

Blood nematode: Wuchereria bancrofti

Introduction

Wuchereria bancrofti is a human parasitic worm also termed as “Filariform” that is the chief cause of lymphatic filariasis. It is one of the three parasitic worms, jointly with *Brugia malayi* and *B. timori*, that infects the lymphatic system to emerge lymphatic filariasis. These filarial worms are multiply and get well distributed in human populations by a variety of mosquito vector species.

Epidemiology

W. bancrofti is mainly prevalent and affects over 120 million people, first and foremost in the Nile delta, Central Africa, South and Central America, the tropical regions of Asia together with southern China, and the Pacific islands. If left untreated, the infectivity can expand into a chronic disease called Lymphatic filariasis. In uncommon circumstances, it also causes asthmatic disease. No vaccine is commercially available, but elevated rates of cure have been conquered with various antifilarial medications. Lymphatic filariasis is the goal of the WHO Global Program to get rid of Lymphatic Filariasis with the aim to eradicate the disease as a public-health problem by 2020.

Morphology

As it is a dioecious worm, *W. bancrofti* possesses sexual dimorphism. The adult worm is cylindrical, slender, long and smooth with rounded ends (at both sides). It is white in colour and almost crystal clear. The body is fairly fragile, making removing it difficult from tissues. It has a short head region linked to the main body by a small neck, which appears as a constriction. Dark spots are detached nuclei throughout the body cavity, with no nuclei at the tail tip.

Males and females can be distinguished by structure and size of their tail tips. The male worm is smaller, 40 mm (1.6 in) and 100 μm (0.0039 in) wide, and shows a ventrally curved tail. The tip of the tail has 15 pairs of minute caudal papillae, which serve as sensory organs. The anal region is a detailed organization consisting of 12 pairs of papillae, of which eight are in front and four are in the rear side of the anus.

Contrary to above, the female is 60 millimetres (2.4 in) to 100 millimetres (3.9 in) long and 300 micrometres (0.012 in) wide, almost three times superior in diameter than the male. Its tail steadily tapers and is rounded at the tip. No extra sensory structures are seen. Its vulva is present towards the anterior side of the worm, about 0.25 mm from the head. Adult males and females

are mainly coiled together and are hard to separate. **Females are ovoviviparous** and can create thousands of juveniles recognized as microfilariae.

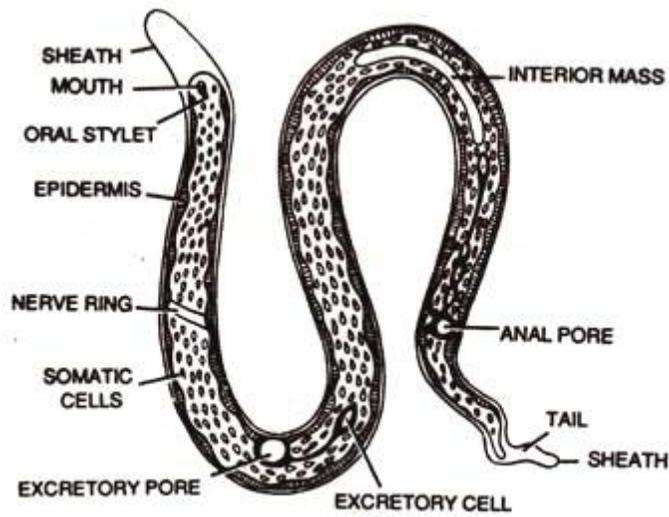
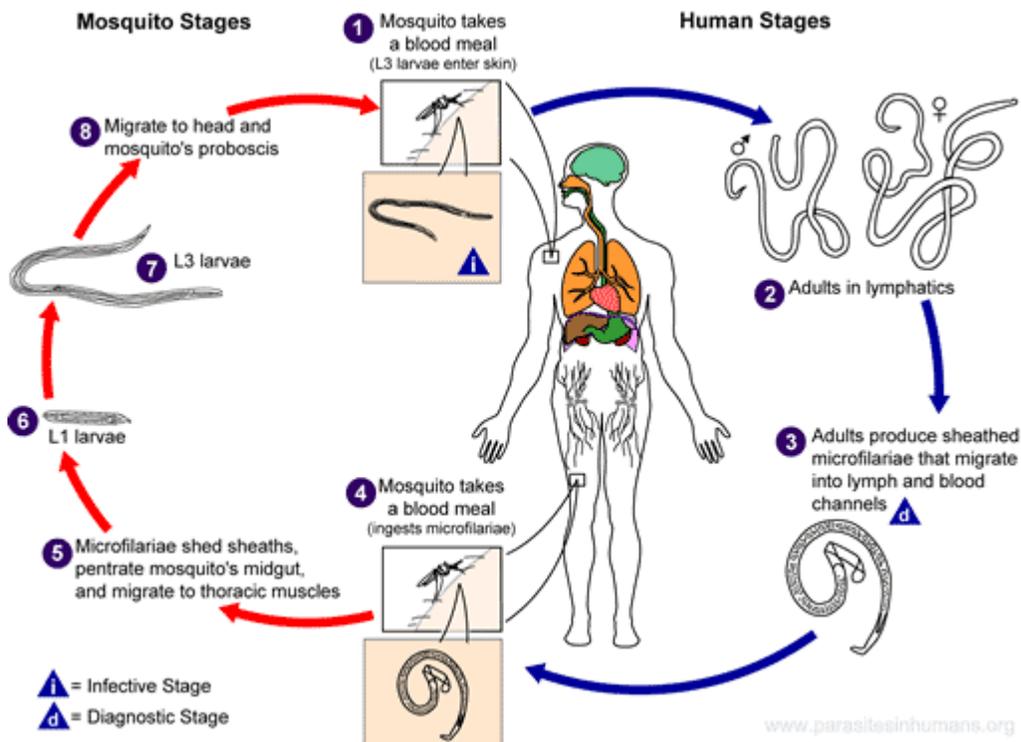


Fig. 9.1 Microfilaria

Host Range

Humans serve as the definitive host and mosquitos as the intermediate host.

Life cycle



The life cycle of *Wuchereria bancrofti* commences, when a male and a female worm, mate within lymphatic vessels of an infected human being. The female discharges thousands of microfilariae (prelarval eggs) into the blood flow. When the host is aware and awake, the microfilariae are likely to be stayed in deep blood vessels. During the sleep they take a trip near the surface in marginal blood vessels. This behavior enables them to get eaten up by the night biting mosquito. When eaten up by the mosquito, the microfilariae travel throughout the wall of the pro ventriculus and cardiac portion of the midgut finally accomplishing the thoracic muscles. Within 1–2 weeks they grown-up into first-stage larvae and ultimately into infective third-stage larvae which travel through the hemocoel to the mosquito's proboscis. When the mosquito bites another person, the larvae are injected into the skin of another human. They travel to the lymph vessels and mature into fully adult forms within six months. Fully developed females can live up to seven years. Repetitive mosquito bites during a number of months are frequently required to develop lymphatic filariasis. In some cases of individuals, lymphedema (swollen tissue caused by obstruction of the lymph fluid) may occur within six months and elephantiasis within a year. Citizens of tropical and subtropical areas have the principal risk while tourists have least risk of getting infected.

Symptoms

Wuchereria bancrofti infection is usually **asymptomatic**. Some citizens can develop swelling, lymphedema, which is ubiquitous in the legs, but occasionally also in the genitalia, arms and breasts. The inflammation and decreased current of the lymph fluid will represent the body with skin and lymph system infections. Over time, the disease causes thickening and hardening of the skin, a condition called **elephantiasis** which can be lethal and incurable. Filarial infection might also cause pulmonary tropical eosinophilia syndrome, which is typically present in patients living in Asia. Pulmonary tropical eosinophilia syndrome can cause: shortness of breath, cough and wheezing. Additionally to eosinophilia there might be high levels of antifilarial antibodies and IgE (Immunoglobulin E).

Diagnosis

Analysis for lymphatic filariasis is conventionally done from a blood sample by microscopic examination. The sample has to be taken during the night to make sure the microfilariae are present in the bloodstream. The blood can also be deliberated to ensure the occurrence of antibodies (antifilarial IgG4) that the human body develops to battle in opposition to antigens excreted by adult female *Wuchereria bancrofti* worms. A new technique of a highly sensitive "card test" has been developed to spot antigens devoid of laboratory tools using finger-prick blood droplets taken anytime in day. Molecular diagnosis by polymerase chain reaction (PCR) is achievable, too.

Treatment

Healing for contaminated patients is frequently done using a drug called diethylcarbamazine (DEC). The drug kills the microfilariae in the bloodstream and occasionally adult worms in the lymphatic vessels. It has few side effects which include: fever, headache, dizziness, nausea and

joint-muscle pain. DEC should only be consumed, if *Wuchereria bancrofti* has been recognized. This is, since many people with lymphedema are not contaminated with parasites. DEC can depreciate Onchocerciasis (an eye disease caused by *Onchocerca volvulus*) and can cause encephalopathy (brain disease) and demise in people who are contaminated with *Loa-loa*. Another drug, ivermectin, can also be used, however it kills microfilariae only. In some cases lymphedema can be protected from getting poorer by exercising the swollen leg or arm to recover the lymph flow. The swollen skin is susceptible to bacterial infections because immune defenses cannot work correctly due to the impaired stream of fluids. That is why the skin must be kept hygienic.

Prophylaxis

To avert new infections-

- 1.Keep away from infective mosquitoes between dusk and dawn (the time when they mostly feed).
- 2.A mosquito net can be useful all around your bed.
- 3.Mosquito repellent applied on your skin or the use of long trousers and sleeves might keep the mosquitoes away.
4. Mass treatments are given to whole communities in some endemic countries.
- 5.Programs to eliminate lymphatic filariasis in more than forty countries are decreasing the risk of infection.