Zebra Mussel Genetic Biocontrol and Genomic Surveillance

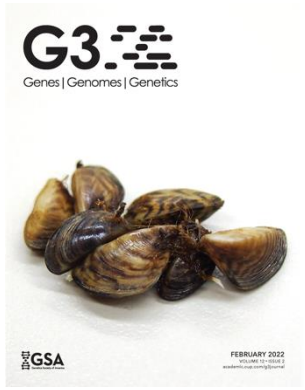
Daryl Gohl, Ph.D.
University of Minnesota Genomics Center
5/21/2026

Towards Developing Genetic Biocontrol Tools in Zebra Mussels

MAISRC Subproject 9
Zebra mussel genome project

2017-2019

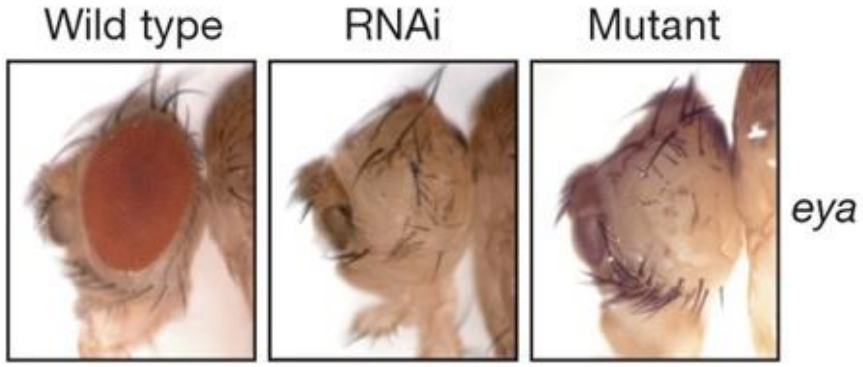
Mike McCartney



How Do You Genetically Manipulate An Organism You Can’t Robustly Cultivate?

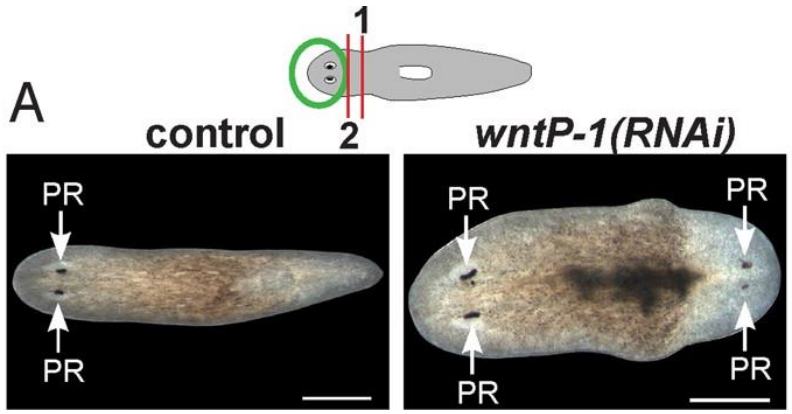
RNA Interference is a Versatile Tool for Manipulating Gene Expression

Drosophila



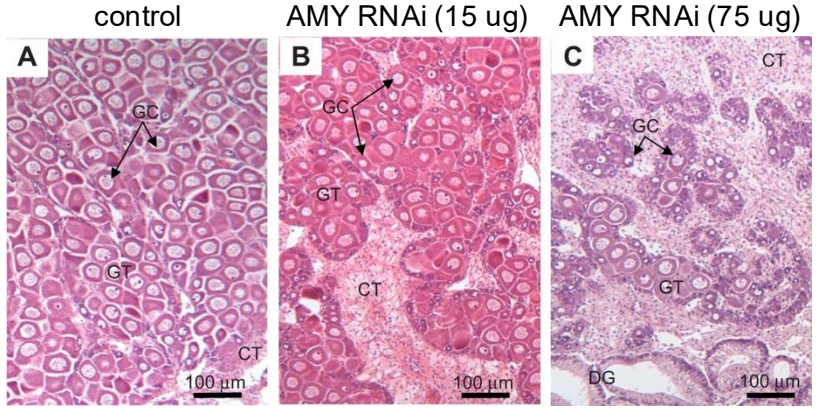
Dietzl et al. 2007. *Nature*.

Planarians



Petersen and Reddien 2009. *PNAS*.

Oysters



Huvet *et al.* 2015. *J. Exp*. Biol.

Humans

FDA Approves Patisiran, First-Ever RNA Interference Therapeutic Approved for Clinical Use

ASGCT Oligonucleotide and RNAi Therapeutics Committee - August 16, 2018

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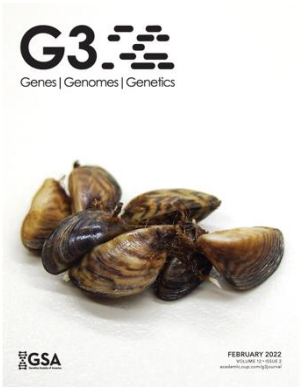


2020-2022

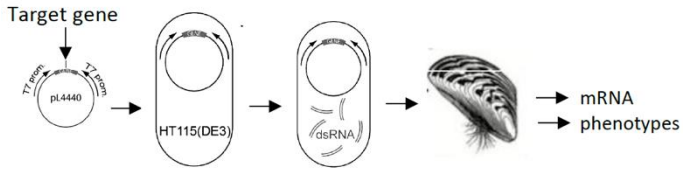
2023

MAISRC Subproject 36
RNA-interference screens for zebra mussel biocontrol target genes

Scott Ballantyne
UWRF

2024-2028

SERDP Project RC23-3845
RNA interference (RNAi) for targeted control of invasive zebra mussels



Cathy Richter
USGS CERC

Katy Klymus
USGS CERC

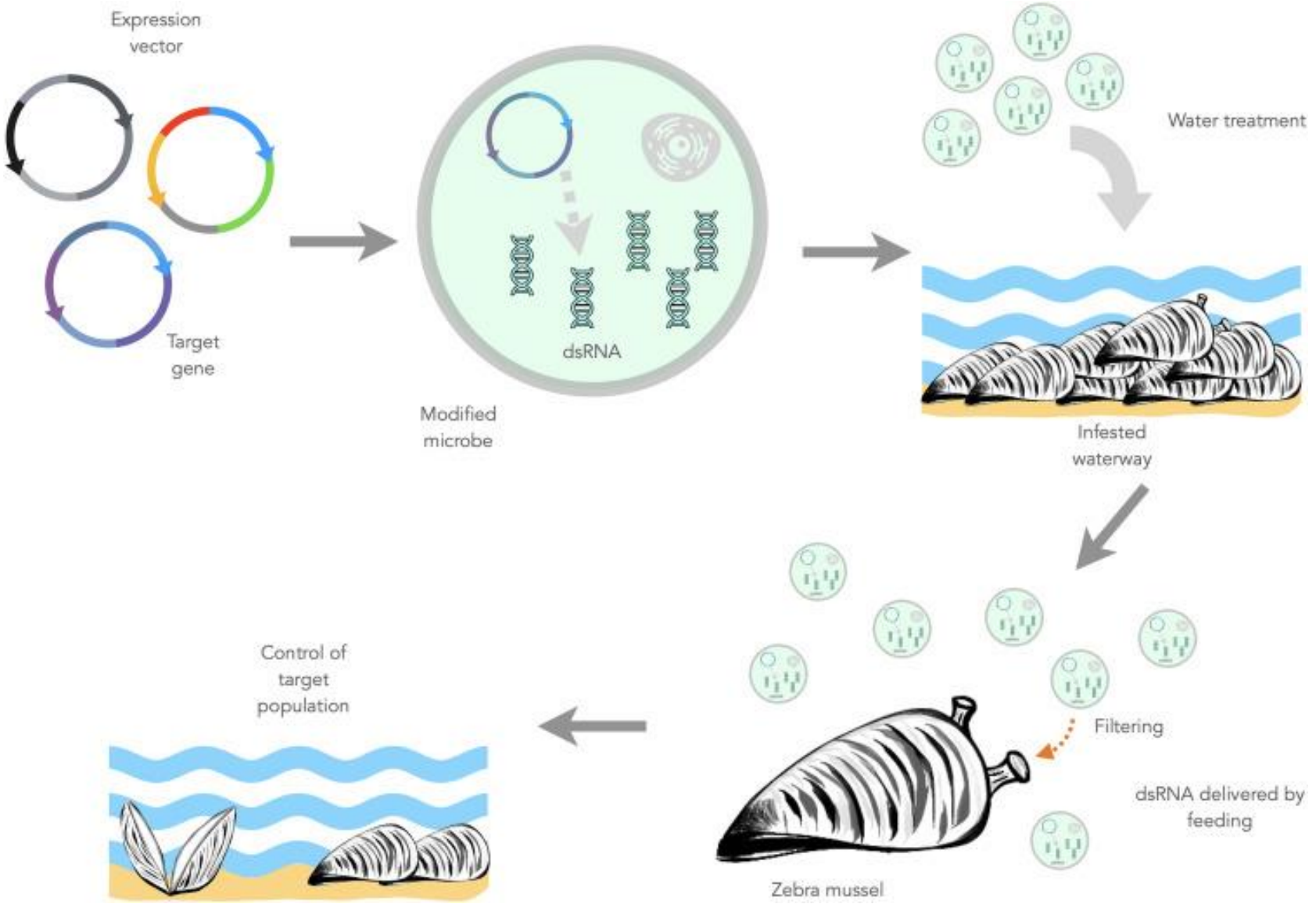
Thea Edwards
USGS CERC

Engineering Microbes to Express RNAi Triggers

Scott Ballantyne

Lindsey O'Brien

Victor Hernandez Elizarraga

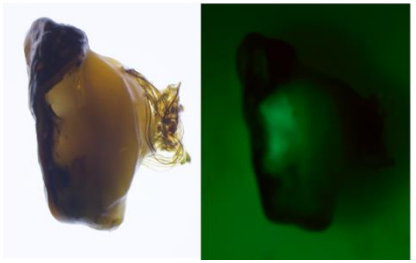


Hernandez-Elizarraga *et al.* 2023. *iScience.*

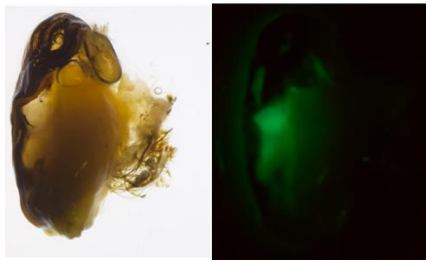
Knock-Down of Zebra Mussel Gene Expression by RNAi

Injection

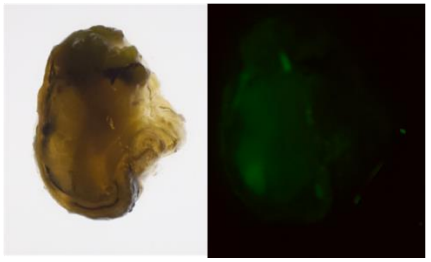
Injection control (Calcein)



Injection dsRNA

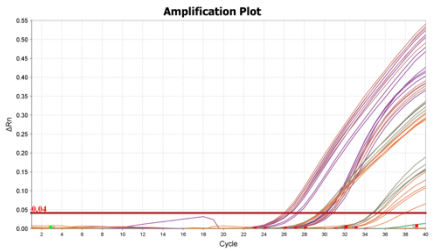


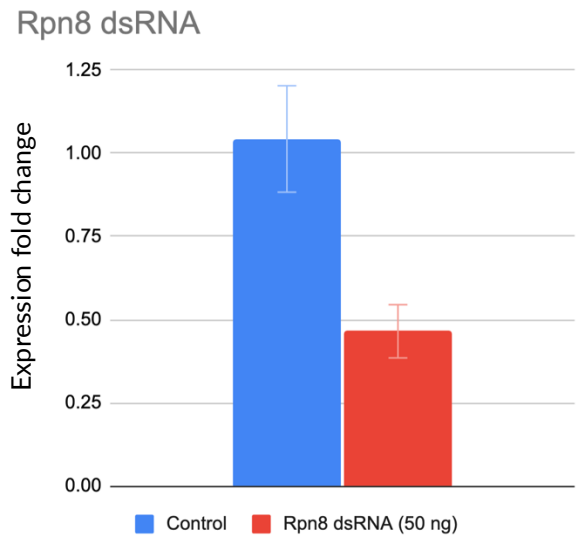
No injection



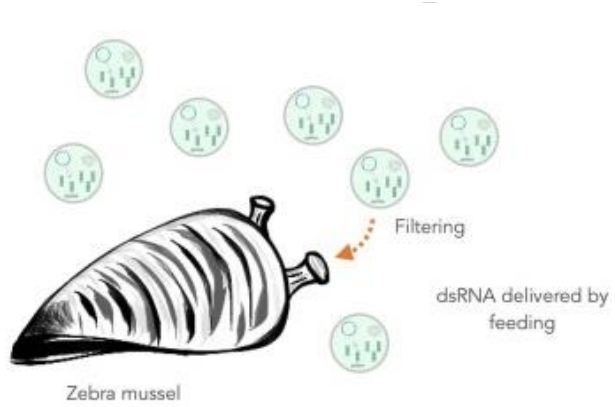
RNA Extraction

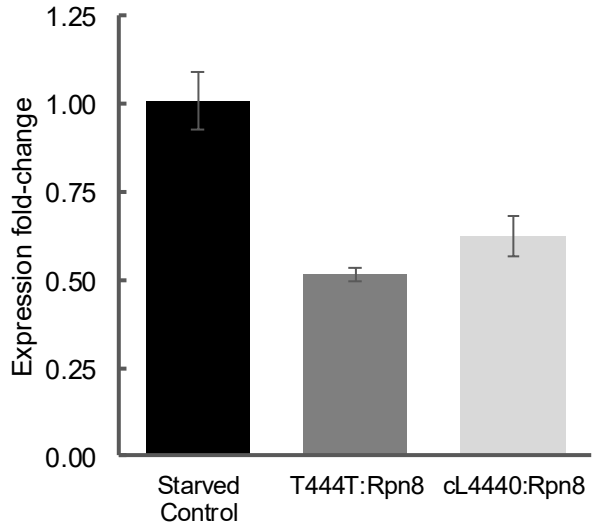
RT-qPCR





Feeding





Victor Hernandez Elizarraga, Lindsey O'Brien

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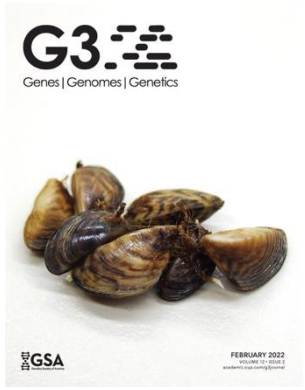

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USGS G25AP00161-00
Genomic Surveillance of Zebra Mussel Populations Using Genotyping by Sequencing

2025-2028

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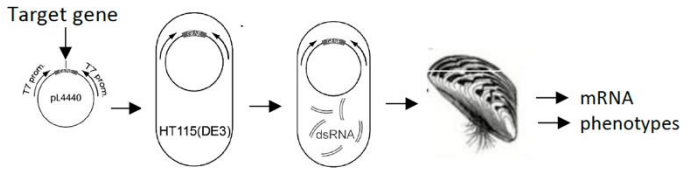

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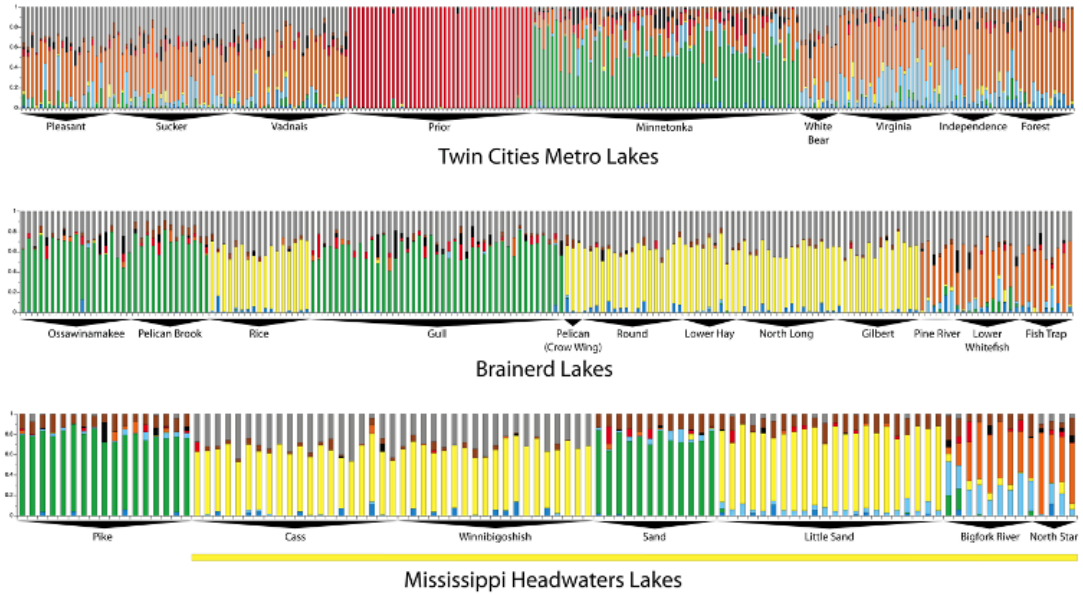
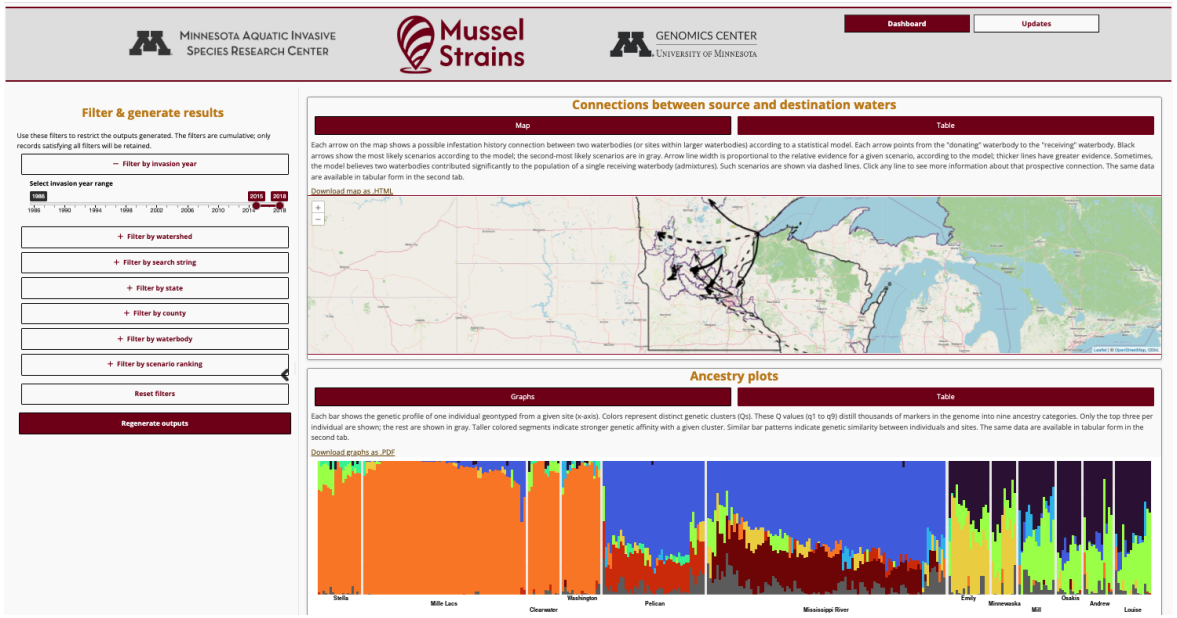
Genomic Surveillance to Infer Invasion Pathways

Zebra mussel genomic surveillance





McCartney *et al.* 2025. *Scientific Reports.*

https://z.umn.edu/MusselStrains

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USGS science for a changing world

Environment and Natural Resources Trust Fund

Genomics Center

Acknowledgements

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The University of Minnesota Genomics Center

Collaborators

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Alex Bajcz

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