**[Trypanosoma lewisi, the potentially lethal trypanosome]**

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**[Abstract: Parasites that possess the ability to be infectious to humans are often closely watched in order to keep medicines abreast with the mutations of parasites in hopes of preventing these organisms of becoming totally resistant to treatment. Some of the most detrimental parasites belong to the genus *Trypanosoma* such as: *Trypanosoma cruzi, Trypanosoma brucei rhodesiense*, and Trypanosoma brucei gambiense. With these parasites being the cause of Chagas disease and African Trypanosomiasis, the predominately rat-dwelling parasite Trypanosoma lewisi has went unnoticed due to previous beliefs that this parasite is rat-specific and poses no serious threat to human life. However, recent studies show that in comparison to the other *Trypansoma* species, *T. lewisi* possesses the ability to resist up to 90% of human serum whereas the other species can only survive the serum in extremely low concentrations (.0001%) or lack the ability to survive at all. *T. lewisi* isolated from Thailand and China have proven to be resistant to human serum and reports of human infection by are slowly increasing**

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**Introduction**

Trypanosomes are unicellular parasitic protozoans that can be dwellers of insects, plants, birds, bats, fish, amphibians, and mammals. Trypanosomes have been around for an estimate of 300 million years and with time they have become very fit and have the ability to adapt to their environment with ease. The most commonly feared trypanosome is *Trypanosoma cruzi* and *Trypanosoma brucei gambiense. Trypanosoma cruzi* is the causing parasite of Chagas disease. Chagas disease causes many symptoms such as fever, congestive heart failure, swollen glands, cardiac arrest, and liver or spleen enlargement. *Trypanosoma gambiense* also causes a lethal disease known as African Trypanosomiasis (Sleeping Sickness Disease) which causes fatigue in muscles and joints, neurological abnormalities, and skin rash. Both of these diseases can result in death if not treated within the a few months.  Sleeping sickness threatens more than 66 million people in sub-Saharan Africa, whereof ten million in Uganda, killing more than 100 people a day. Not only does sleeping sickness affect humans it also threats populations of cattle. Three million cattle deaths occurred and an estimate of 4 billion per year is spent on cattle reproduction (“Human African Trypanosomiasis”). On the other hand, *Trypanosoma lewisi* is a rat parasite that is transmitted by fleas and is thought to only reside in rats but recent reports show that *T. lewisi* is now present in humans and has the potential to cause lethal diseases considering the fact that they are more resistant to human serum than the other trypanosomes mentioned above ("East African Trypanosomiasis FAQs."). Human serum is blood plasma obtained from all blood type groups in order to act as an immune system booster in order to fight off foreign bacteria and other pathogens (Human Serum, Normal). According to recent findings it has been shown *that T. lewisi* are highly resistant to normal human serum and can survive in concentrations as high as 90%.

Recent Progress

Nineteen Trypanosoma lewisi trypanosomes extracts were isolated from China and Thailand and were observed for features such morphology and DNA sequence comparison and it was shown that there was no difference between T. lewisi found in rats. All nineteen isolates were tested in 10% normal human serum all were resistant. In comparison to Trypanosoma cruzi, which could not survive in .0001% normal human serum, it is easy to conclude that T. lewisi has a much better chance at surviving in the human body. In contrast to African trypanosomes, T. lewisi does not exhibit antigenic variation and is therefore progressively eliminated by the immune response of its natural hosts. According to recent reports infections caused by T.lewisi in humans are increasing. Once infected by T.lewisi the number of parasites populations and diversity increased dramatically and all who were infected showed symptoms of high fever and high fatigue. Also, cases of infected infants by Trypanosoma lewisi have been reported; infants have much more fatal symptoms than adults. In infants symptoms such as anemia, cough, anorexia, edema as well as central nervous system invasion were present in each case (Zhao-Rong Lun).

Discussion

Every day the world and the organisms in it are evolving and we fail to realize that even the organisms that appear to have no negative effects on us today could evolve and become a lethal epidemic tomorrow. Now that we know that *T. lewisi* has the potential to evade the human body and survive with ease we now need to find the medical advances in order to prevent them from becoming even more resistant. Although such infections are quite rare in the United States it is possible for an epidemic to occur. It is evident that this species has the potential to be just as dangerous as the other species of *Trypanosoma*

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