

November 29, 2021 1:00 - 3:00 PM

All are invited to attend the defense. For more information please contact Graduate Coordinator at

dstgerma@gmu.edu

**Candidate:** Faisal Madkhali

**Program:** PhD, Biosciences

**Date:** Monday, November 29, 2021

**Time:** 1:00 PM

**Meeting Location:** [https://gmu.zoom.us/j/91317904791?](https://gmu.zoom.us/j/91317904791?pwd=YzEvOUxTOWZoT1UyVVM2SEMwYlpOQT09)

[pwd=YzEvOUxTOWZoT1UyVVM2SEMwYlpOQT09](https://gmu.zoom.us/j/91317904791?pwd=YzEvOUxTOWZoT1UyVVM2SEMwYlpOQT09)eeting Location:

**Title:** Secreted Proteome, Nanotraps-Associated Proteins and the Role of Tul4 in *Francisella novicida*

---

**Committee Chair:** Dr. Monique van Hoek

**Committee Members:** Dr. Weidong Zhou, Dr. Patrick Gillevet, Dr. Kylene Kehn-Hall

**ABSTRACT:**

*Francisella tularensis* is an intracellular zoonotic bacterium and the causative pathogen of the life-threatening tularemia. Because of its high infectivity and low infectious dose, *Francisella* has been classified as a category A select agent. Although previous studies have explored the secreted proteins (secretome) and proteome of *Francisella*, but there is still need to identify the truly secreted proteins and the effectors of *Francisella*. In this work, we combined the protein predictors tools along with the experimental approaches to identify the truly secreted proteins of *Francisella* after we removed out the outer membrane vesicles from the supernatant. We reported 88 secreted proteins in total, 24 of the 88 secreted proteins are predicted to have secretory signal peptide. We also applied Nanotraps particles on the whole lysate of *Francisella* and we successfully identified 44 proteins bound exclusively in the Nanotraps, most importantly CN1010 Nanotraps trapped and enriched at least five pilus assembly proteins. Because Tul4 lipoprotein was found bound to CN1010 Nanotraps, we investigated the effect of Tul4 mutation on *Francisella* and we reported no difference in the generation time between the wild type and Tul4 mutant. We also reported that Tul4 mutation has a small effect on both Levofloxacin and Polymyxin B sensitivity, but we noticed no effect on Gentamicin sensitivity. Lastly, our data also showed that Tul4 mutant showed no significant intracellular replication, demonstrating that Tul4 (*lpnA* gene) is important for *Francisella novicida* U112 in the process of intracellular replication.