

Tikrit University

College of Nursing

Basic Nursing Sciences



Second Year - 2023-2024

Microbiology

Parasitology

Nematode Laboratory

By: assistant lecturer

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Approach Considerations

Several approaches are available to identify nematodes, from the basic traditional morphological identification methods to the more complex high-throughput sequencing technologies. The morphological and morphometric features allow identification of nematodes within their respective genus. The species can be identified based on the morphological features of the sexual organs of adult male nematodes.

The morphology of the eggs or larvae collected from feces, along with any clinical symptoms, is usually sufficient to diagnose a human nematode infection.

The detection of an antibody response mounted toward a nematode infection constitutes another frequently used diagnostic strategy. Sensitive immunological methods such as enzyme-linked immunosorbent assay (ELISA) are useful to detect antibodies in the serum.

Molecular methods are effective for identification of nematodes. Polymerase chain reaction (PCR)–based methods and multiplex PCR have provided solutions in problems related to differential diagnosis.

Laboratory Studies

Laboratory studies are as follows:

Stool examination for intestinal nematodes using native, zinc sulfate flotation, or formalin-ethyl acetate sedimentation techniques (based on characteristics of eggs or larvae in stool or adult worm, if passed; cellophane-tape impression for pinworms)

Examination of larvae or adult worms taken from the tissue, characteristic microfilariae on blood smear, eosinophilia

Filariasis - Membrane filtration technique, Knott technique, and thick blood smear (Giemsa stained)

Distinction of species by larval examination - Challenging and may require expert examination; fecal culture of at least 1 week necessary to identify, for example, the first-stage (L1) or the infective third-stage (L3) larvae in order to differentiate between the human hookworms (*A duodenale*, *N americanus*) and *S stercoralis* nematodes

Onchocerciasis - Identified by skin snip/biopsy showing larvae

Toxocariasis - Enzyme-linked immunosorbent assay (ELISA) and, occasionally, biopsy

Trichinosis - Muscle biopsy and ELISA

Dirofilariasis - The definitive diagnosis is obtained after worm removal using microscopic examination

Anisakiasis - Latex-based agglutination, immunofluorescence, indirect hemagglutination, complement fixation, immunoblotting, and ELISA

Angiostrongyliasis (rat lungworm disease) - Eosinophilia in blood (>5%) or cerebrospinal fluid (CSF) (>10%).

Imaging Studies

Imaging studies are as follows:

Larvae in sputum or adult worms observed on radiologic studies (uncommon)

Lung radiography for Löeffler syndrome

Ultrasonography - Useful in the diagnosis of ascariasis as a cause of biliary tract disease.

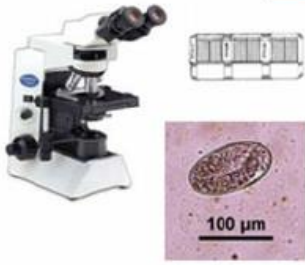
Other Tests

Onchocerciasis: Skin snip, nodulectomy, slit-lamp examination, and Mazzotti test are helpful.

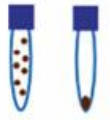
Histologic Findings

Characteristic eggs, worms, or larvae in tissue.

1. Coproscopy



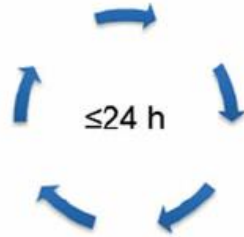
2. Washing



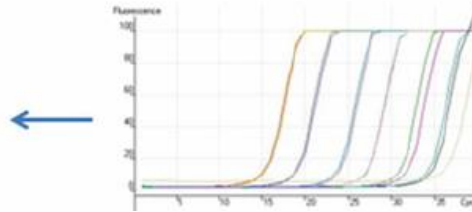
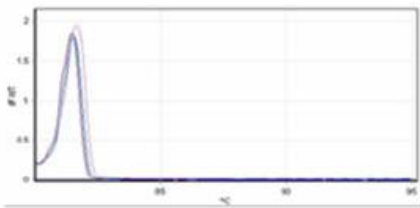
3. DNA isolation



4. Real-time PCR and melting-curve analyses



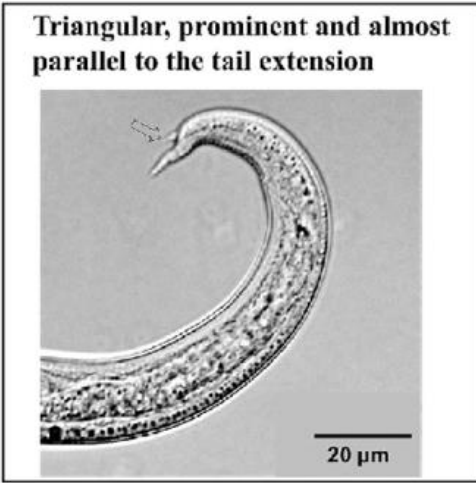
5. Analyses of results



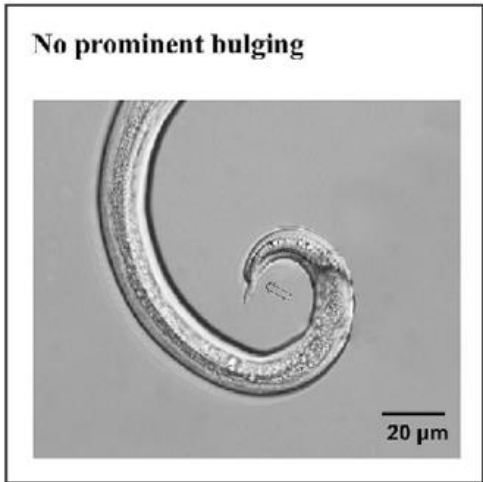
Parelaphostrongylus andersoni

Varestrongylus eleguneniensis

1. Dorsal spine morphology



2. Start of tail extension



3. Tail spike morphology

