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THE QUICK AND THE DEAD: FUNGAL INFECTION AND IMMUNITY IN A HIBERNATING HOST

Dr. Marianne Moore, NIH IRACDA Postdoctoral Scholar, Department of Ecology & Evolution, Stony Brook University

The emergent bat fungal disease known as white-nose syndrome (WNS) is predicted to cause the extinction of two North American species, however, other species in the WNS-affected area are surviving and even thriving. My research uses blood-based functional tests to describe immune responses in the highly susceptible little brown myotis (Myotis lucifugus) and shows that bats from WNS-affected sites respond immunologically during hibernation, a time when natural immune suppression occurs to conserve energy. Extreme mortality, scant evidence of inflammation in the skin where the fungus invades, and the cost of mounting observed responses suggest these responses may actually contribute to mortality. I have also used experimental infection trials and immune system challenges to test for differences in susceptibility and immunity between two bat species differentially impacted by WNS. Results show that the big brown bat (Eptesicus fuscus) is more resistant to WNS compared with the little brown myotis, which may be explained by a more rapid, robust skin immune response. My current research combines functional tests with high throughput proteome sequencing to describe the nature of remnant bat populations in the WNS-affected area. Specific immune proteins identified using this approach may lead to an effective, host-derived control.