



MMI 291 Seminar Series

Current Theme: Interdisciplinary Research
Spring Quarter 2021 – CRN 51367

Friday Seminar – 12:10-1 p.m.

“One Strep at a Time: New Advances in Understanding and Controlling the Fish Pathogen *Streptococcus iniae*”

Research / Bio

Streptococcus iniae is one of the primary agents of piscine *streptococcosis*, a pervasive disease that costs the global aquaculture industry billions of dollars in annual losses. Treatment by antimicrobial administration and prevention by vaccination have had limited success in controlling *S. iniae*. The primary obstacle for developing sustainable control strategies is a lack of understanding regarding the genetic and antigenic diversity of *S. iniae* in relation to its pathogenesis. This research aimed to elucidate the genetics, ecology, and infection dynamics of strains from varied isolation sources with translatable results for aquaculture. I developed a multilocus sequence analysis (MLSA) scheme to understand the genetic relationships between diverse isolates and uncover shared phenotypic and virulence characteristics. Characterized strains from different genetic backgrounds were assessed for their ability to form biofilms, and for the role of biofilms in environmental persistence and resistance to treatment and disinfection. Finally, live-attenuated vaccine candidates were generated from representative strains from North American clades by rifampin passaging. Candidate strains were attenuated in virulence and elicited a protective immune response in tilapia, demonstrating potential for development into safe and effective vaccines to control *streptococcosis* in aquaculture.

Publications

Heckman TI, Soto E. (2021) *Streptococcus iniae* biofilm formation enhances environmental persistence and resistance to antimicrobials and disinfectants. *Aquaculture*. 540: 736739. <https://doi.org/10.1016/j.aquaculture.2021.736739>

Heckman TI, Griffin MJ, Camus AC, LaFrentz BR, Morick D, Smirnov R, Ofek T, Soto E. (2020) Multilocus sequence analysis of diverse *Streptococcus iniae* isolates indicates an underlying genetic basis for phenotypic heterogeneity. *Dis Aquat Org*. 141:53-69. <https://doi.org/10.3354/dao03521>

Pierezan F, Shahin K, **Heckman TI**, Ang J, Byrne BA, Soto E. (2020) Outbreaks of severe myositis in cultured white sturgeon (*Acipenser transmontanus* L.) associated with *Streptococcus iniae*. *J Fish Dis*. 43(4): 485-490. <https://doi.org/10.1111/jfd.13145>



May
28



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May 28, 2021
12:10 – 1 p.m.
ZOOM Meeting

Medical Microbiology
& Immunology
School of Medicine

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We hope to see you there!