Rocky Mountain Spotted Fever

**Background**

Dr. Lutter is a professor at Oklahoma State University. She has her Bachelor of Science in Biochemistry, Master of Science in Microbiology and Infectious Diseases, and her PhD in Cellular and Molecular Microbiology. She received her all these degrees in Canada then moved to Montana for her Postdoctoral studies in Laboratory of Intracellular Parasites. She has been at Oklahoma State University since 2014 teaching Microbiology, Recent Advancements in Microbiology, and Pathogenic Microbiology. She has over 16 publications the first one being published in 2001. One of her more recent publications included studying different strains of *Rickettsia rickettsia.*

**Introduction**

*Rickettsia rickettsii* causes the disease Rocky Mountain spotted fever. Cases of this disease have been reported all over the United States, but most are in Oklahoma, Arkansas, Missouri, North Carolina, and Tennessee. This disease is caused by the bite of a tick. It commonly causes a rash, fever, stomach problems, headache, and muscle pain. If not treated this disease can become deadly. Early action of antibiotics is recommended for adults and children. Prevention includes EPA registered insect repellents, protective clothing, and showering soon after being outdoors.

**Study**

Dr. Lutter studies the different strains focusing on their virulence. Which. Is the severity of the disease. The strains include Sheila Smith, R, Morgan, Sao Paulo, HLP7421 and Iowa. Guinea pigs were infected with these strains. It was difficult to study the virulence factors previously due to the lack in genetic systems in *R. rickettsii .* The first main difference was between “ *R. rickesttsii* Shelia Smith strain and the avirulent *R. rickesttsii* Iowa strain, including the absence of rickettsial outer membrane protein A (rOmpA) from the avirulent *R. rickettsia* Iowa, the number of polymorphisms make it difficult to ascertain which are responsible for the variation in virulence between the two strains” (Clark). To better study the different strains genomic DNA purification, comparative genome sequencing, alignment, and annotation, plaque cloning, transposon sequencing, western blotting, multilocous sequence alignment, and nucleotide sequence accession number were used to understand the virulence. Whether or not the guinea pig developed a fever and how severe of a fever was another observation the help determine the virulence. After the guinea pigs were infected they were monitored for 14 days with their body temperatures being tested daily. The guinea pigs that were infected with the Iowa strain had the healthiest results by not producing a fever. The guinea pigs infected with the HLP7421 strain produced a minimal fever. The guinea pigs infected with the Morgan and the Sao Paulo strain only produced a slight fever but more than the HLP7421. The guinea pigs infected with the Sheila Smith strain produced the worst fever.

**Conclusion**

This study was important because it is now known how to better treat each of these strains. Once the strain is identified a doctor will know how severe the infection can get and therefore be able to treat the infection and the common symptoms. Dr. Lutter was able to show the difference in infection and give proof that the different strains can cause different infections.

Citation Page

Clark, T. R., Noriea, N. F., Bublitz, D. C., Ellison, D. W., Martens, C., Lutter, E. I., & Hackstadt, T. Comparative Genomic Sequencing of Rickettsia rickettsii strains differing in virulence. Infect Immun. 2018 Feb 2. pii:IAI.03140-14.