Lynn Bimler, PhD
Postdoctoral Fellow
Baylor College of Medicine

Developing a Chronic Model of Candida albicans cerebral mycosis Through Gut Colonization

Lynn Bimler is a postdoctoral fellow in the lab of Dr. David Corry. For her PhD, Lynn worked in the laboratory of Dr. Silke Paust at Baylor College of Medicine studying a novel vaccine and therapies directed towards the M2e peptide of influenza. Through her work on this project, her interest in pathogen-host interactions and aging increased. Leading to her current focus on developing a chronic murine model of Candida Albicans induced cerebral mycosis to determine its relationship to the pathogenesis of Alzheimer's Disease.

Abstract: Recent evidence suggests that Alzheimer's Disease (AD) is linked to fungal brain infections. We have previously established an acute model of cerebral mycosis by intravenously (IV) injecting the pathogenic yeast Candida albicans. The resulting infection induces mild transient memory deficits and fungal induced glial granulomas (FIGGs) consisting of microglia and amyloid β (aβ) deposits surrounding yeast aggregates. This structure essentially duplicates AD's characteristic senile plaque. AD involves numerous senile plaques and tauopathy that presumably accrue over many years potentially from chronic infection. This raises the key possibility that C. albicans might persist in a remote tissue, such as the intestines, from which it periodically mobilizes to chronically re-infect the brain. As both C. albicans colonization of the GI tract and low-level candidemia deriving from the GI tract have been documented in humans, we hypothesize that chronic C. albicans enteritis leads to low-level transmission of fungal cells into the bloodstream and persistent cerebral mycosis. To test this hypothesis and establish a more translationally relevant chronic model, we administered yeast from C. albicans to wildtype C57BL/6 mice via oral gavage. Live yeast are recoverable from the brain as soon as 2 days post gavage and out to at least two months. Additionally, these colonies were polymicrobial, consisting of both yeast and bacteria, an observation that is consistent with recent published analysis and our own cultures of AD brains. Through this study we will establish if this infection produces an AD phenotype. This research is groundbreaking for the AD field, producing an unprecedented model that could be used for critical AD therapeutic and mechanistic studies.