Ebola virus paper – microbiology assignment

Introduction Bola virus which causes Bola hemorrhagic fever, was first recognized in 1976 in Zaire, now Democratic Republic of Congo, and Sudan. It is named after the river Bola in Zaire. The virus has five known subtypes named after the location where they were first identified and caused disease: Bola Sudan, Bola-Buoying, Bola- Zaire, Bola-Ivory Coast and Bola-Restore. (CDC. Gob) Bola-Restore is the newest subtype and was identified in research macaques imported from Philippines to Virginia in 2004 and later in Texas in 2006.

It was discovered that the research animals in both cases were from the same site in the Philippines where Guiana pigs were also found to have been infected with the same strain. (CDC. Gob) While Bola- Ivory Coast and Bola-Restore do infect humans, symptoms as manifested by infection with other subtypes is not seen nor have any human deaths been reported. (Lee and Sapphire, 2009) Bola-Zaire and Bola-Sudan are the most lethal with mortality rates upwards of 90% and 61% respectively. (CDC. Gob) Bola virus is classified as a Class A baptisteries agent and one that must be handled bio-safety level 4 labs.

Research of Bola virus requires trained refashions and facilities with rigorous levels of control to access. (CDC. Gob) Like other viruses, the survival and spread of Bola is dependent upon the host organism. At this time, the natural reservoir is not known which complicates containment and prevention of acquisition of Bola. There are hypotheses that a non-primate is the host organism. Recent research points to fruit bats as the possible host carriers as the virus and viral antibodies are found in them though they do not exhibit any symptoms.

Research continues in attempting to discover the natural reservoir so transmission prevention mechanisms may be implemented. The virus is not known to be native to continents other than Africa and Philippines in Asia. (CDC. Gob) Bola virus poses a considerable public health concern due to recent emergence of new subtype, high mortality rate associated with it, concern of possible misuse of the virus and lack of antiviral or vaccines. (Swarm, 2011) Pathologically Bola virus belongs to the Fluoridate family of viruses which also includes the very similar Marabou virus.

It is an enveloped virus and is characterized by a long filamentous structure which can present as straight, branched, circular or folded trans with a uniform diameter of approximately 80 NM but variable in length. It specifically targets, endothelial cells, liver cells, interruptions and macrophages. Infected cells produce large amount of cytokines which solicits a huge response from the immune system and disrupts normal behavior of liver, kidneys, respiratory system, skin and blood. Hammer, 2012) “ Bola virus is a non-segmented negative strand RNA genome containing 7 structural and regulatory genes. The Bola genome contains four virgin structural proteins and three membrane associated proteins. ” (CDC. Gob)The viral non tutorial secretors globetrotting, SSP, is produced in large quantities early in infection. This globetrotting binds to interruption receptor and inhibits its activation and the body’s innate immune response at large. A non secretors envelope globetrotting, GAP, binds to endothelial cells but not to interruptions. It is known to destroy endothelial cells which is associated with disseminated intramuscular coagulation. This may contribute to the hemorrhagic manifestations of Bola. ” (Lee and Cook, 2013) The receptor of

host cell on which the globetrotting attaches to is still being researched. The virus enters the host cells through endometriosis where it replicates and synthesizes its proteins. It exits the cell with host cell membrane including its proteins enveloped around it. (Lee and Cook, 2013) Bola virus is classified as economic as transmission of it can be from animals to humans.

It can also be passed from human to human and is contracted through direct contact with bodily fluids of infected person. Endemic level of infection in mid to late ass was seen both in Sudan and Zaire due to lack of sanitation of reusable needles and improper barrier techniques. Still today, in poor African countries here clinical sites are unsanitary or where sanitary hospital practices are not used, Bola is often transmitted from patients to their caregivers. Many cultures have burial rituals which include cleansing of the dead body prior to burial.

The bodies of people who have died of Bola are still contagious and many family members unknowingly acquire the virus through this process. (Swarm, 2011) Many of the large Bola endemics were contained only after implementing strict quarantine and preventing family members from performing these rituals thus limiting their exposure to the virus. In some African countries, “ bush meat” is considered a delicacy. Eating or butchering infected animals can spread the virus. (WHO. Into) Clinical Manifestations The incubation period for Bola virus is 2 to 21 days.

The infected person is not considered contagious during the early stages of incubation period but as the illness progresses, bodily fluids are considered extremely bio-hazardous. Virus isolation and antigen-capture enzyme-linked

misbegotten assay testing can be used to diagnose Bola. (CDC. Gob) The onset of symptoms is sudden and usually confused with other common viral infections such as flu. They include fever with or without chills, soar throat, severe headaches, chills and Joint and muscle aches. (CDC. Ova) Over time, symptoms become severe and include red eyes, nausea and vomiting, raised rash and bleeding from mucous membranes. Blood fills the intestines, bladder, spilling out from nose, eyes and mouth. The terminally ill may manifest rapid breathing, hypertension and coma. (monoclinic. Com) Medical Management There is currently no antiviral drugs proven effective for treatment of Bola. Supportive care is usually given to infected people in hospital settings. This includes maintaining adequate blood pressure, replacing blood loss, providing fluids and treating any other infections that may develop.

Heparin injections are also part of treatment plan in attempt to restore the anticoagulation doctor in DOD. Care must be provided with strict isolation barriers to prevent spread of virus. Death comes soon after infection, typically within 7-10 days, due to multiple organ failure and virus induced septic shock. (monoclinic. Com) There have been total 1800 reported infections of Bola, 1300 of which resulted in death. For those who survive this disease, recovery can be slow taking months to again strength. People may experience hair loss, headaches, fatigue, liver inflammation and sensory changes. WHO. Into) The virus remains in the body weeks after clinical symptoms may subside. Sexual transmission can occur as the virus has been detected in semen 7 weeks into recovery from Bola. (Swarm, 2011) There is much research going into developing a vaccine for Bola. Some clinical

studies have shown vaccines to be effective for rats and macaques. This point to subjects being vaccinated against virus and developing both a cell-mediated response and a humeral antibody response. Medicine) “ Antibodies that are in survivor sera appear to preferentially recognize SSP over GAP .