The genus *Trichomonas*

- These are common flagellates of the tropical areas.
- They exist only in trophozoite stage.
- They are pear-shaped body and measures 10-12 microns in length, a single ovoid nucleus is situated at the rounded anterior end and a cleft-like depression (mouth) lies at its side.
- There are 3-5 free flagella, a thicker flagellum passes backwards along the side of the body forming the undulating membrane and coming out free at the posterior end.
- The undulating membrane is supported at the base by a rod like structure (costa).
- The axostyle runs down the middle of the body and ends in the pointed end.

Genus *Trichomonas* is classified into 3 species:
1- *T. hominis*: inhabiting the ileo-caecal region.

2- *T. tenax*: inhabiting the oral cavity.

3- *T. vaginalis*: inhabiting the female genital tract, also found in the urinary tract of both males and females.

**Trichomonas hominis**
- There is no proof that *T. hominis* is pathogenic.
- It is most commonly diagnosed in unformed stools that contain considerable mucous.

**Trichomonas tenax**
- This specie is slightly smaller than *T. hominis*.
- Its normal habitat is the mouth, particularly in diseased gums, in tartar around the teeth and in carious teeth.
- It is not pathogenic but its presence indicates poor hygiene.

**Trichomonas vaginalis**
- The motile organism is larger than *T. hominis* and *T. tenax* reaching in length 27 microns and 18 microns in breadth.
- *T. vaginalis* is a pathogenic flagellate that infects the urogenital tracts of males and females.
-It is primarily a sexually transmitted disease.

-The incidence of trichomaniasis differs depending on the population examined, factors such as lower socio-economic state, multiple sex partners and poor personal hygiene which linked to higher incidence of infection.

-The life cycle of *T.vaginalis* includes only trophozoite stage. The organism is similar in morphology to the other trichomonas and it is characterized by prominent axostyle and undulating membrane that stops half way down the side of the trophozoite. It is divides by binary fission and it cannot survive long outside the host.

**Clinical significance:**

-It is a frequent inhabitant of the human vagina and of the male genital tract localized in the prostate and urethra. It is sexually transmitted disease. The organism is capable of surviving on dry materials for a few hours and on moist materials for longer period. Severity of the disease depends on the strain of the parasite ranging from symptomatic to mild to sever infection.

-Infection in male is often asymptomatic although at sometime, it is associated with urethritis which represents the most common symptomatic presentation in male.

- In female, the infection may also be asymptomatic (up to 50% of infected women are asymptomatic carriers) or may produce vaginitis, cervicitis and urethritis.
Asymptomatic carriers serve as a reservoir for transmission and also remain at risk for developing disease.

Vaginitis may be complicated by bacterial, fungal (yeast) or spirochetal infection. The chief complaints are leukorrhea (pus cells in urine) and dysuria, excessive discharge that is creamy yellowish to greenish and frothy due to the gases produced vaginal bacteria and sometimes the discharge may have a bad odor (foul smell).

The onset of symptoms, such as intense vaginal and vulvar pruritis, and discharge is often sudden and occurs during or after menstruation.

As above, urticaria and acute vulvulitis may also occur. It is considered that the disease is more annoying than disabling.

In general, it causes non-gonococcal urethritis or tetracyclin-resistant urethritis in male.

The organism does not infect the epithelium, it is found loose in the vaginal cavity or adherent to the epithelium.

There are certain factors that play a role in the pathogenesis of the parasite which include: age, sex, glycogen contents, pH, pregnancy, seminal fluid and number of parasites needed for infection.

The essential factors for growth of *T. vaginalis* are:

1- Presence of glycogen in vaginal cells.

2- pH of vagina (optimal pH for growth of *T. vaginalis* is 5.5).
**Why the incidence of *T.vaginalis* infection is high among mature females?**

This explained by the changes in the pH and glycogen amount of vagina.

-In **mature female** (15-40 years), the normal vaginal **pH** is acidic (4-4.5), this acidity maintains by certain type of bacteria called Dauder lein’s lactobacillus which lives on expence of the high amount of **glycogen** in the vaginal cells, and as a biproducts, it produces lactic acid which makes vaginal medium acidic (4-4.5) in the mature females. Also, there is a highest peak of sexual activity, so, the **semenal fluid** can elevate the acidity of vagina to 5.5 (optimal pH).

-Female of this age (15-40 years) need less than $10x^4$ parasites to become infected, whereas the male need $10x^6$ parasites to become infected.
- Because of both *T. vaginalis* and bacterial flora (lactobacilli) live on glycogen and acidic pH, therefore, during infection with *T. vaginalis*, no chance for bacteria to live and the pH of vagina rise to 5.5 (optimal pH for *T. vaginalis* growth) because no lactic acid production.

- The glycogen content of the epithelium is high and increases during pregnancy, thus **pregnant female** is more liable for infection.

- Using of **antibiotics** and presence of **other infection** will elevate the pH of vagina or urethra to 5.5 and can help in producing infection.

- In other groups (immature female, menapause and male) because of scanty or no glycogen due to the hormonal changes, this bacteria (lactobacillus) can not live. Therefore, the pH will rise and be high (about 7) and whole bacterial flora changes to other flora, and because of this high pH (7) and scanty glycogen, *T. vaginalis* loses its viability and can not live in this environment (*T. vaginalis* loses its viability below the pH of 3.8 and above pH of 7.5).

- Infection has also been associated with premature rupture of amniotic membrane, premature birth and post-hysterectomy cuff infection. More recently, it has been implicated as a factor in transmission of HIV.

- Neonate can acquire the organism during passage through infected birth canal. It is estimated that 2-7% of female babies acquire trichomoniasis by directed vulvovaginal contamination. Reports have been also documented *T. vaginalis* as a cause of neonatal pneumonia.


Laboratory diagnosis

The diagnosis for this organism is commonly based on the examination of wet preparation of vaginal and urethral discharges, prostatic secretions and urine sediments. The presence of actively motile organism with jerky motility is diagnostic.

Treatment

The treatment of choice for \textit{T. vaginalis} infection is metronidazole. All sexual partners of infected individuals should also receive treatment. This medication should not be used during pregnancy unless the benefits of treatment outweigh the risks to the fetus.