Learning Objectives of Lecture 7

Parasites of skin

Students become able to:

- Identify different parasites causing skin infestation
- Demonstrate the morphology of different parasite.
- Understand the role of vector in disease transmission.
- Know life cycle, Pathogenesis, different clinical presentations and prognosis associated with each parasitic infestation.
- Understand laboratory methods of diagnosis.
- Know proper way to avoid the infection and how to treat it.

Page numbers of the studied parasites in:

Medical parasitology, 9th Edition. Markell & Voge's

<u>Lecture 7</u>:

(1): Filarial Worms (Cont.):

[1] ***Loa loa*****:** 289 - 292

[2] ***Onchocerca volvulus*****:** 294 – 301

(2) Parasites of skin causing:

Cutaneous & Mucocutaneous Leishmaniasis: 127-133

Loa loa
(African eye worm)

The name; African eye worm; As adult migrate in subcutaneous tissues including sub-conjunctival area, so appears crossing the eye.

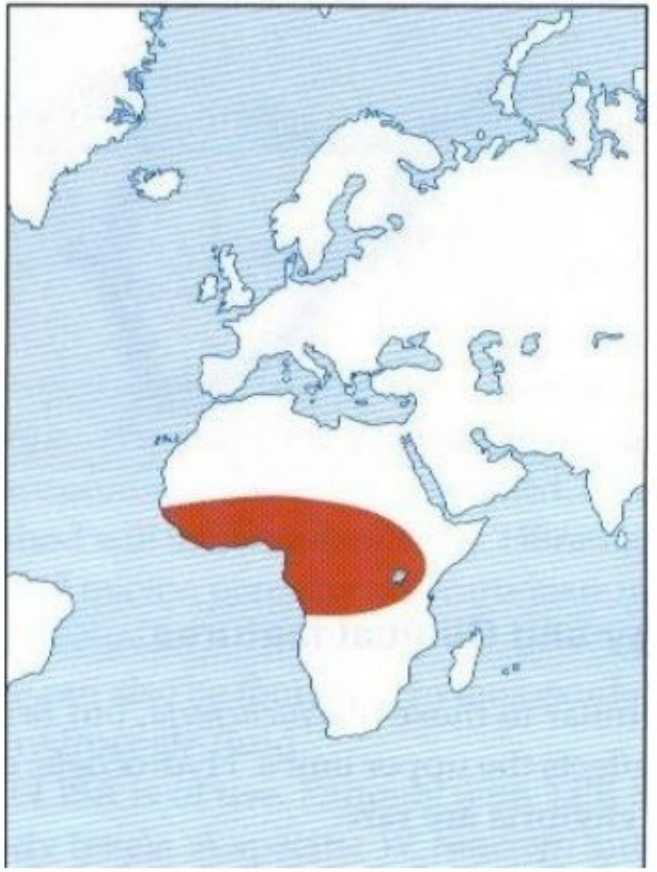
Disease: Loiasis, Calabar swelling or Fugitive swelling.

Distribution: West and Central parts of Tropical Africa.

Habitat: Adults live in subcutaneous tissue.

D. H.: Man.

I.H.: *Chrysops* fly.



Morphology

Adults: White slender worms with cuticular striations.

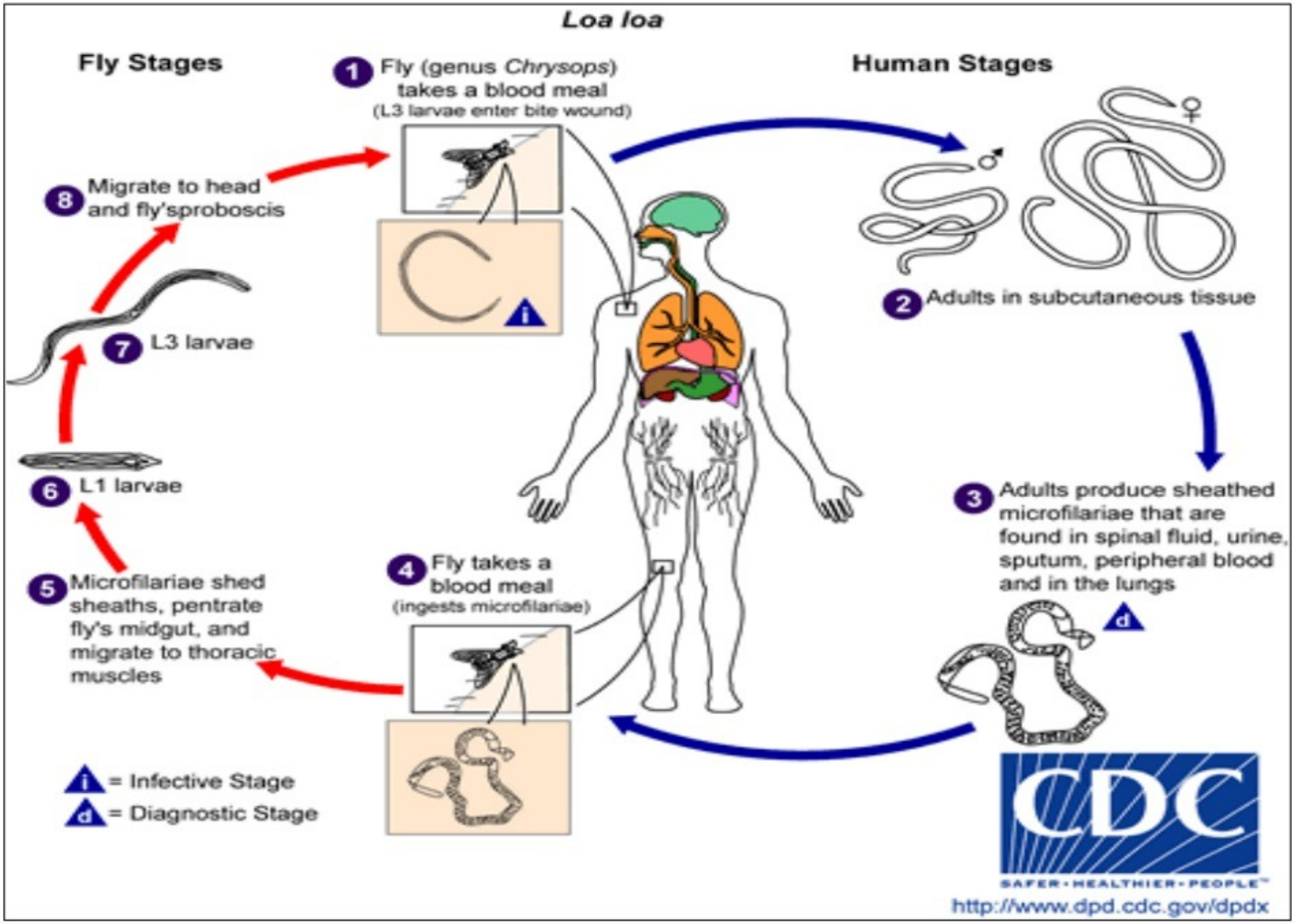
Male: 2 - 4 cm x 0.1 mm in size.

Female: 33 - 50 cm x o.3 mm in size.

Microfilaria: 300 x 9 um, **unsheathed**, **tail free of nuclei**

and have no periodicity.

Life cycle of Loa loa

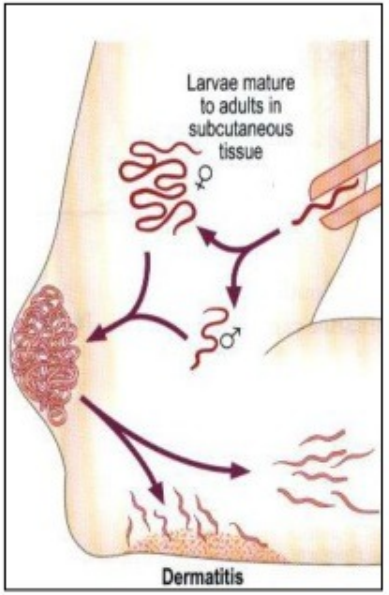


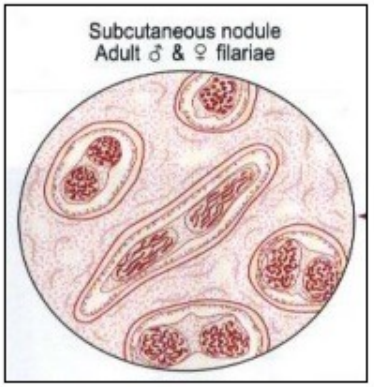
Pathogenesis & Clinical picture

Adults lie coiled in subcutaneous fibrous nodules (Onchocercoma) & do not cause any other symptoms.

The main pathogenic effect is from microfilariae

Reaction around them causes tissue damage, loss of skin elasticity and infiltration by inflammatory cells. This occurs in skin and in the eyes.



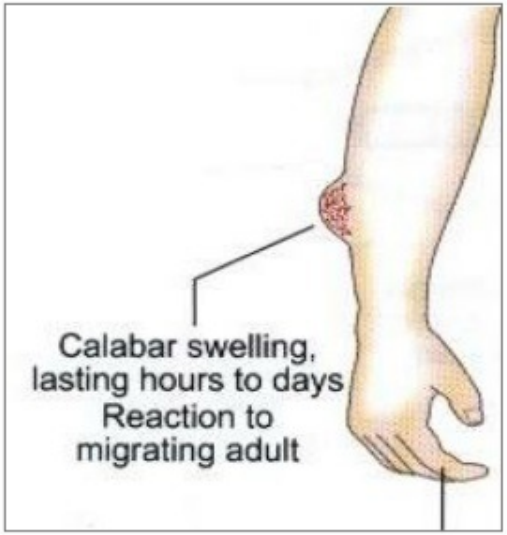


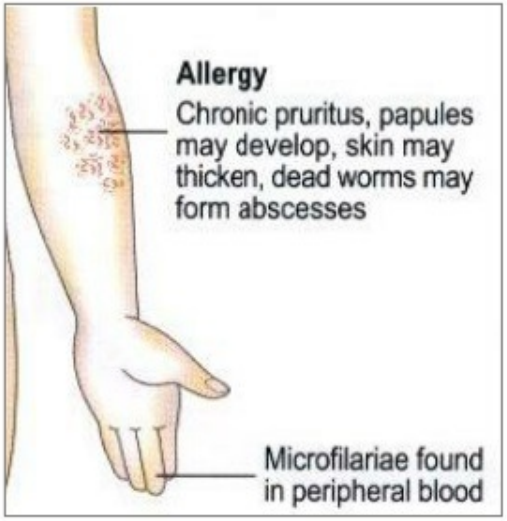
4- Calabar or fugitive swellings

These are transient cutaneous swellings, commonly observed on the hand, forearm, elbow, ankle, but may appear anywhere on the body.

The swellings are painless, itchy, non pitting about the size of hen's egg that appear suddenly & disappear within 2-3 days & reappear again (fugitive).

They are allergic in nature & never contain microfilariae or worms.





Diagnosis of Loiasis

1- Clinical

History of Calabar swelling & detection of adult worms under conjunctiva.

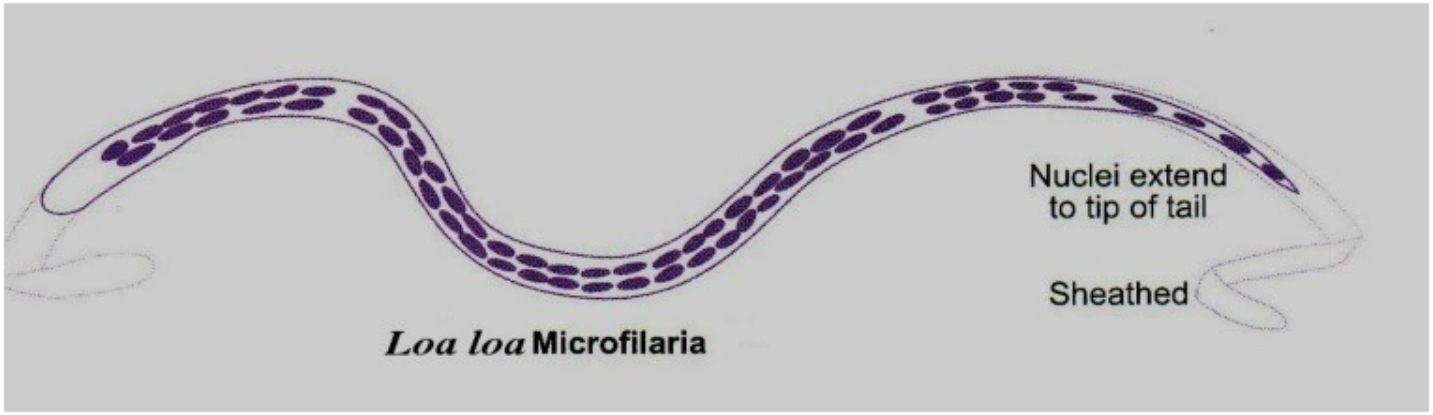
2- Laboratory

a- Detection of microfilaria in blood film prepared during the **day time**.

b- Serological tests.

c- PCR.

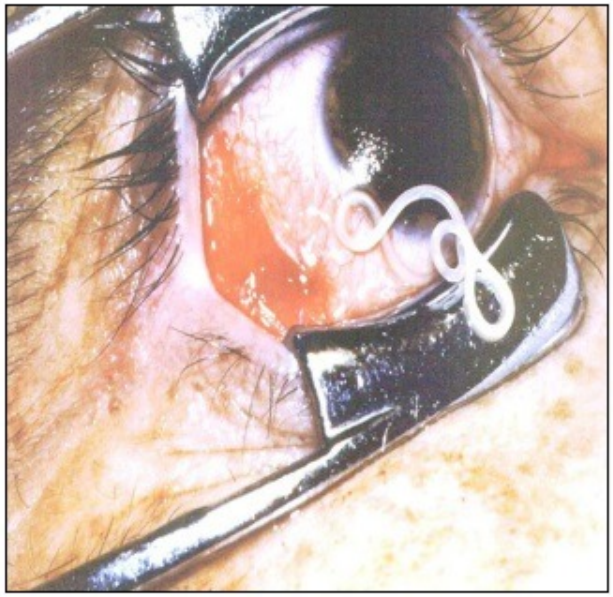
e- Eosinophilia.



Treatment

1- Similar to *W. bancrofti*.

2- Surgical removal of adult worm if seen under conjunctiva.



Prevention & control

1- Detection & treatment of cases.

2- Control of Chrysops.

Onchocerca volvulus (Convoluted filaria)

Disease: Onchocercosis, Onchocerciasis, *Onchocerca* tumour, Sudanese or river blindness.

Distribution:

Central Africa, Central & South America.

There is a small focus in Saudi Arabia & Yemen.

D.H.: Man.

I.H.: *Simulium* (black fly).

Habitat: Adult worms and microfilariae are located in nodules in subcutaneous tissues.

Morphology

Adults: White slender worms with cuticular striations.

Male: 2 - 4 cm x 0.1 mm in size.

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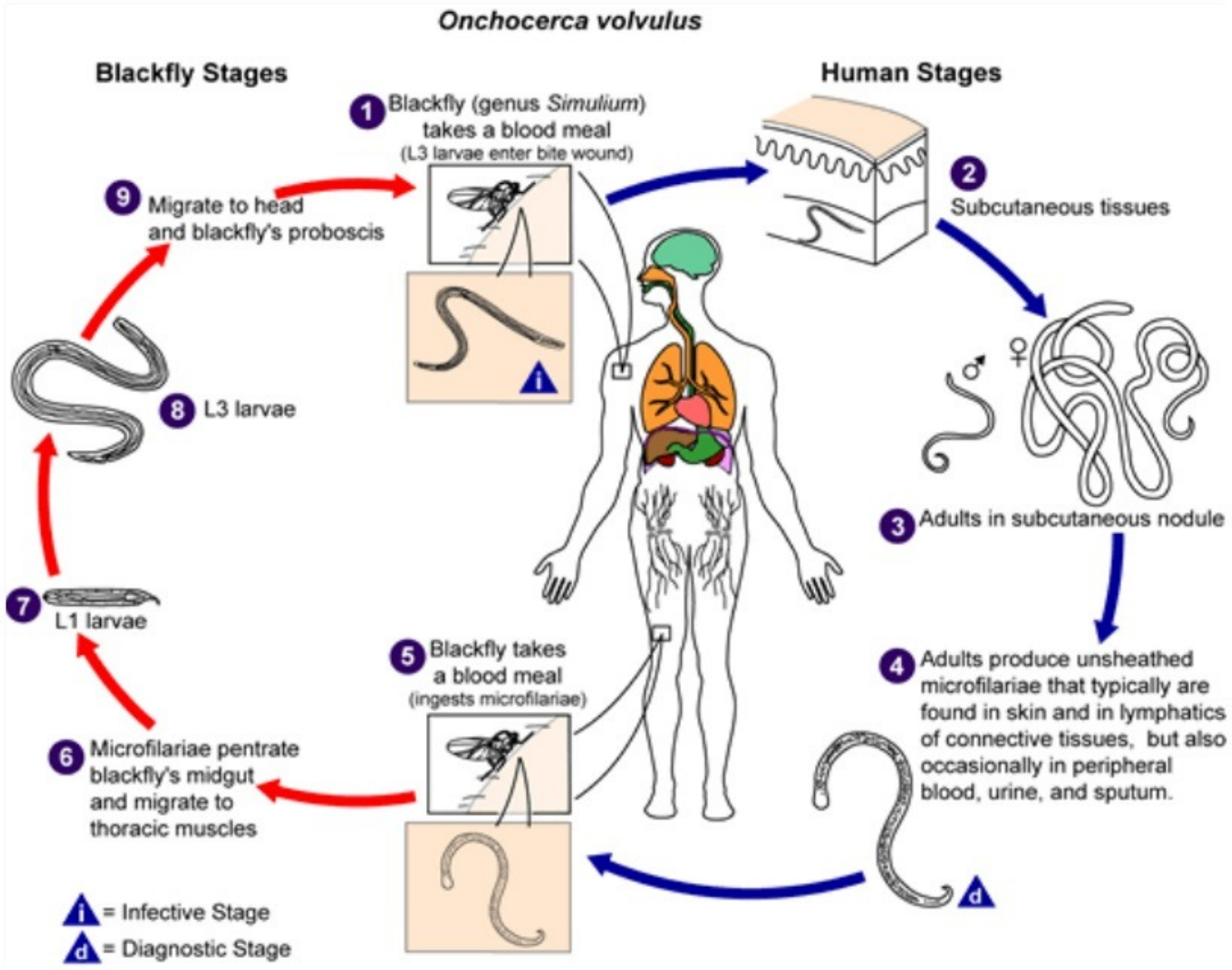
Life cycle of Onchocerca volvulus



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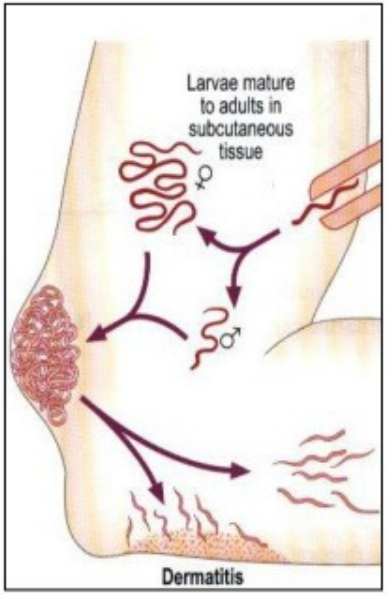
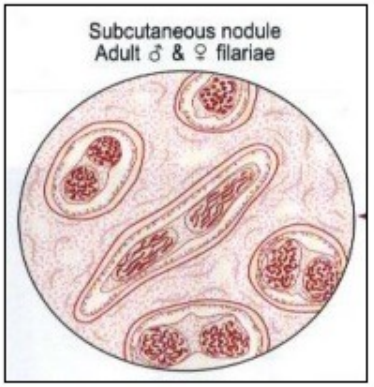
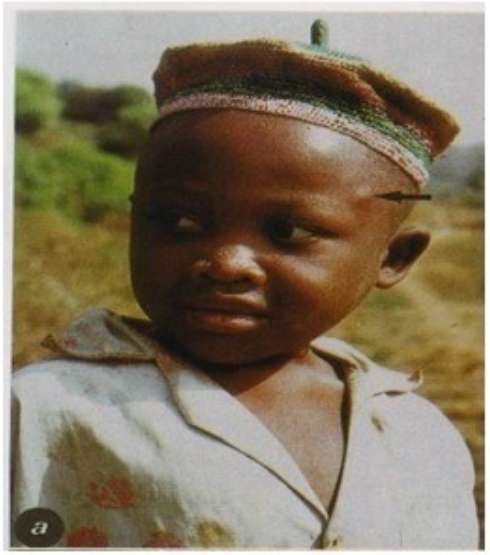




1- Onchocerca nodule (Onchocercoma)

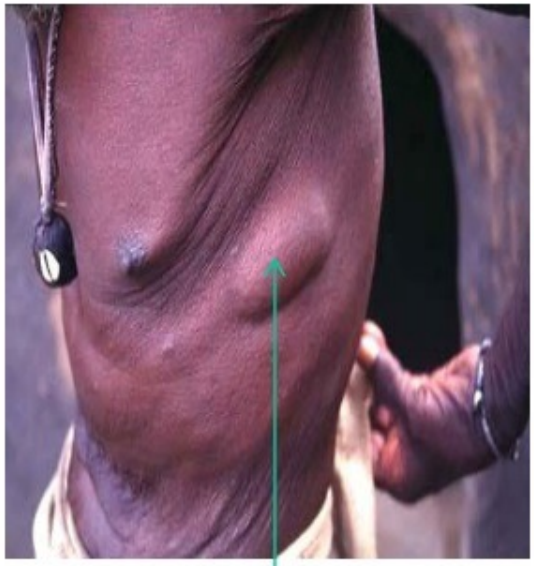
It is painless, firm, movable subcutaneous nodule, variable in size. **Mainly found on bony parts** (scalp, elbow, knee, ribs & iliac crest).

Inside lesion, adult worms and microfilariae are coiled in masses & are surrounded by tissue reaction from the host.



On scalp

On iliac crest



On ribs

2-Ocular lesions (River-Sudan blindness)

Ocular lesions are due to:

1- Toxic or allergic reactions to living and dead microfilariae.

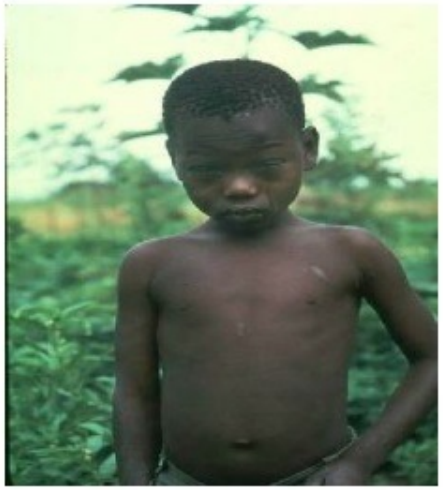
2- Migration of microfilariae from the nodules into the eyes.

Lesions:

Keratitis, iridocyclitis, optic nerve atrophy complete blindness.

Manifestations:

Photophobia, lacrimation, blurring of vision, foreign body sensation up to blindness.



River blindness

3- Skin lesions

A- In Latin Americans:

There is inflammatory skin reaction in the upper part of the body, that causes skin thickening & dark coloration. Loss of elasticity causes **premature senility** or **leonine faces.**

leonine face

B- In Africans:

It affects back, lower trunk and lower limbs. There is skin wrinkling, loss of elasticity, thickening of skin & areas of depigmentation (**leopard skin**).

Loss of elasticity in lower abdomen causes skin folding (**hanging groin**).

Premature senility

Leopard skin

Hanging groin

3- Skin lesions (Cont.)

C- In Yemen area,

skin manifestations are localized mainly in lower limbs & may be in one limb, arm or trunk as dark discoloration **(sowda),**

with inflammation, intense itching, swelling & enlargement of regional lymph nodes.

sowda

Diagnosis of *O. volvulus*

Clinical & Laboratory

Laboratory diagnosis

a- Detection of microfilariae in aspirate of nodules or skin snips.

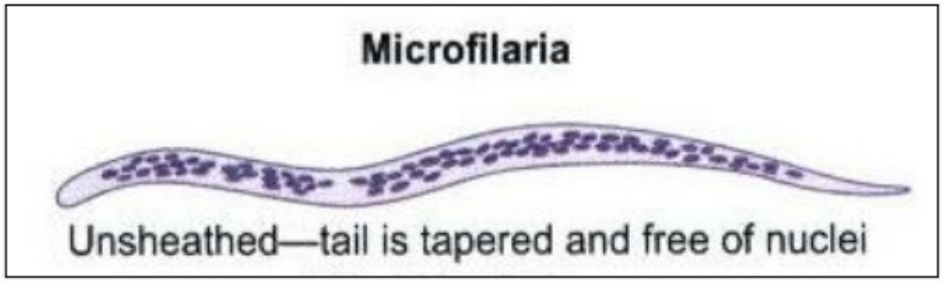
b- Biopsy of nodules for detection of adults.

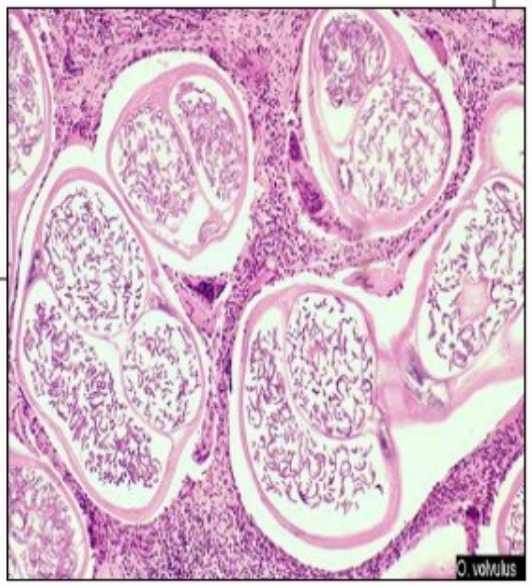
c- Infections in the eye can be diagnosed with a slit-lamp examination of the anterior part of the eye **where the larvae** or **the lesions they cause are visible.**

d- Serological test: to detect specific **antibodies**.

e- Eosinophilia.

f- Molecular techniques: PCR





Treatment of cases infected with *O. volvulus*

1- Surgical removal of nodules [Nodulectomy].

2- Ivermectin. 150 ug/Kg body weight in a single oral dose.

The recommended treatment, which will need to be given every 6 months for the life span of the adult worms **or** for as long as the infected person has evidence of skin or eye infection.

Ivermectin kills microfilariae **but it does not** kill adult worms; it impairs their fertility.

3- DEC (Hetrazan).

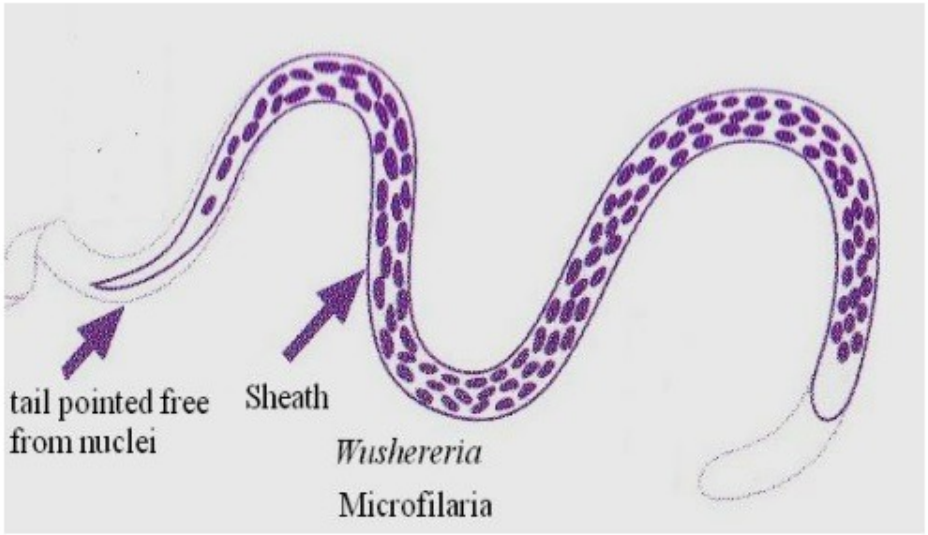
Prevention & control

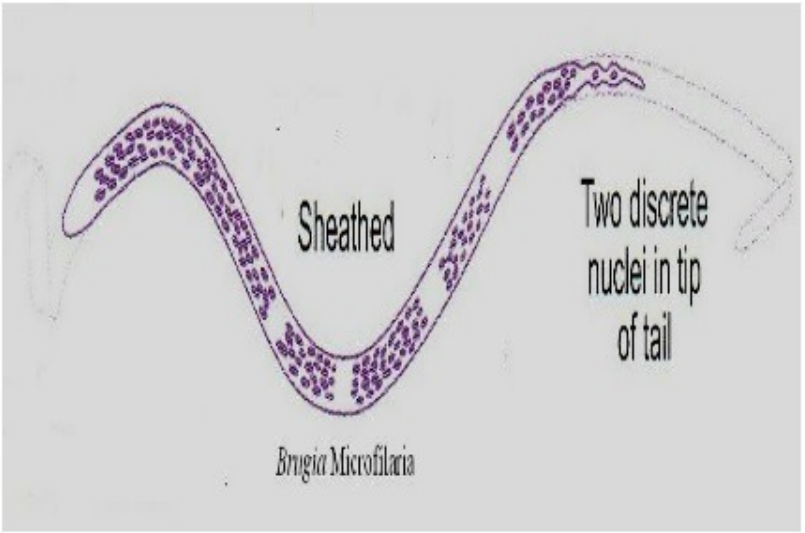
1- Treatment of patients.

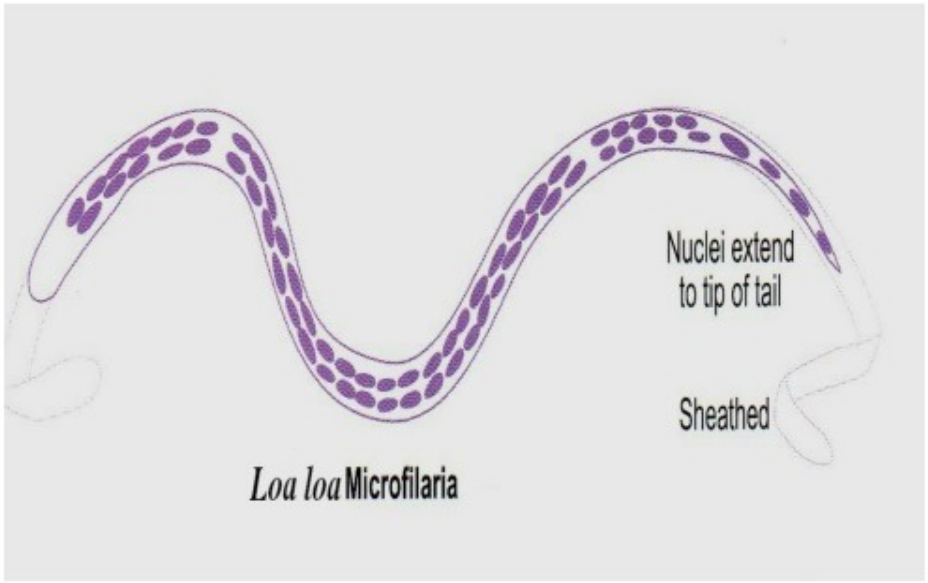
2- Vector control: Control of *Simulium* fly **is difficult** as larvae & pupae attach to **submerging rocks in river**.

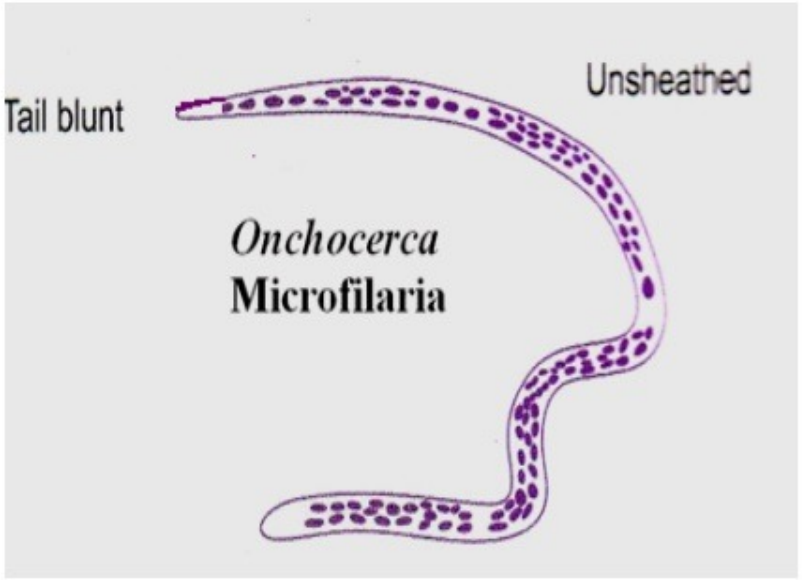
3- Personal protection by repellent, screening & insecticides.

Comparison between microfilariae
[for: Sheath, Size, Curves, Nuclei at tail].









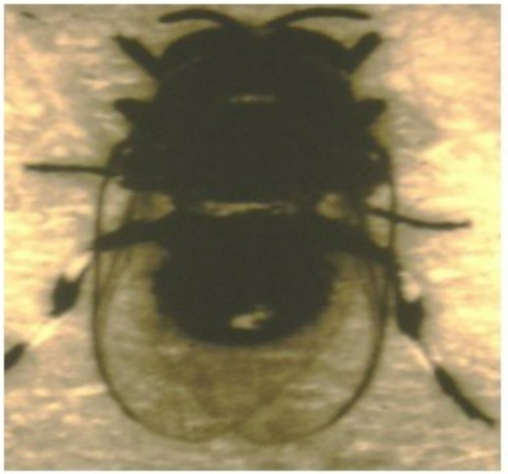
Mechanism of transmission by the vector [intermediate host] in filarial worms

In the vector, **no multiplication** of the larvae takes place, **only growth.**

One ingested microfilaria gives rise to **one** infective larva [**Cyclo-developmental transmission**].

Culex **- Mosquito**

Chrysops **- Fly**



Simulium **– Fly**