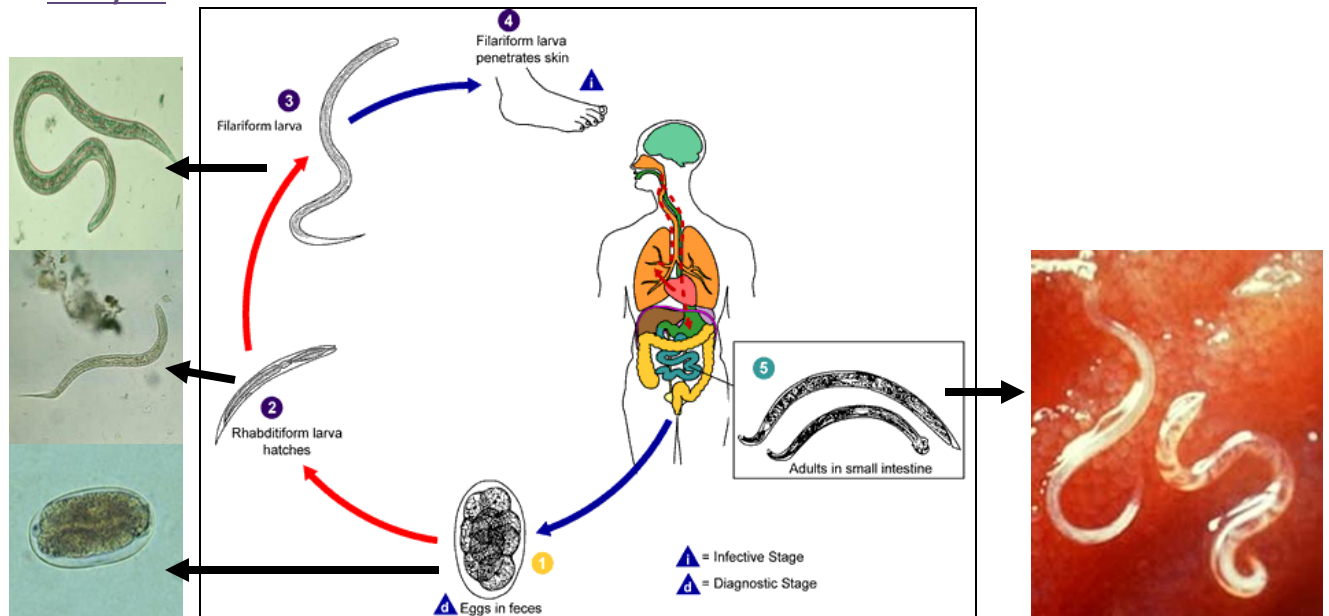
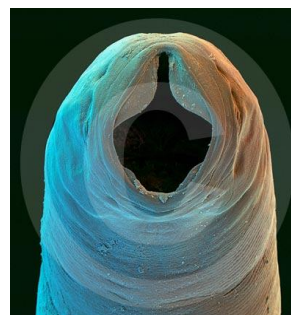




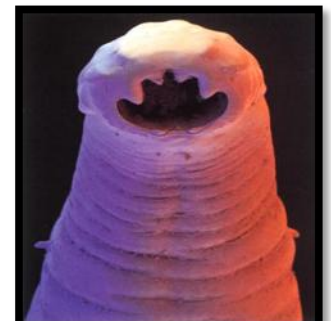
- **Epidemiology:**
  - 800 million people in tropical & subtropical countries are infected with *Ancylostoma duodenale* & *Necator americanus*.
  - 65,000 deaths annually from these two hookworms.
- **Geographic distribution:**
  - They are the 2<sup>nd</sup> most common helminthic infection (after ascariasis) and they are distributed in areas with moist (رطب), warm climate.
  - *Necator americanus* is found in the Americas and Australia.
  - *Ancylostoma duodenale* is found in middle east, north Africa & southern Europe.
- **History:**
  - Ibn Sina discovered the worm in several of his patients in the 11<sup>th</sup> century.
  - Angelo Dubini is the modern-day discoverer of these worms.
  - Theodor Bilharz found these worms in autopsies.
- **Life cycle:**



(1): eggs pass with feces to the environment (this is the diagnostic stage). (2) & (3): eggs will hatch producing larvae which will grow in the environment. (4): the larvae are going to enter the human body by penetration of the skin where they will go to the general circulation and then to the heart, lungs & small intestine (infective stage). (5): adults are found in the small intestine where they will produce eggs that will pass with feces.



N.Americanus



A.duodenale

- **Laboratory diagnosis:** identification of eggs in the stool. The procedure is as follows:
  - Collect a stool specimen & fix it in 10% formalin.
  - Concentrate using formalin-ethyl acetate sedimentation technique.
  - Examine a wet mount of the sediment.

Note: when this procedure cannot be applied, a direct wet mount examination is adequate to detect moderate to heavy infections.
- **Clinical features include:** iron deficiency anemia accompanied by cardiac problems – GI & nutritional symptoms – ground itch caused by hookworm that infect animals but not humans – respiratory symptoms.
- **Treatment:** albendazole or mebendazole.

