CHEMISTRY & BIOCHEMISTRY COLLOQUIUM:

Metal Homeostasis at the host – pathogen interface: from nutritional immunity to nutritional intoxication

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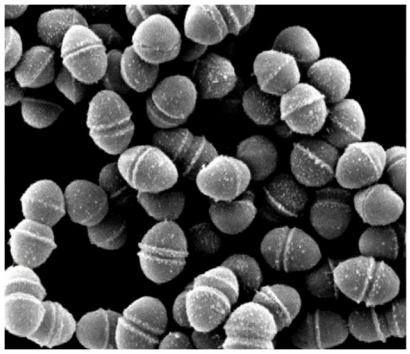
About The Speaker:

Steve Damo, is an Assistant Professor of Chemistry, Biochemistry and Molecular Biology, Chair of the Department of Life and Physical Sciences and Interim Assistant Dean of the School of Natural Sciences and Mathematics at Fisk University in Nashville, TN. His research program focuses on understanding molecular mechanisms at the host-pathogen interface with an emphasis on understanding metal homeostasis. He has a strong personal commitment to empowering the next generation of STEM leaders, especially those from historically excluded backgrounds. He earned his PhD at UC Berkeley and conducted Postdoctoral Training at Weill Cornell Medical College and Vanderbilt University. He is a Berkeley Sloan Scholar, member of the Senior Society of Ford Fellows, and a recipient of the Chan-Zuckerberg Science Diversity Leadership Award.



Date:
11/4/2022

Time:
10:30 AM - 11:50 AM

Location:
COB 110

Abstract:

Antibiotic resistance is a global health concern that causes over one million deaths worldwide. Understanding molecular mechanisms of bacterial pathogenesis and the innate immune response is critical for identifying new antimicrobial therapeutic approaches. My lab is interested in characterizing the underlying determinants of metal homeostasis with an eye toward creating new antimicrobial agents. One-third of the proteome is predicted to comprise metalloproteins. Metals are essential for all forms of life as they serve as enzymatic cofactors, structural stabilizers and chemical messengers. However, high concentrations of metals are toxic. Thus, maintenance of metal homeostasis is essential at the host-pathogen interface. For example, S100A12 is a high-affinity transition metal binding protein that starves invading pathogens and prevents them from acquiring essential zinc, in a process termed nutritional immunity. I will present recent results from my lab that sugges t zinc binding to S100A12 potentiates oligomerization and is associated with activation of inflammation through the receptor for advanced glycation end products. The importance of zinc regulation is also highlighted in the pathogenesis of the human pathogen Streptococcus agalactiae, one of the primary causes of adverse pregnancy outcomes. CadD, a metal efflux transporter is essential for S. agalactiae to resist zinc intoxication by macrophages, thereby facilitating ascending infection in a pregnant host. Together, these data demonstrate the importance of understanding metal homeostasis and provide potential pathways to overcoming antibiotic resistance.

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