

# Life cycle of schistosoma haematobium biology essay

[Science](#), [Biology](#)



Schistosoma haematobium is a digenetic trematode that causes Schistosomiasis. Adult males and females are located in the vesical venous plexus. The female fluke lays about 30 eggs per day. The eggs containing ciliated embryos travel to the lumen of the urinary bladder and are eliminated from the host by micturition where it reaches the water supply (Coon, 2005). In water, the eggs hatch to form the 1st stage larva called miracidium which infects the intermediate host snail (Mitрева, 2012). Inside the liver of the snail, the miracidium sheds its cilia and develops into sporocyst. After two weeks, sporocyst matures into redia which in turn produces cercariae. Four weeks after the initial penetration of the miracidium, the fully developed fork-tailed cercariae is released into the water where it can infect a definitive host by skin penetration. Once in the human host, the cercariae enter the bloodstream where they reach the lung in about 4 days and then migrate to the liver to mature into blood flukes (Coon, 2005). Three weeks later, the flukes travel to the vesical venous plexus to copulate. Fasciola hepatica is a hermaphroditic liver fluke that causes Fascioliasis. Being hermaphroditic means that they multiply by self-fertilization since they have both male and female structures. This parasite primarily infects sheep, goats and cattle but humans can also be infected as an accidental host. Operculated eggs are laid in biliary passages by mature flukes and excreted in the faeces of infected animals. In water, these eggs hatch into ciliated miracidia (Aksoy et al., 2005). To be infective, the miracidium penetrates its intermediate host, the freshwater snail. Once in the snail, multiplication takes place to produce sporocytes, which then matures into redia and eventually cercariae. Unlike in *S. haematobium*, its

cercariae have unforked tails. *Fasciola hepatica* life cycle differ from that of *S. haematobium* in that its cercariae is enclosed by a cyst on aquatic vegetation and develop into the metacercariae instead of entering host directly through skin penetration (Ozer et al., (2003). The metacercaria are then ingested by sheep, cattle or humans (Aksoy et al., 2005). In the host, the metacercariae excyst in the duodenum, perforate the intestinal wall, enter the peritoneal cavity and then travel to biliary passages where they mature into adults in about 3 months (Alatoom et al., 2008).

**Describe the differences of pathogenesis and clinical features between *Trichinella spiralis* and *Trichuris trichiura*. (5 marks)**

*Trichinella spiralis* is an intestinal nematode that causes Trichinosis. It is commonly found in undercooked pork products. Majority of trichinosis infections have either minor symptoms such as mild diarrhoea and nausea or no symptoms. The clinical features of trichinosis can be classified based on the stages in the worm life cycle. The two main phases are the enteral phase which involves any affects on the intestines and the parenteral phase which involves infection outside the intestines such as the muscle (Capo & Despommier, 1996). In the early phase of helminthic infection, when the larvae excyst and invade the epithelium of the gastrointestinal tract, it induces a type I hypersensitivity reaction, leading to the production of high levels of mast cells, eosinophils, and parasite specific IgE (Bruschi & Murrell, 2002). Therefore, the first week of the enteral phase in patients with moderate to severe infection is associated with upper abdominal pain, diarrhoea or constipation, vomiting, malaise, and low-grade fever which last

only a few days (Capo & Despommier, 1996). Two to six weeks after infection, symptoms that are linked to diarrhoea and vomiting subside but the enteral phase is still present. At this time, symptoms due to the migratory stage of the larvae where it migrates and invades muscle cells, develop (Olaison & Ljungstrom, 1992). These symptoms include facial oedema, conjunctivitis, fever, headache, skin rash and paralysis of the muscles. In severe infections, complications such as endocarditis, myocarditis, and even cardiac failure can occur due to the damaging effects of this migratory phase (Capo & Despommier, 1996). After the second week of the parenteral phase of infection, most patients tend to develop specific serum antibodies against the secreted antigens of the larvae. In spite of this, the larvae remain in the host for months to years before complete recovery. Over the years, the muscle larvae in the muscles are slowly destroyed by the specific serum antibodies and calcified (Bruschi & Murrell, 2002). *Trichuris trichiura* is a whip worm that causes trichuriasis when it infects the large intestines in humans. Infection with this parasite is normally asymptomatic unless infection is heavy. After ingestion of eggs by humans, they hatch in the small intestine where the larvae then migrate to the caecum. In the caecum, the larvae burrow into the mucosal surface resulting in allergic symptoms, diarrhea, vomiting, weight loss and increased blood and iron loss in moderate infections while bloody diarrhea with mucus, abdominal pain, severe anaemia and rectal prolapse can be detected in severe infections (Stephenson et al., 2000). In addition, masses of worms may block the lumen of the appendix or cause inflammation of the epithelium of the caecum, appendix and colon leading to appendicitis and colitis (Stephenson et al.,

2000). Unlike *T. spiralis*, infection with *T. trichiura* does not commonly cause eosinophilia.

**Read the journal article below and critically discuss (300-500 words):**

**the significance of the objectives (4 marks)**

The main objectives of this paper by Booth et al. (2013) is to gain information regarding the current laboratory practices followed in the testing of human papillomavirus and at the same time create consensus best practice guidelines for quality assurance in gynecologic cytopathology. The detection of HPV precursors at an early stage is important in decreasing the occurrence of cervical cancer in women. Over the past 50 years, papanicolaou tests have reduced the occurrence of cervical cancer tremendously (Saslow et al., 2002). However, it seems that the used of human papillomavirus (HPV) testing as a testing strategy in the prevention of cervical cancer is becoming more common (Schiffman et al., 2011). Therefore, the significance of these objectives is that as the HPV testing continues to evolve in its uses in gynaecologic cytopathology, the consensus guidelines acts as a measure of laboratory quality so as to improve the performance and cost-effectiveness of HPV detection (Lörincz, 2003). By carrying out this survey, it helps review the potential clinical applications of HPV testing which are: triage of women with low-grade cytological abnormalities, follow-up of abnormal screening results and primary screening of HPV test for the detection of precursors of cervical cancer (Cuzicka et al., 2008).

**the impact of its outcomes on good laboratory practice in gynaecologic cytopathology. (6 marks)**

The unavoidable move to HPV-based cervical cancer prevention strategies would cause a disruption in the current gynecologic cytopathology laboratory practices. The impact of this paper's outcomes on good laboratory practices in gynecologic cytopathology is that it aids in the decision making process in diagnostically difficult situations (Murphy et al., 1999). Laboratories that do not follow any guideline tend to add unnecessary costs and contribute to delayed and potentially harmful clinical decisions. By collecting information on the latest laboratory practices, it provides a clearer picture on how to handle cases of low risk human papillomavirus patients so that no unnecessary test is performed. It also determines when HPV testing should and should not be ordered. Based on good laboratory practices, the performance of individuals in the laboratory and the laboratory as a whole should be monitored and compared against national benchmarks in order to determine the performance of the laboratory. Additionally, all HPV test results of the past 5 years should also be documented in detail so as to allow for future retrieval of information if ever needed.