



WUCHERERIA BANCROFTI

B.Sc. Part I, Paper I, Group A:
Animal Diversity
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CLASSIFICATION

Kingdom- Animalia

Phylum- Nematoda

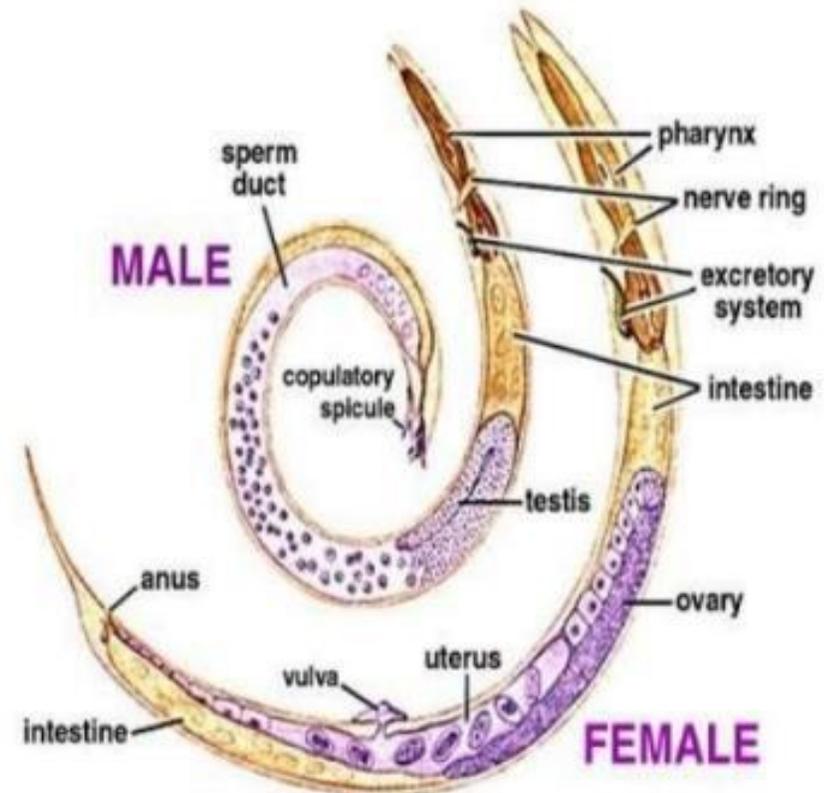
Class- Phasmida

Order- Filaroidea

Family- Fileriidae

Genus- Wuchereria

Species- bancrofti



INTRODUCTION

Wuchereria bancrofti is a parasitic worm which is responsible for causing filariasis infection. The mode of transmission of *Wuchereria bancrofti* larvae is through mosquito bite. After entering in the body of an individual the larvae circulates in the blood and gets matured to become an adult worm in the lymphatic nodes of the body, mainly in the lymph nodes of groin.

It causes recurrent filariasis infection and complications such as swelling of legs and hands, testicles and scrotum in men and labia in females. *Wuchereria bancrofti* infection is common in tropical countries.

CHARACTERISTICS

Wuchereria bancrofti is a filarial nematode that, as an adult, is a thread-like worm.

The female nematodes are 10 cm long and 0.2 mm wide, while the males are only about 4 cm long.

The adults reside and mate in the lymphatic system where they can produce up to 50,000 microfilaria per day.

The microfilaria are 250-300 μm long, 8 μm wide and circulate in the peripheral blood.

They can live in the host as microfilaria for up to 12 months(1,4).

Adult worms take 6 to 12 months to develop from the larval stage and can live between 4 and 6 years.

MALE AND FEMALE WUCHERERIA

- Male measures 40 mm in length and .1 mm in diameter.
- Posterior end of male is curved and contain 2 spicules.
- The female worms measure 80 to 100mm in length and 0.24 to 0.03 mm in diameter.
- Posterior end of female worm is sharply pointed.
- Ovo-viviparous, though liberates active embryos.

LIFE CYCLE

During blood meal an infected mosquito introduces third stage filarial larvae onto the skin of the human host and from there they penetrate inside.

They then migrate to the nearest lymph gland where they mature into thread like adult worms in about 3 to one year.

Average incubation time before potency is about 15 months.

The mature adult can survive for 5 to 10 years.

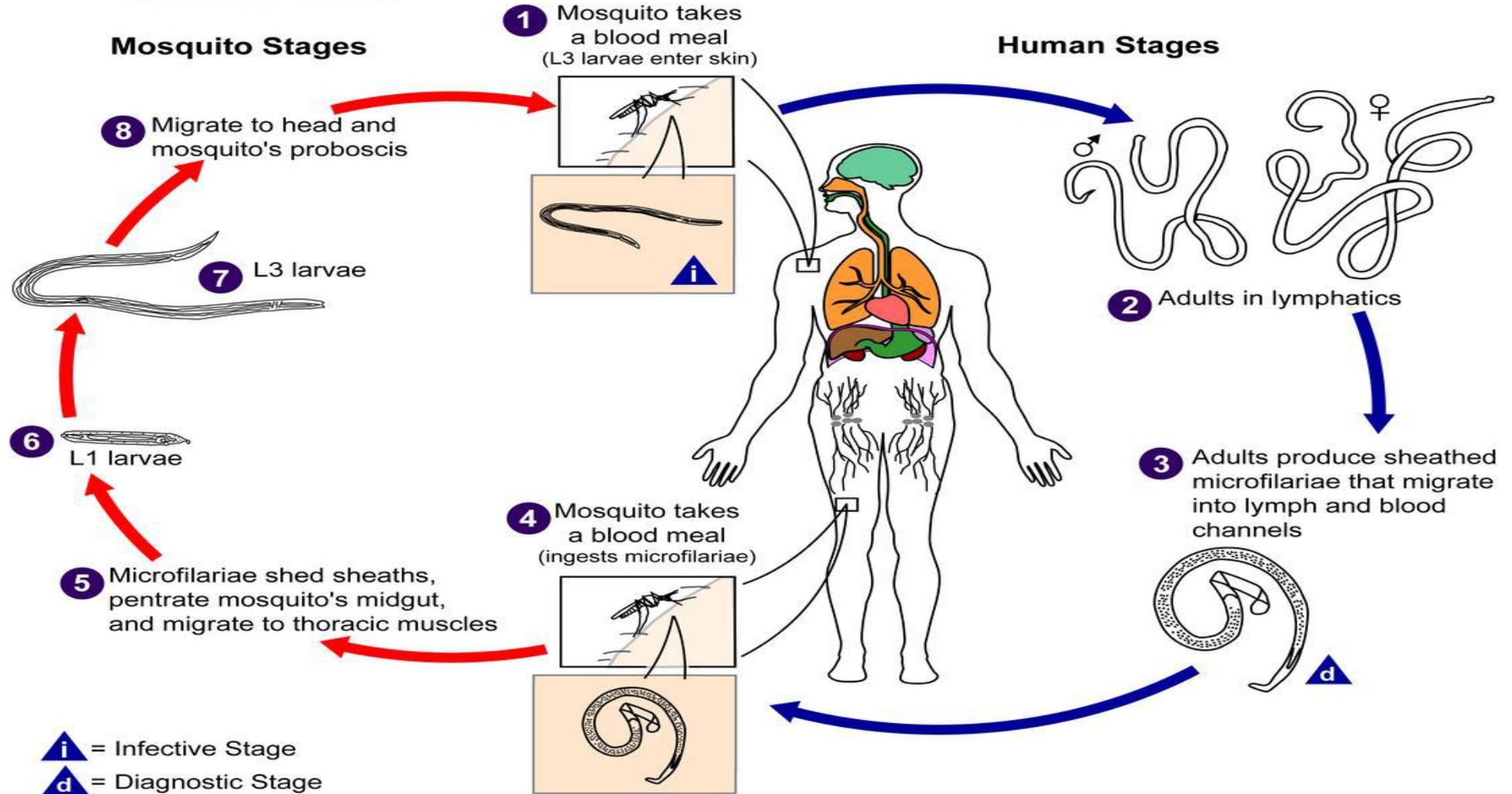
Once male and female worms mate ,the female produces microfilariae (1st stage larva)

This first larval stage moves through the circulatory system and collect in the arterioles of the lung during the day.

The microfilaria will die if they are not transferred to a mosquito within 70 days

Filariasis

(*Wuchereria bancrofti*)



MICROFILARIAE

Measures about 244 to 296 μ m by 7.5 to 10 μ m.

They are colourless and transparent with blunt head and pointed tail.

They are sheathed and the sheath is much larger than the embryo, they can move within the sheath.

Its body contains columns of cytoplasm with a number of nuclei. An oral style is present at the anterior end where the mouth develops in future. Microfilaria also bears the following parts,

- A nerve ring around the pharynx
- Excretory pore
- Rennette cells
- Four large germinal cells
- Future anal pore
- Inner cell mass
- Somatic cell mass

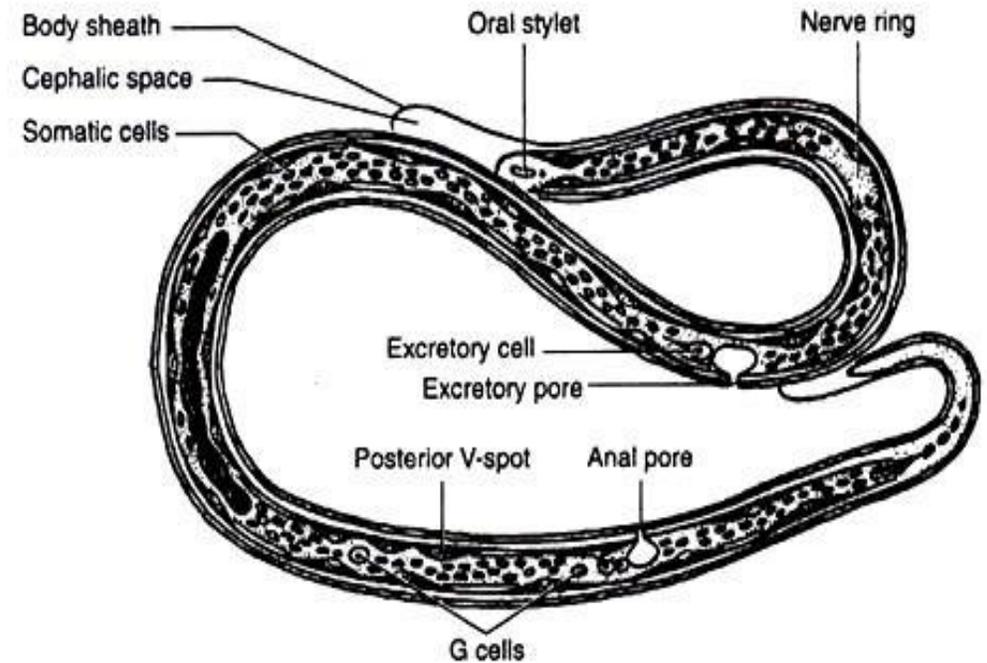


Fig. 6.11 : Diagram of microfilaria of *W. bancrofti*

IN MOSQUITO

- A mosquito ingests the microfilariae during a blood meal.
- After ingestion, the microfilariae lose their sheath and some of them work their way through the wall of the proventriculus and cardiac portion of the mosquito mid gut and reach the thoracic muscles.
- There the microfilariae develop subsequently into 3rd stage larva.
- This is the infective stage and migrate through the hemocoel to the mosquito proboscis and can infect another human when the mosquito takes a blood meal.

VECTORS

- Mosquitoes are the vector for this nematode
- Certain genera and species appear to transmit the infectious agent in particular geographical locations.
- At least 43 species of Anopheles mosquitoes are responsible for the infection of people in West Africa, rural Southeast Asia.
- Anopheles mosquitoes, in particular, transmit the nocturnal periodic form of the worm.
- Other genera like Aedes, Ochleratus, and Downsyomia, which have 20 different species among them, spread both the nocturnal and diurnal supperiodic forms of the nematode, particularly in the Pacific islands and parts of Southeast Asia
- Like the Anopheles genus, 6 species of the Culex genus infect humans with the nocturnal periodic form of Wuchereria Bancrofti, but in East Africa, the Middle East, urban Southeast Asia and Latin America.

PATHOGENECITY

The pathogenicity of *Wuchereria bancrofti* effects are mainly caused by the adult worms that infect the victims. This is asymptomatic disease meaning, there is no sign of symptoms even though a person is infected. When an infection caused by *Wuchereria bancrofti* is severe, there will be noticeable pathological problems in the lymphatic and immune system of the human body. There are three major pathogenic stages of *Wuchereria bancrofti* after it has been incubated

Asymptomatic

During the asymptomatic stage no symptoms emerge which gives the parasite an opportunity to proliferate undetected. During this stage, many days or even months will go by and the microfilariae (embryonic larva of the parasite) will be discharged daily unnoticed.

Acute inflammatory

In the acute inflammatory stage, symptoms become noticeable and the human host will most likely seek medical attention. There will be swelling of the limbs, fever, chills, swollen gland, and even vomiting. These inflammatory responses are recurrent and they can last for several hours, days, and weeks at the most. After symptoms subside, the limbs usually remain slightly swollen.

Chronic obstructive

Chronic obstructive stage is the most severe of the stages and can lead to death. This is the stage where elephantiasis becomes present. The inflammation may be caused by the movement of the worm, fertilized females releasing toxins during birth, and secondary infections in the lymphatic system.

CHRONIC OBSTRUCTIVE DISEASES OF THE LYMPHATIC SYSTEM

1. **Lymphangitis**
2. **Lymphadenitis**
3. **Hydrocoele**
4. **Elephantiasis-** Elephantiasis is the result of accumulated lymph because the worms are blocking the flow of lymph through the lymphatic system. The skin of the infected areas become rough, hard, dry, and extremely swollen.