



# Investigating the Role of dUTPase-1 in the Iron Acquisition of *Bacillus anthracis*

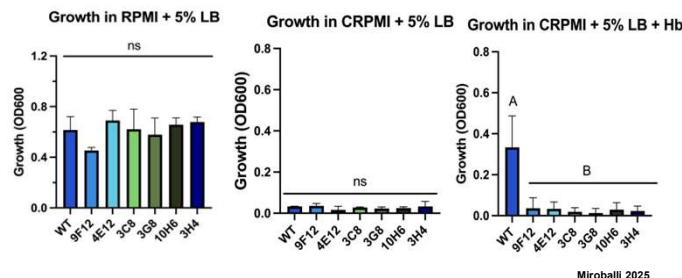
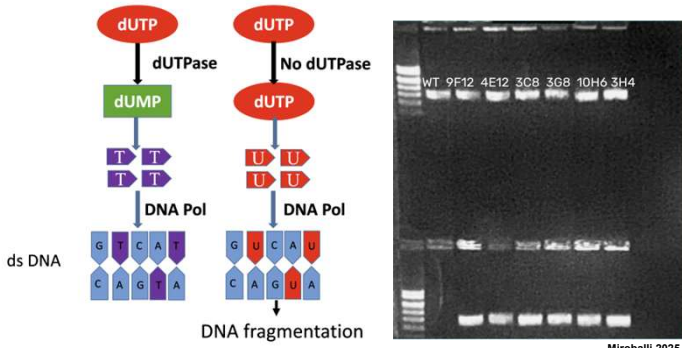
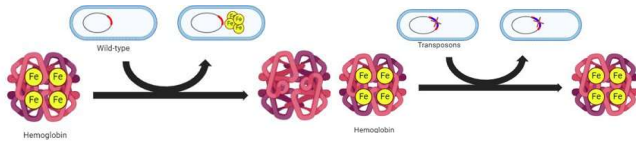
Sophie Degrand, Adewale Adewole, Gracie Miroballi, Jessica Guillhas, and Shauna M. McGillivray  
Department of Biology, Texas Christian University, Fort Worth, TX



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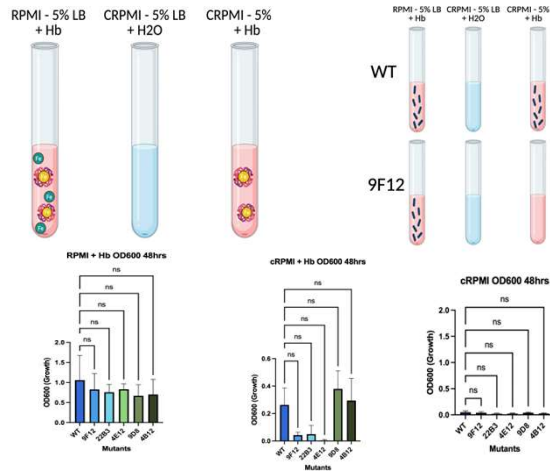
## Background

*Bacillus anthracis* is the bacterial pathogen responsible for the lethal disease anthrax. For the pathogens to cause disease, they must overcome several host defenses and obtain essential nutrients like iron. Our lab has identified that the dUTPase-1 gene is critical for iron acquisition from hemoglobin in *B. anthracis*. Normally, dUTPase functions to hydrolyze dUTP into dUMP. This functions to maintain DNA integrity as hydrolysis lowers the concentration of dUTP preventing uracil incorporation. This enzyme has never been linked to iron acquisition before, although in other systems, it has been linked with a secondary role in regulating signaling. Our goal is to determine whether the enzymatic activity, dUTP hydrolysis, is important for iron acquisition from hemoglobin. We hypothesize that dUTPase's enzymatic activity is not responsible for the iron acquisition phenotype, and that it is through another mechanism. This research will help us determine which structural domains are key to the iron acquisition activity of dUTPase and shed light on the secondary function of this enzyme.

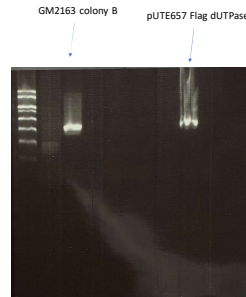
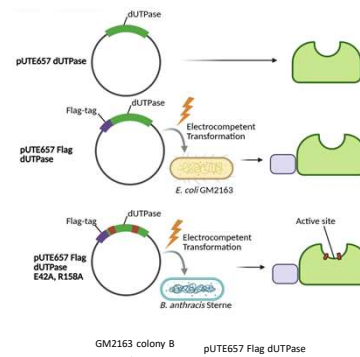


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## Methods - Confirming dUTPase Relevance

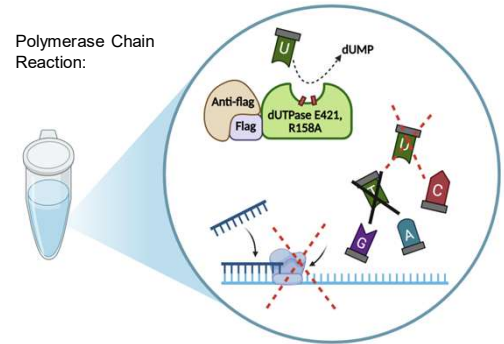


## Site Directed Mutagenesis

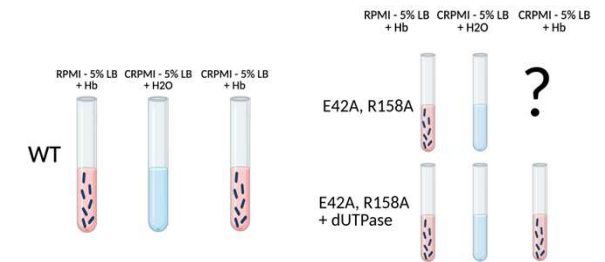


## Confirming Destroyed Enzymatic Activity

Polymerase Chain Reaction:



## Conclusion and Future Directions



- Test whether dUTPase hydrolysis activity is necessary for the iron acquisition phenotype of *B. anthracis*
- Explore the potential secondary role of dUTPase or secondary role of dUTP in iron acquisition

## Acknowledgements

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