2007). InPouch TV (TM) culture for detection of *Trichomonas vaginalis*. *Indian J Med Res*, 125, 567.
- Soper, D. (2004). Trichomoniasis: under control or undercontrolled?. *American journal of obstetrics and gynecology*, 190(1), 281-290. doi:10.1016/j.ajog.2003.08.023.
- Swygard, H., Sena, A. C., Hobbs, M. M., & Cohen, M. S. (2004). Trichomoniasis: clinical manifestations, diagnosis and management. *Sexually transmitted infections*, 80(2), 91-95. doi:10.1136/sti.2003.005124.
- Tahmasebi, S., Qasim, M. T., Krivenkova, M. V., Zekiy, A. O., Thangavelu, L., Aravindhan, S., ... & Roshangar, L. (2021). The effects of oxygen-ozone therapy on regulatory T-cell responses in multiple sclerosis patients. *Cell biology international*.
- Upcroft, P., & Upcroft, J. A. (2001). Drug targets and mechanisms of resistance in the anaerobic protozoa. *Clinical microbiology reviews*, 14(1), 150-164. doi:10.1128/CMR.14.1.150-164.2001.
- Verges, J. (1979). Les prostatites a trichomonas formes rondes (TFR). [Prostatitis due to the circular form of trichomonas]. *Journal d'Urologie et de Nephrologie (in French)*. 85 (6): 357-361.

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).



#### How to cite this article:

Al-Ethafa, L.F.M., (2021). *Trichomonas vaginalis*: a review on pathogenicity, diagnosis and treatment. *Science Archives*, Vol. 2 (2), 75-79 <http://dx.doi.org/10.47587/SA.2021.2202>