## Identifying bacterial infection in Alaskan small mammals

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Agarose gel

electrophoresis

## Introduction

DEPARTMENT OF

BIOLOGY & WILDLIFE Iniversity of Alaska Fairbanks College of Natural Science and Mathematic

Methods

Zoonotic diseases are those that can spread from animals to people. Voles are present in many peridomestic settings and are capable of being reservoirs for zoonotic diseases. For this project we utilized Northern-Red Backed Vole (*Myodes rutilus*) tissue samples collected during the summer of 2024 from various locations to include animal facilities such as dog kennels and reindeer farms and compared them to control sites (forests and fields) across Interior Alaska. We utilized universal 16S rRNA gene PCR to identify bacterial DNA in vole liver and spleen tissue samples.

# Research Question: Are small mammals at animal facility sites more likely to be carriers for bacterial zoonotic disease?

Identifying bacteria present in sterile tissues of voles could indicate infection. Determining whether small mammals living near animal facilities such as kennels or farms are more or less likely to harbor bacterial zoonotic disease could be useful for understanding what disease could spread to pets, livestock, or humans.



**DNA** quantification

- Dissected voles to obtain liver and spleen
- Extracted DNA using Qiagen DNeasy tissue DNA extraction kit and protocol
- Quantified DNA samples using NanoDrop One
- Ran PCR assays for the 16S ribosomal RNA gene according to Hansen, 2015
- Ran agarose gel electrophoresis and analyzed the gel using a Spectroline UV transilluminator to determine positives
- Positive samples sent to Elim Biopharmaceuticals for Sanger sequencing
- Used SnapGene to clean up the chromatogram data
- Obtained bacterial species identification through NCBI
  Blast

### Literature Cited

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DNA sequencing

Species identified through Sanger sequencing:		
acterial Species	Description	TAP +
usobacterium necrophum	Gastrointestinal (GI) bacteria	
artonella vinsonii (3)	Pathogenic bacteria	
esorhizobium loti	Soil bacteria	
actobacillus helveticus	GI bacteria	
nterococcus faecium	GI bacteria	
lostridium	Pathogenic GI bacteria	

## **Discussion & Future Directions**

- Pathogenic bacteria (*Bartonella* and *Clostridium*) could indicate presence of infection or weakened immune system
- Difficulties faced:

Results

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Resource and time constraints

Obtained 57 positive results (59% of samples)

- Possible contamination during the procedure
- Human error in final clean-up procedure
- Future research could isolate higher concentrations of DNA from specimen tissues and run specific bacterial gene PCR

## Acknowledgements

Thank you to Dr. Hansen for her support, teaching, and inspiration for future involvement. Thank you to Tabitha for being a wonderful lab mate and for letting me use and help dissect your voles. I would also like to thank URSA for the funding and support throughout the entirety of this project.