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How can I avoid disease? - Bilharzia

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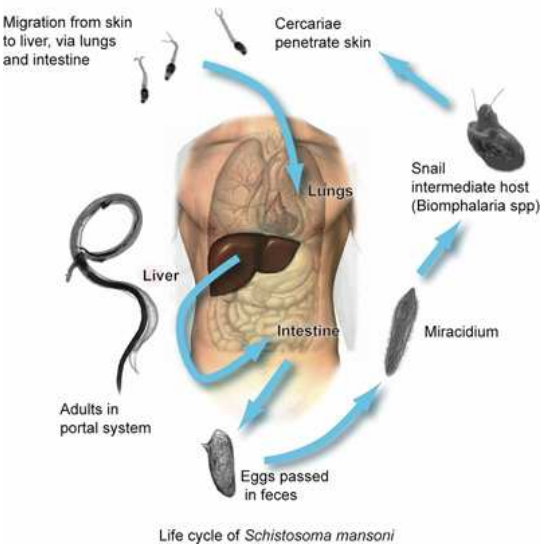
Schistosomiasis, commonly known as snail fever, bilharzia and bilharziasis, is a disease caused by parasitic worms. It is the mostly deadly NTD – neglected tropical disease – affecting millions of people each year around the world. Even with a low mortality rate, schistosomiasis is only second to malaria in terms of having a great social, economic, and health impact in tropical regions of the world, and also as the most common parasitic disease among humans.

Schistosomiasis is caused by a pathogen, which is basically a disease-producing agent. The term 'pathogen' is generally used to directly refer to infectious organisms; for example, a virus, a bacterium, or fungi. There are several ways where pathogens can enter a human body; mainly by air respiration, water contact or ingestion, soil contact and animal contact or bite. Diseases, illnesses characterized by a patient's symptoms and physical findings, are sometimes confused with pathogens and the difference is that diseases are what pathogen *causes.* Our bodies often destroy pathogens before it really causes anything.

The main forms of human schistosomiasis are caused by five different species of flatworms, known as schistosomes: Schistosoma mansoni (causes intestinal schistosomiasis), Schistosoma intercalatum, Schistosoma japonicum (causes Asian forms of intestinal schistosomiasis), Schistosoma mekongi (causes Asian forms of intestinal schistosomiasis) and Schistosoma haematobium (causes urinary schistosomiasis). People get infected when they come into contact with contaminated ponds, streams and rivers inhabited by snails

carrying the parasite. It is also common in local waterways polluted with human waste. Normal daily activities for domestic, personal and professional can lead to infection, such as swimming, bathing, fishing, irrigation, rice cultivation etc. Human schistosomiasis is confined to freshwater, and therefore cannot be acquired from saltwater. All ages are at risk for infection, whether travelling or living at endemic areas and freshwater exposure. Individuals at increased hazard include children under the age of 14, laborers with domestic chores centered around freshwater areas, adventure travelers, Peace Corps volunteers, missionaries, soldiers, and ecotourists.

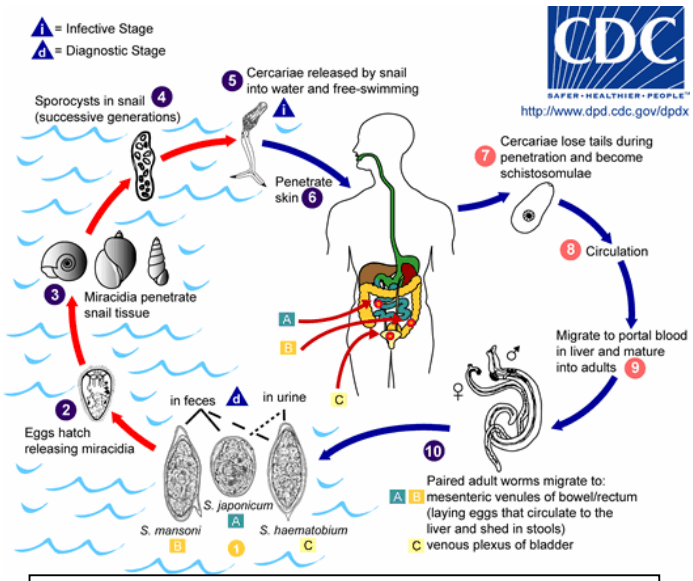
Schistosome parasites have a very complex life cycle, involving many steps. Like an average parasitic worm, they require at least 2 hosts to complete their life cycle. Once entering the snail (the 1st host) through the head or foot, the larvae undergoes a development in the digestive gland of the snail, producing thousands of new parasites. This stage inside the snail host takes between 4-6 weeks. A single snail can release up to 3000 cercariae every day, the resulting parasites, into the freshwater, all capable of infecting human. They remain alive for up to 48 hours and in order to continue, they must penetrate human skin vulnerable in the water not beyond this period of time. Once finding an exposed human body's skin (the 2nd host), the larvae burrow into the skin in only a few seconds and migrate in the body system from the skin capillaries to the lungs, heart and then finally the liver in 7 days or so. By the time the parasites reach the liver, they mature and form into pairs of adult worms (12 to 16 millimeters in length), a male protecting the female inside his ventral groove. The entire process takes around 45 days and



Life cycle of *Schistosoma mansoni*

http://www.sandler.ucsf.edu/diseases.html

the worms then live together in the blood vessels. The average life expectancy of an adult worm inside a body is 5 years, however can also be up to 20 years. The worms fuels on red blood cells and nutrients, for example sugars and amino acids. This can cause anemia and reduced protection towards other diseases. Female worms will release thousands of eggs which pass out of the body depending on where they are located. If the worms are situated near the bladder, the eggs will invade the bladder wall and are disposed in urine. If in the intestinal blood supply, they will attack the intestine walls and removed in the faeces. However, about 50% of the eggs become trapped in the body and thus, harmful towards many vital organs, including the bladder and the intestines. In the case when people urinate or defecate in freshwater, the eggs then migrate to snails where they eventually hatch and begin the cycle all over again. It is the eggs and not the adult worms responsible for the symptoms of schistosomiasis.



http://www.dpd.cdc.gov/dpdx/HTML/Schistosomiasis.htm

Each species of schistosome cause slightly different symptoms, depending on the kind worm involved and the location of the parasite inside the body, but all of them severely damage the liver and other organs. The incubation period is typically 14–84 days for acute schistosomiasis. Usually, a rash, the ‘swimmer’s itch’, develops within hours or up to a week after contaminated water exposures. It is often to be the only symptom. Muscle pain, headache, diarrhea, fever, vomiting, coughing, frequent, painful and bloody urine are also common problems and can come within a month of the infection. Untreated snail fever may cause deadly urinary system or liver inflammation and scarring, bladder tumors and

bowel cancer. Children who are recurrently infected can develop anemia, malnutrition, learning difficulties and distended bellies. Seldom, seizures, paralysis, or spinal cord inflammation can also be brought by eggs found in the brain or spinal cord. However, a single dose of praziquantel has been shown to reduce the severity of symptoms in those re-infected with the disease

There are few defenses that the body provides against the schistosomiasis pathogen. An inflammatory reaction will be produced around each egg, but the inflamed tissue will then harden and block blood and lymph vessels, causing problems for the human body. No vaccine in preventing infection is available at the moment; nevertheless bilharzia can be treated with a variety of drugs. As mentioned above, praziquantel is a common treatment and is most effective against adult worms, requiring an immune reaction to be fully effective. It may cause headaches, tiredness, vomiting, loss of appetite and increased sweating as side effects, yet it will kill the majority of parasites within the bloodstream. Despite that, some worms will possibly survive and developing larvae that are not altered by the drug can rebuild the infection. Other problems are that the adult worms are much bigger in size than the white blood cells and they can imitate their host by covering themselves with the host's molecules. Also, praziquantel is often too expensive for most infected yet underprivileged people and so, Ethiopians took advantage of a specific plant, endod, which can be used to kill snails. The berries helped lower snail populations in river systems and therefore, reduced disease. In rare cases, corticosteroids are given when the infection is relatively serious or involves the brain,

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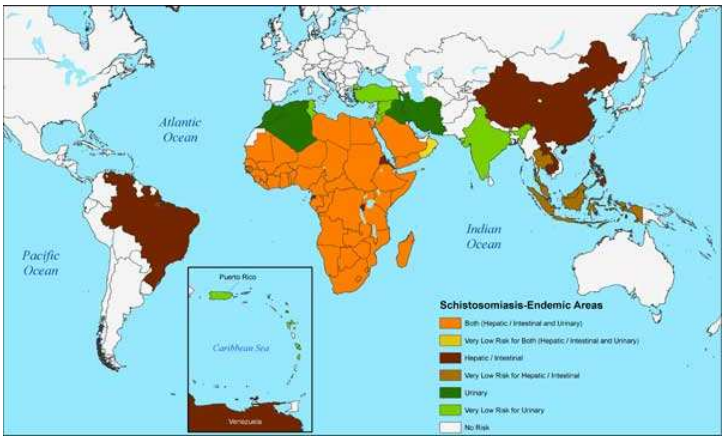
Bilharzia is not a typical disease where people become immune to once cured. It is because pathogenic schistosomes are very capable of evading one's immune system and surviving for long periods of time in the bloodstream. Also, it would not be practical to invariably re-treat whole communities. Thus, re-infection is very common for those who live near contaminated rivers and streams. Death, however, is not as ordinary as schistosomiasis is only fatal if left untreated. Estimates imply that mortality amounts in Africa at 280,000 per year out of millions with clinical symptoms. Usually intestinal damage caused by eggs wedged in tissues inside the body and bleeding from abdominal blood vessels are the reasons in causing the body system to fail. Regardless, it is mainly on account of bladder cancer (in relationship with urinary schistosomiasis) and bleeding from varicose veins in the oesopahagus (in relationship with intestinal schistosomiasis), as mentioned before. If the host does not pass away, long term effects may occur in the body if he/she has been infected for an extended period of time. This includes spinal cord inflammation, paralysis and seizures from eggs in the spinal cord or brain. (Andy Crump, 2004)



http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter5/schistosomiasis.aspx

Schistosomiasis is wide spread around the world. Different types of the disease are found in respective regions, but it is prevalent mainly in Africa (where about 85% of the world's cases exist), the Eastern Mediterranean, the Caribbean and South America. Some specific forms of intestinal schistosomiasis can be found in a number of Asian countries, including China and Japan. The distribution of schistosomiasis is quite central and is concluded by the residence of snails, insufficient

sanitation, and diseased humans. Most often, developing countries with less-advanced sanitation systems become areas with commonly-found bilharzia, as the cleanliness of the waters affect greatly on the growth of the snails. Poverty, poor sanitary conditions and inadequate public health infrastructure are also the qualities for a region to become infected easily.

Bilharzia has an extensive association with economic factors as it is very economically damaging towards many infected countries and societies. This is not because of the cost of medicines needed and the development of vaccinations, but because it makes an impact on factory workers and similar employees around the world. As praziquantel is available for purchase for 8¢ (HK$0.6) per tablet, it is considered inexpensive compared to other medicines. However, in parts of Brazil, Egypt and Sudan, rural workers' work capacity has been predicted to be severely weakened, due to the disease. In infected areas of South-East Asia, the standards working for China became about 28% disabled and for Japan 10%. As for the Philippines, 4 % of significant cases were categorized as serious and 39% as mediocre. (W. H. Wright)

There are little complications, especially cultural, ethical or religious ones, in stopping the disease being wiped out. Nonetheless, the disease of schistosomiasis and its spread around the world relates greatly to social issues. As many people who take refuge near the contaminated rivers often live in unfortunate conditions, they would also have to use the waters for everyday activities, like fishing, washing and cooking. That is a main reason to why schistosomiasis continues growing. Another is because the public, especially ones living at risk, knows very little about the disease. In societies too poor to develop advanced sanitation systems of

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rivers and streams, hundreds of people would still bathe in the infected waters without much care to their health. This is why recently, education campaigns about the risks of bathing in fresh water have been organized to raise awareness among people. Also, refined water quality, snail population control and treatment of infected people have started to make good accomplishments in endemic areas, involving China, Brazil, Egypt, and Africa.

Schistosomiasis, also known as bilharzia or snail fever, is a disease produced from the schistosomiasis pathogen. Despite being considered widespread, it is found mainly in parts of Africa where water sanitation is not developed. There are different types of schistosomiasis; all exposed from contaminated waters and each can cause various symptoms, some fatal, some not. It can be treated from the drug praziquantel, however still causes big impacts on the economy of societies and is affected from social issues. In order to avoid this disease, we should be cautious when travelling in infected regions and always keep one's hygiene in mind.

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