Yellow fever

Science, Biology

Yellow fever is caused by the flavivirus (PHAC and is from the family flaviviridae (Robertson 1993). It gets the term yellow by causing yellowing of the eyes and skin related to liver damage (PHAC 2010, WHO 2011). It is a small virus that contains single-stranded RNA encapsulated by a lipid membrane (Robertson 1993) and can be rendered inactive by " lipid solvents (ether, chloroform), heat (56 degrees Celsius for 30 minutes), and ultraviolet light" (Robertson 1993, p 1, ¶ 3). It is similar to the " West Nile virus, St. Louis encephalitis virus, and Japanese encephalitis virus" (CDC 2010, section ' Yellow fever virus transmission'). The virus is spread by mosquitoes in tropical regions of South America and Africa (CDC 2010, PHAC 2010, PubMed Health 2009, WHO 1993, WHO 2011). It replicates inside the mosquito (WHO 1993) and after being bitten by an infected mosquito, symptoms usually occur within three to six days (CDC 2010, PubMed Health 2009, WHO 2011). There is no treatment of yellow fever, but the focus is on symptom management and vaccination (WHO 2011). Many difference species of the Haemogogus and Aedes mosquitoes are vectors or hosts that act as a vessel to spread the flavivirus that causes yellow fever (WHO 2011). It can be transferred between monkeys, between people, and from monkeys to humans (WHO 2011). Mosquitoes can be classified as domestic, wild, or semi-domestic and there are three main transmission cycles (CDC 2010, PHAC 2010, WHO 2011). In the first cycle known as the sylvatic yellow fever (or jungle), monkeys are infected by mosquitoes who then pass on the virus to mosquitoes that bite them. The vector-infected mosquitoes then bite humans that are near jungle regions who may or may not get yellow fever (CDC 2010, WHO 2011). In the second cycle called intermediate yellow fever,

mosquitoes infect both humans and monkeys in the jungle and around households (CDC 2010, WHO 2011). This type of outbreak commonly occurs in humid regions of Africa and can become an epidemic if the infection is introduced in communities with unvaccinated people and domestic mosquitoes (WHO 2011). In the last cycle, urban yellow fever, infected people cause epidemics when they bring the virus into highly populated communities where the residents are not immune and the infected mosquitoes transfer the virus between people (WHO 2011). Yellow fever has three stages: early stage, remission stage, and intoxication stage. In the early stage, a person experiences generalized symptoms such as a headache, anorexia, vomiting, fever, and muscular and joint fatigue. Symptoms usually go away temporarily after three to four days and this is where a person enters the remission period. Infected persons usually recover in this period, but others may progress to the third stage within one day. The intoxication stage is where multi-organ failure occurs and can lead to bleeding, brain dysfunction, and eventually death. Symptoms of yellow fever include “ bleeding, fever, headache, jaundice, muscle fatigue, decreased urination, arrhythmias, confusion, red eyes, vomiting, bloody vomit, seizures, and coma” (PubMed Health 2009, section ‘ Symptoms’). Yellow fever occurs mainly in tropical regions of South America and Africa. Generally speaking, viral reproduction is increased with humidity, temperature, and rainfall due to higher number of mosquitoes in these conditions. In South America, yellow fever virus is transmitted more in forest regions instead of urban populations and has been reported in the Amazon and grassland regions. Bolivia and Peru have had the highest occurrence within the last 20 years.

The virus has re-emerged in urban areas in South America since the occurrence in 2007 (CDC 2010). In South America, the countries considered to have the greatest risk of contracting yellow fever include Bolivia, Brazil, Colombia, Ecuador and Peru. Several Caribbean islands are also at low risk for epidemics. Countries at risk for yellow fever in Africa are typically situated on or around the equator. Yellow fever is not endemic in Asia, however since both the mosquitoes and the non-human primates are present in different parts of Asia, there is potential for future epidemics. (PHAC 2010, section ‘ Where is yellow fever a concern?’) In South America, incidences of yellow fever virus increases with higher rainfall, temperature, and humidity. Majority of the outbreaks occur in West Africa where 30% are infected and three to four percent present with yellow fever. In West Africa, the flavivirus reproduction increases in the rainy seasons (CDC 2010). Since yellow fever has general symptoms, especially in the early stage, and can be mistaken for other diseases such as malaria and viral hepatitis, it is hard to diagnose (WHO 2011). Our body produces antibodies when a foreign organism invades our body and causes an infection so a blood test can identify these antibodies (WHO 2011). There are other methods that can detect the virus in a dead liver cell (WHO 2011). Yellow fever has no definitive treatment and is based on symptom management (CDC 2010, PHAC 2010, PubMed Health 2009, WHO 2011) such as blood transfusion for excessive bleeding, fluid resuscitation for dehydration, and dialysis for renal insufficiency (PubMed Health 2009). The best way to prevent yellow fever is to avoid travelling to regions with endemic and epidemic cases of the yellow fever virus, but if a person wishes to travel to these regions it is advisable to be vaccinated ten

to fourteen days prior to travelling (PubMed Health 2009). The vaccine is effective, safe, affordable, offers protection for up to 35 years, and can provide immunity within seven days for about 95% of people vaccinated (WHO 2011). A person should sleep indoors with a good ventilation system, use repellents, and wear long sleeve shirts and long pants to decrease exposure to the skin (PubMed Health 2009). If sleeping outside, use a bed net that is sprayed with insecticide. Ensure that there are no holes in the netting and that it is not touching the skin because this way a person can still be bitten (PHAC 2010). If a person experiences symptoms such as fever, muscles aches, jaundice, vomiting, or headache after returning from an endemic region, he/she should call their family doctor (PubMed Health 2009).

Literature Cited [CDC] Centre for Disease Control and Prevention. 2010 July 30. Yellow fever vaccine. Recommendations of The Advisory Committee On Immunization Practices (ACIP). Morbidity and mortality weekly report (MMWR). Available from: http://www. cdc. gov/mmwr/preview/mmwrhtml/rr5907a1. htm? s_cid= rr5907a1_e. Accessed 2011 July 21. PubMed Health. 2009 Dec 1. Yellow fever. Available from: http://www. ncbi. nlm. nih. gov/pubmedhealth/PMH0002341/. Accessed 2011 July 21. [PHAC] Public Health Agency of Canada. 2010 Mar 12. Yellow fever. Available from: http://www. phac-aspc. gc. ca/tmp-pmv/info/yf-fj-eng. php. Accessed 2011 July 21. [WHO] World Health Organization. 1993. Module 8: Yellow fever. The Immunological Basis for Immunization Series 93(18): 1-11. Available from: http://www. who. int/vaccines-documents/DocsPDF-IBI-e/mod8_e. pdf. Accessed 2011 July 21. [WHO] World Health Organization. 2011 January. Yellow fever fact sheet.

Available from: http://www. who. int/mediacentre/factsheets/fs100/en/.

Accessed 2011 July 21.