Subject: Dissertation Defense - Kathryn Cassels, PhD Biosciences
Date: Friday, June 21, 2024 at 2:40:06 PM Eastern Daylight Time
From: SSB Faculty List on behalf of Diane St. Germain
To: SSB-FACULTY-LIST-L@LISTSERV.GMU.EDU

Dissertation Defense Announcement
To: The George Mason University Community

Candidate: Kathryn Cassels

Program: PhD Biosciences

Date: Monday July 8, 2024

Time: 2:00 PM Eastern Time (US and Canada)

Location: In Person, IABR Conference Room #1004
And Via Zoom
Join Zoom Meeting:

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Committee chair: Dr. Alessandra Luchini

Committee members: Dr. Amanda Still, Dr. Mikell Paige, Dr. Robert Gilman

Title: “Investigation of the Role of Major *T. cruzi* Proteins in the Detection of Chagas Disease”

Abstract:

Chagas disease (CD) is a neglected tropical disease caused by the parasite *Trypanosoma cruzi* (*T. cruzi*) and estimated to affect 7 million people globally. Cases of the disease are rapidly spreading to other parts of the world due to immigration of infected individuals from the endemic regions of South and Central America and the expansion of the insect vector's habitat due to climate change. As such, improvements in the detection and management of the disease are urgently needed. Current treatments are effective only if administered early in the course of infection and are poorly tolerated in adults. To address this problem in two ways, this work explores means of earlier detection of *T. cruzi* infection, specifically in infants congenitally infected with CD, and to characterize a poorly studied *T. cruzi* protein that seems crucial to infection and may therefore be a promising therapeutic target. First, urine samples obtained from a cohort of infants in an endemic area were analyzed using affinity concentration techniques and mass spectrometry analysis to identify biomarkers of CD. Two peptides, derived from the *T. cruzi* mucin-associated surface protein and trans-sialidase families, were identified as consistently present in the urine of infants infected with *T. cruzi*. Antibodies against these two peptides were developed, and their ability to differentiate between the urine samples of congenitally infected infants and healthy controls was validated using a group of 35 urine samples. Cases and controls were differentiated with a sensitivity of up to 89.5% and a specificity of up to 93.8%, suggesting that these antibodies could form the basis of a reliable test for CD in the target population. A competitive lateral flow immunoassay was developed as a proof of concept.

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