

2018 SPARK AWARDS – CYCLE 1

6 MONTH PROGRESS REPORTS



Immune response to *Strep pneumoniae* Catherine Crosby, Ph.D.

The primary focus of my SPARK project is to characterize how the immune system responds to and protects us from bacteria that infect the lungs. *Streptococcus pneumoniae* is a common bacterium that is not only the leading cause of community-acquired pneumonia, but is also responsible for more serious conditions of meningitis, sepsis, and even death.

In order to develop improved therapies, our strategy has been first gain a global understanding of how a healthy individual combats *S. pneumoniae*. In the first six months of this project, I have focused on investigating the immune cells, specifically the invariant natural killer T cells (iNKT), which respond within the first 15 hours of infection in mice. We know that iNKT cells respond very early to pulmonary *S. pneumoniae* infection and are critical for survival, but we still need to understand why.

Thus far I've used SPARK funding to locate iNKT cells in the lungs by microscopy, determine which parts of the lungs they reside in, and identify cells that they interact with both before and after infection. Our preliminary data has shown that a specific type of dendritic cells is important for activation of iNKT cells and that they almost exclusively cluster along major airways, and are sparse in small alveoli. In uninfected mouse sections, iNKT cells are found similarly located and in close proximity or directly in contact with these dendritic cells.

When infection occurs, our data has shown that the dendritic cells take up the *S. pneumoniae* bacteria, which could have potential implications for presentation of antigens to activate iNKT cells.

The next steps will be to use the remaining SPARK funds to further optimize our view of iNKT cells to help determine if: 1) the dendritic cells are interacting with the iNKT cells during an infection and specifically where this interaction happens; and 2) where the activated iNKT cells are localized within the lungs during infection.