**Research in Rickettsia at Oklahoma State University**

OSU prides itself in many fields of academia. OSU has many opportunities that go beyond the classroom such as research. In every college, almost each and every department has faculty and students leading research projects. The department of Microbiology and Molecular Genetics consists of many faculty with multiple research projects. One professor in particular is Dr. Edward Shaw. He is an associate professor of this department and has had a vast number of publications. One in particular, “*’Rickettsia amblyommii*’ and *R. montanensis* Infection in Dogs Following Natural Exposure to Ticks” shows real promise for Rickettsia infections.

Rickettsia is a genus of bacteria that has several strains such as *rickettsii, prowazekii*, *amblyommii*, and *montanensis*. Rickettsia is a causative agent of Rocky Mountain spotted fever. The vectors for this infectious disease are ticks, fleas, and lice. Rocky Mountain spotted fever is very rare but ticks are very prevalent in Oklahoma. The infectious disease is characterized by a rash, headache and muscle aches and it can be fatal if untreated.

Dr. Susan Little at OSU’s Vet school has a passion for vector borne pathogens. She teamed up with Dr. Shaw to work with Rickettsia. Their study consisted of 10 beagles, blood samples, indirect fluorescence antibody and PCR technology.

The 10 beagles were kept out at Lake McMurtry and walked in certain paths. During these walks, ticks would naturally infect the dogs. Blood samples would be taken twice a week. The course of the ticks being on the dogs would allow the dogs to build antibodies to the bacteria. The ticks themselves were inspected to see what type they were.

Polymerase Chain Reaction (PCR) technology was used to identify the DNA of the particular bacteria. The PCR showed that Rickettsia was present in the ticks. For the Indirect Fluorescence Antibody (IFA) technology is a process where the serum from the blood of the dogs was tested. The various bacteria strains were placed into wells and then killed with an agent such as ethanol to make the proteins immobile. The serum from each dog was diluted into titers that measured how diluted they became. The serum samples were injected with a fluorescent antibody. This antibody would bind to the particular bacteria and light up. The more diluted the serum that showed the fluorescence, the stronger and more specific the immune response. This means if a particular serum from a dog had a high-diluted titer that showed fluorescence for Rickettsia rickettsii then the dog was infected with Rickettsia rickettsii from the ticks.

*Rickettsia amblyommii* and *Rickettsia montanensis* are two of the more avirulent strains. This means they are not likely to cause any noticeable symptoms. The results of this study showed that the more diluted titers were from these two strains than the more virulent strain *Rickettsia rickettsii*.

The antibodies from the two less virulent strains could show promise for the defense against *Rickettsia rickettsii*. The three strains from this study are very close. The promise for the future could be a study that involves injecting dogs with the two less Rickettsia strains and then seeing if it defends them against *Rickettsia rickettsii*. Dr. Shaw says he wants to continue research with Rickettsia to see if there is a way to protect people from the virulent strain of Rickettsia.

Sources:

<https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/rickettsial-spotted-and-typhus-fevers-and-related-infections-including-anaplasmosis-and-ehrlichiosis>

 Barrett, Anne, Shaw, E. I., and Little, S. E. Rickettsia amblyommii and R. montanensis infection in dogs following natural exposure to ticks. Vector Born Zoonotic Diseases Epub Dec. 2013. In print Jan.2014