



Innovations

MODERATOR: Panchu Duraisamy





Shelly Wanamaker

Research Scientist
Gloucester Marine Genomics Institute

- Shelly Wanamaker is a Research Scientist at Gloucester Marine Genomics Institute developing rapid diagnostics and computational tools to support sustainable fisheries. Her postdoctoral research at the University of Washington's School of Aquatic and Fishery Sciences and graduate intern research at the National Oceanic and Atmospheric Administration focused on environmental impact on shellfish, salmon, crab, and plankton. Shelly has a Ph.D. in Biological Sciences from the University of California San Diego and a B.S. in Biochemistry from Simmons College in Boston. She is passionate about collaborative work to develop practical solutions to aid food security and climate resiliency.

Rapid Molecular Diagnostics for Shrimp Aquaculture

Shelly Wanamaker, PhD

Research Scientist

Gloucester Marine Genomics Institute

Massachusetts, USA

Sherlock
BIOSCIENCES 

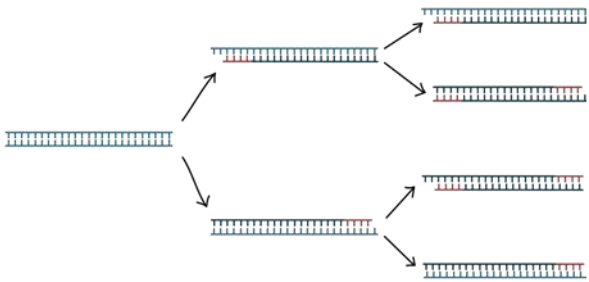


GLOUCESTER MARINE
GENOMICS INSTITUTE



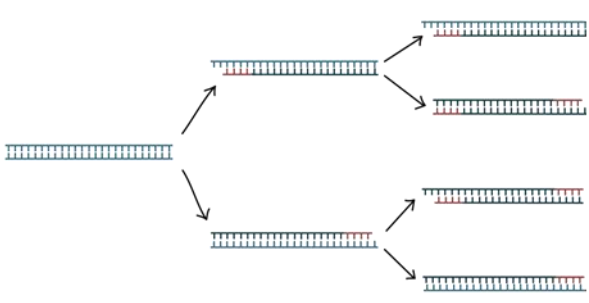


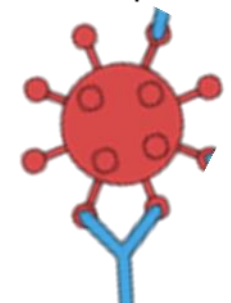


















Diagnostic tools for shrimp disease detection

PCR

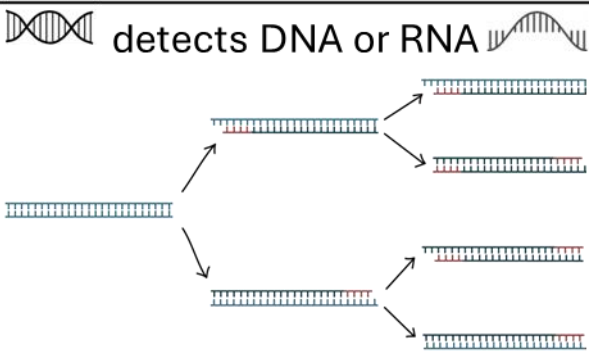
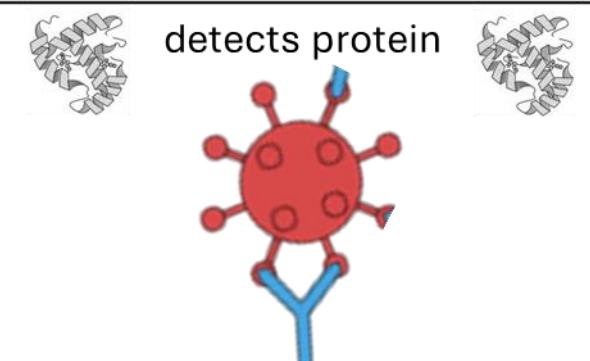
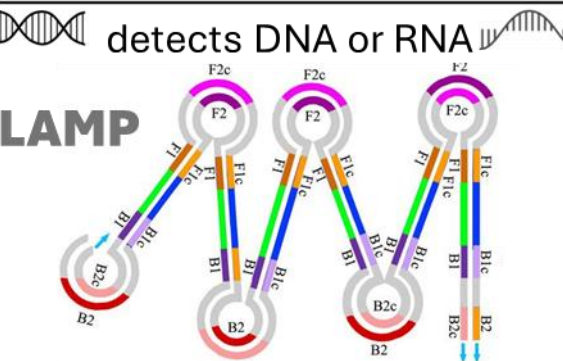
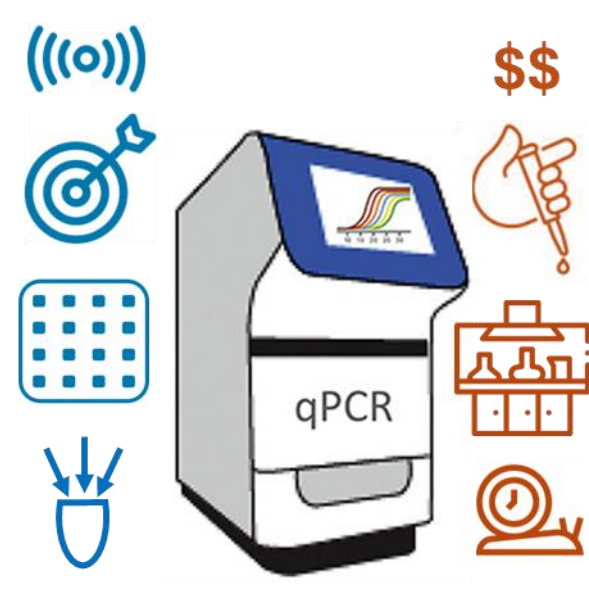
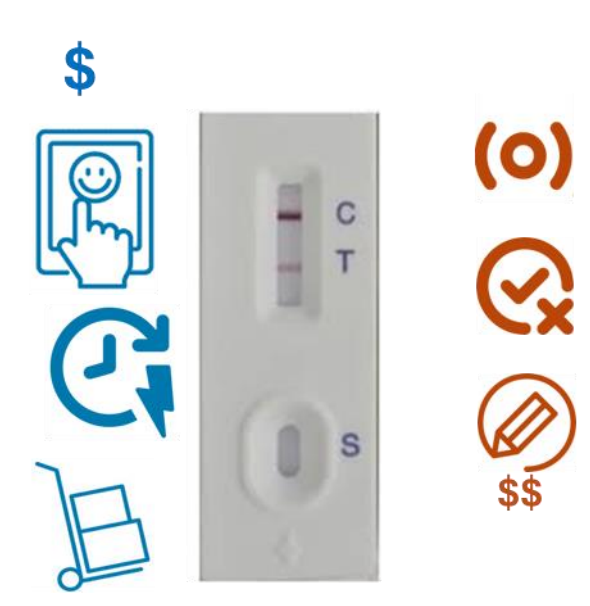

 detects DNA or RNA 



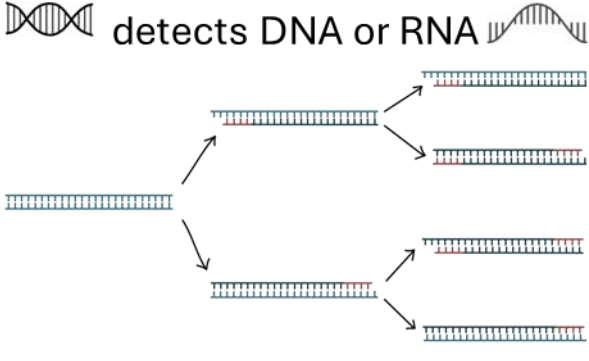
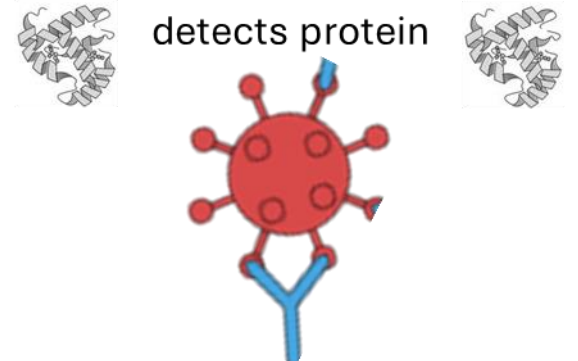
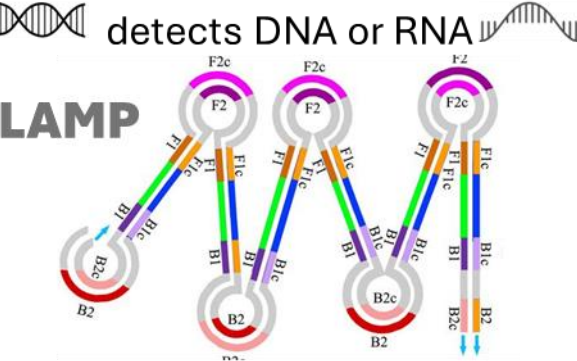
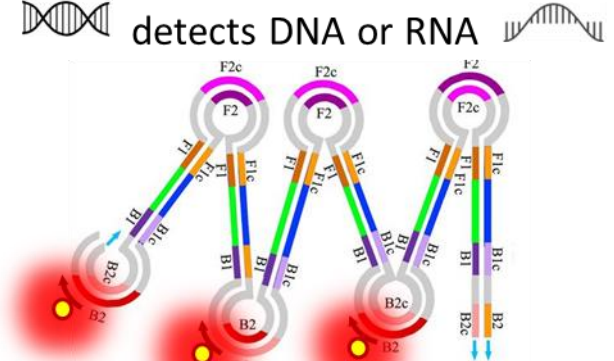
















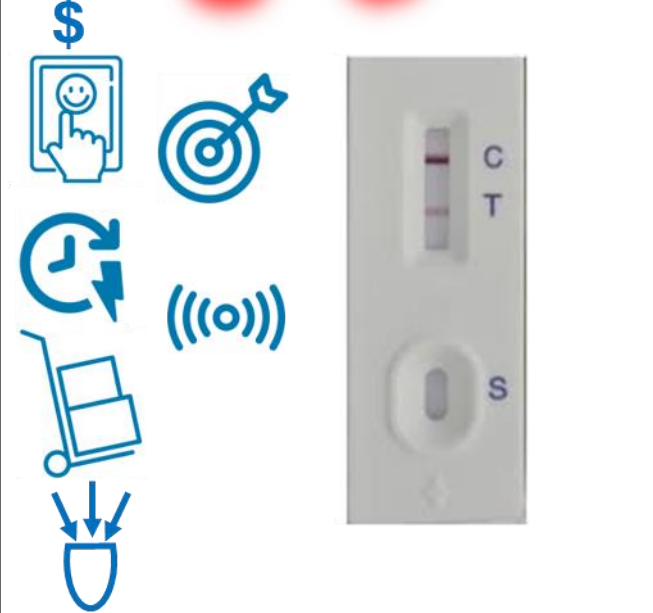
Diagnostic tools for shrimp disease detection

PCR	Antibody
<p> detects DNA or RNA </p> 	<p> detects protein </p> 
     <p>qPCR</p>    	     <p>C T</p> <p>S</p>    

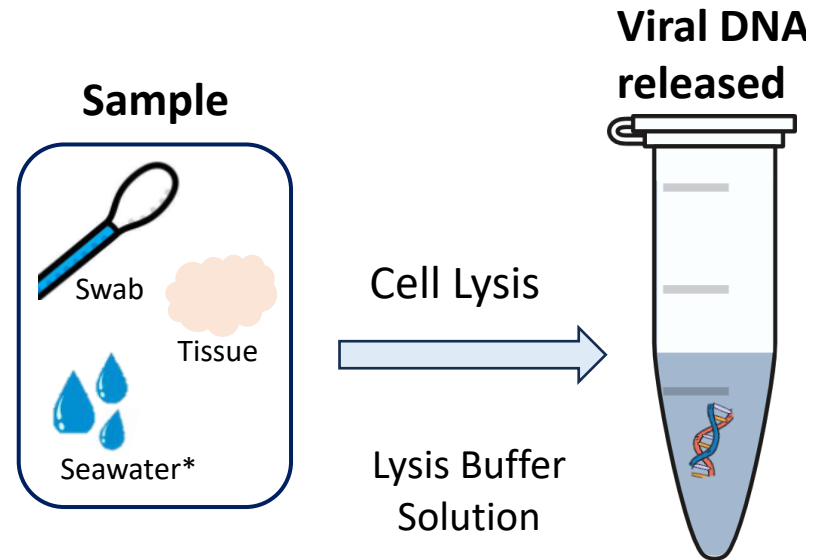
Diagnostic tools for shrimp disease detection

PCR	Antibody	Isothermal amplification
<p>detects DNA or RNA</p> 	<p>detects protein</p> 	<p>detects DNA or RNA</p> <p>LAMP</p> 
 <p>qPCR</p>	 <p>C T S</p>	 <p>C T S</p>

Diagnostic tools for shrimp disease detection

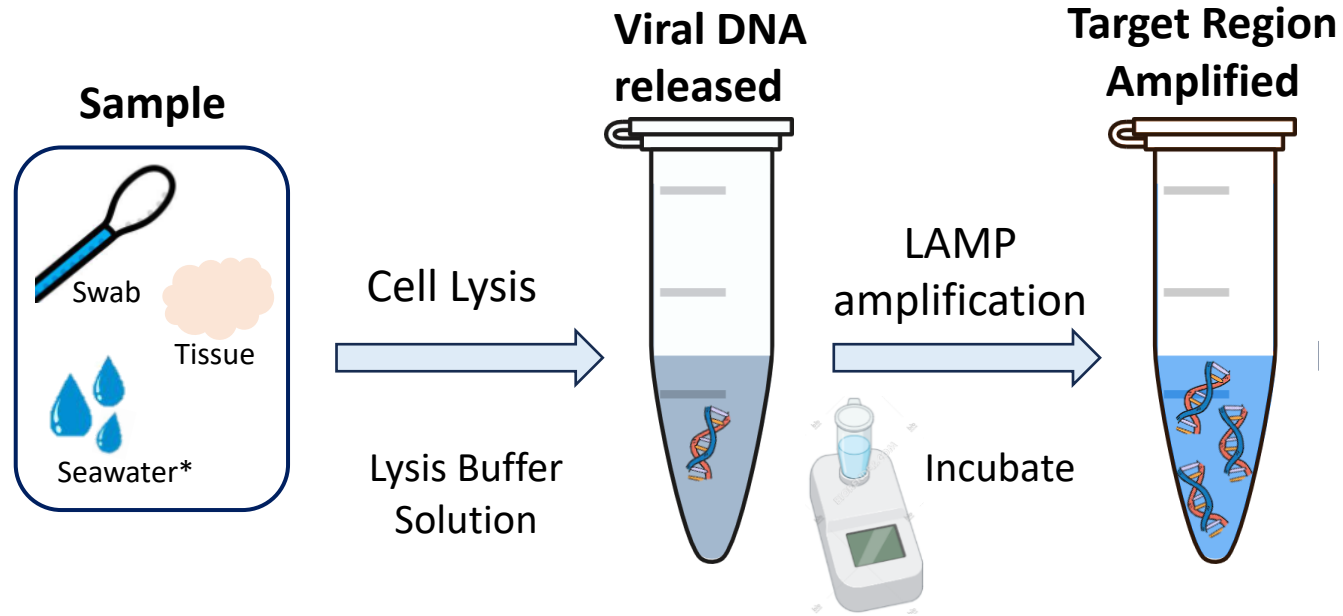
PCR	Antibody	Isothermal amplification	Isothermal amplification + probe
<p>detects DNA or RNA</p> 	<p>detects protein</p> 	<p>detects DNA or RNA</p> <p>LAMP</p> 	<p>detects DNA or RNA</p> 
  <p>qPCR</p> 	   	     	   

GMGI and Sherlock Biosciences develop a rapid lateral flow diagnostic (LAMP + Probe)



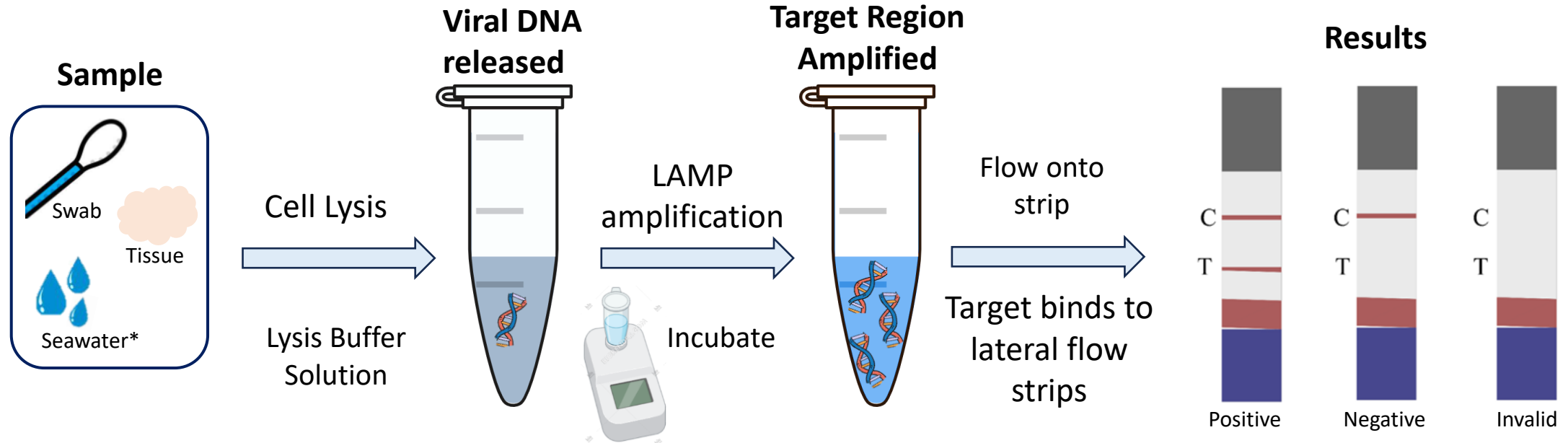
*Results from seawater samples have not yet been confirmed.

GMGI and Sherlock Biosciences develop a rapid lateral flow diagnostic (LAMP + Probe)



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GMGI and Sherlock Biosciences develop a rapid lateral flow diagnostic (LAMP + Probe)

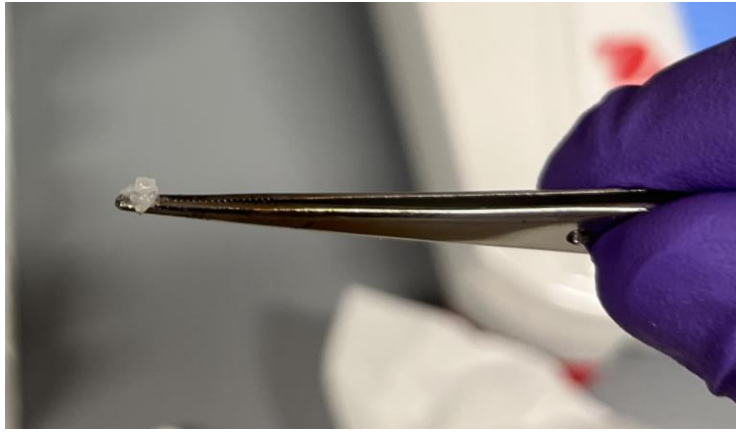
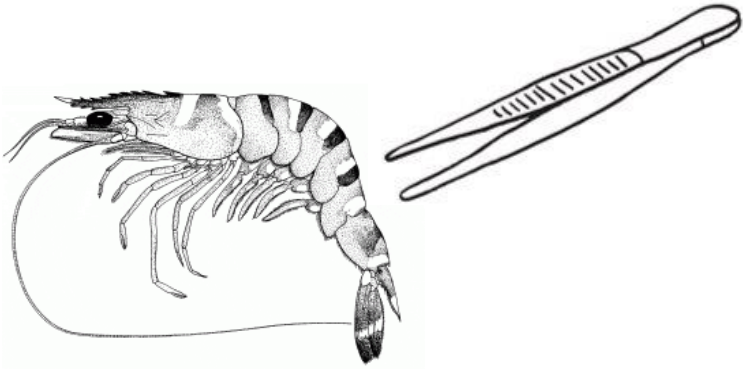


*Results from seawater samples have not yet been confirmed.

Workflow

Sample Collection:

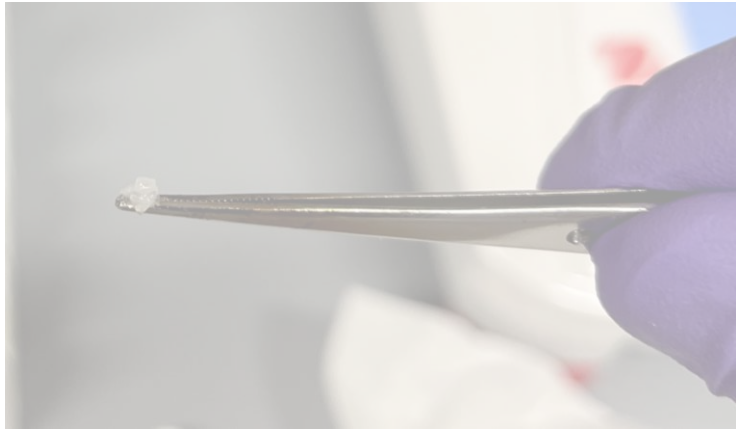
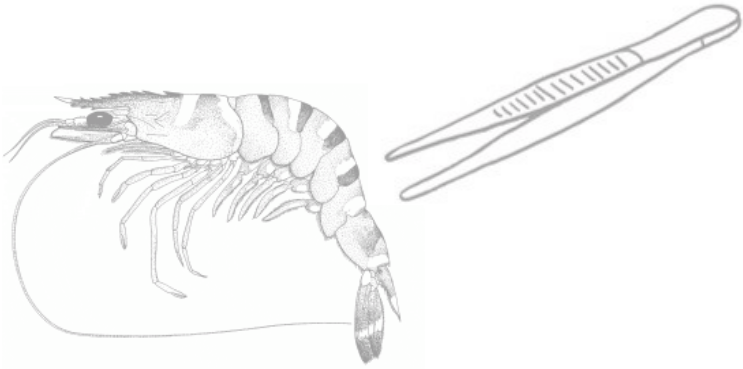
Pinch off a small piece of shrimp tissue



Workflow

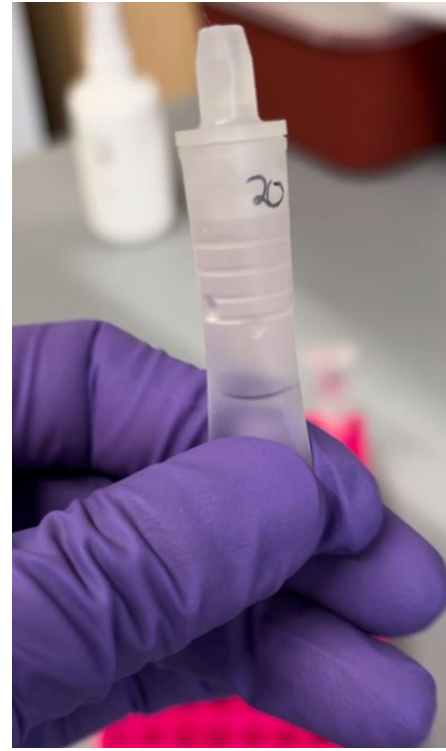
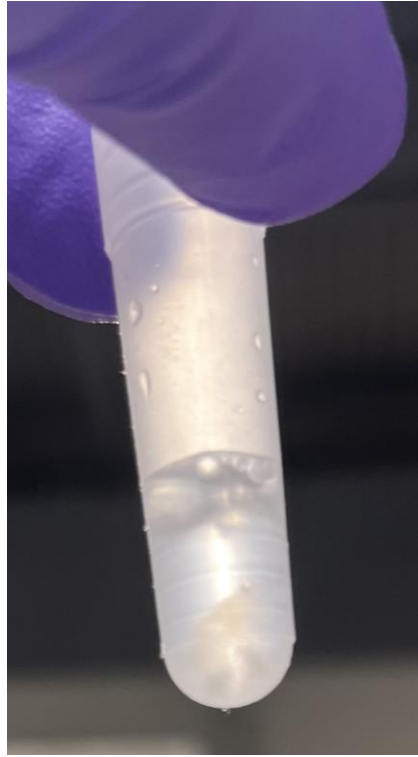
Sample Collection:

Pinch off a small piece of shrimp tissue



Cell Lysis:

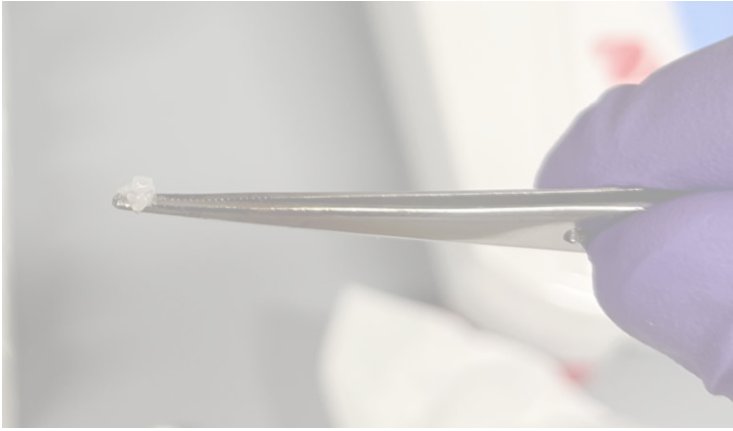
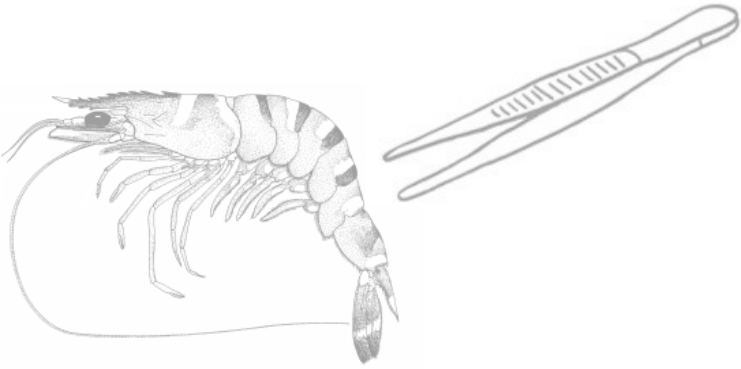
Add tissue to soft tube with 500uL of lysis buffer and squish for 30 seconds



Workflow

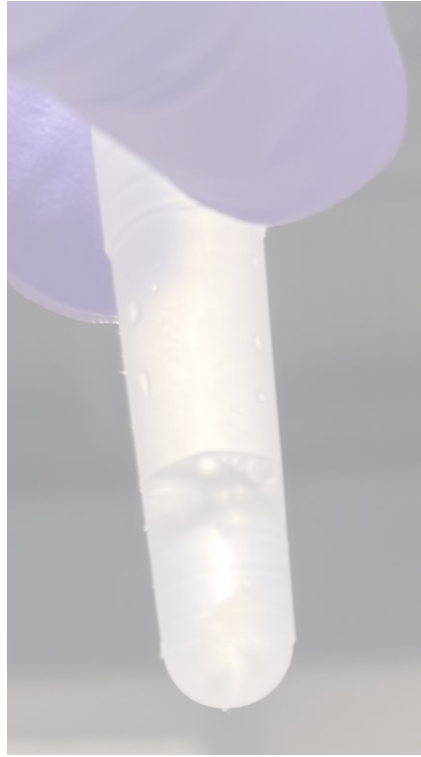
Sample Collection:

Pinch off a small piece of shrimp tissue



Cell Lysis:

Add tissue to soft tube with 500uL of lysis buffer and squish for 30 seconds



Run and Read:

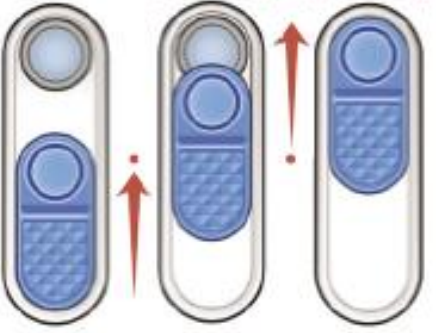
Add drops lysis to sample well.
View results in 20 minutes.



Device operation


⚠ CAUTION:
Pause at first click.


CLICK **CLICK**

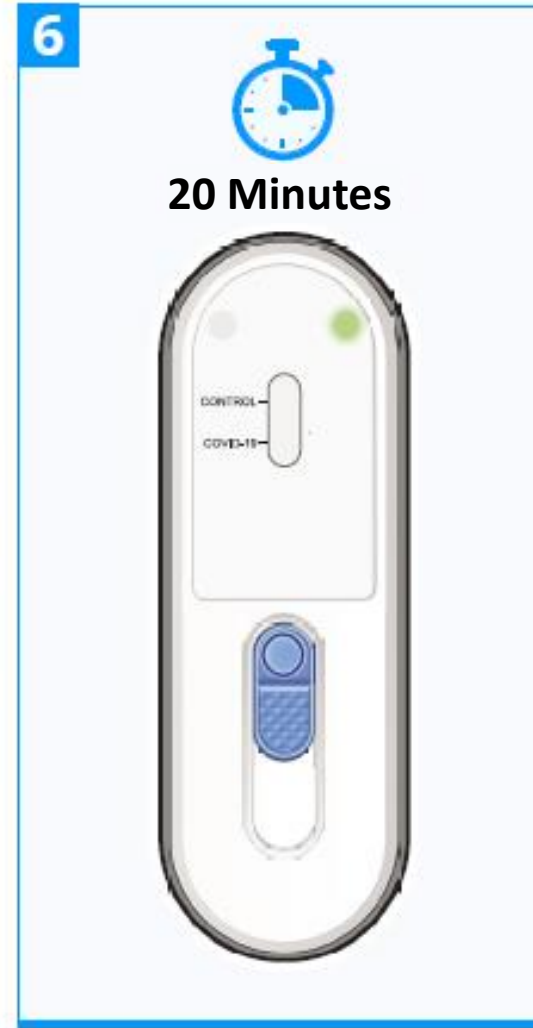


PAUSE

Do not push down hard while sliding the lid.

✓ 

✗ 



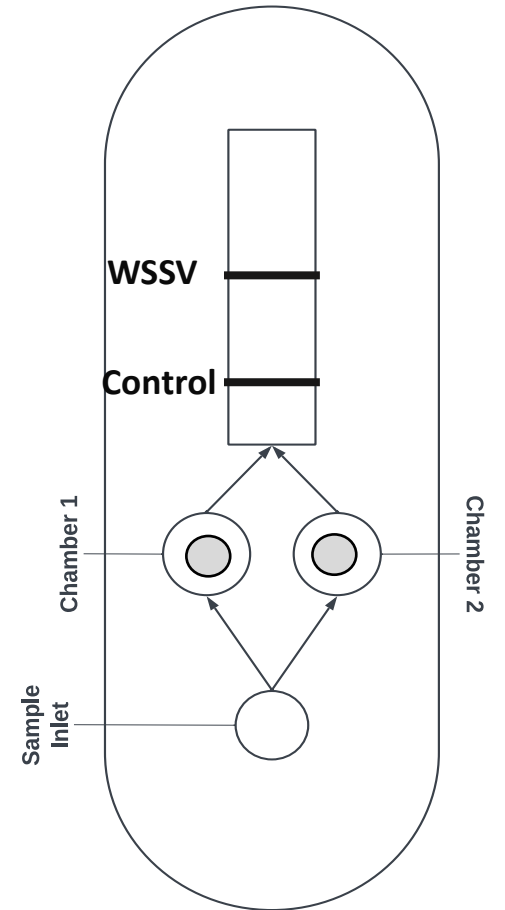
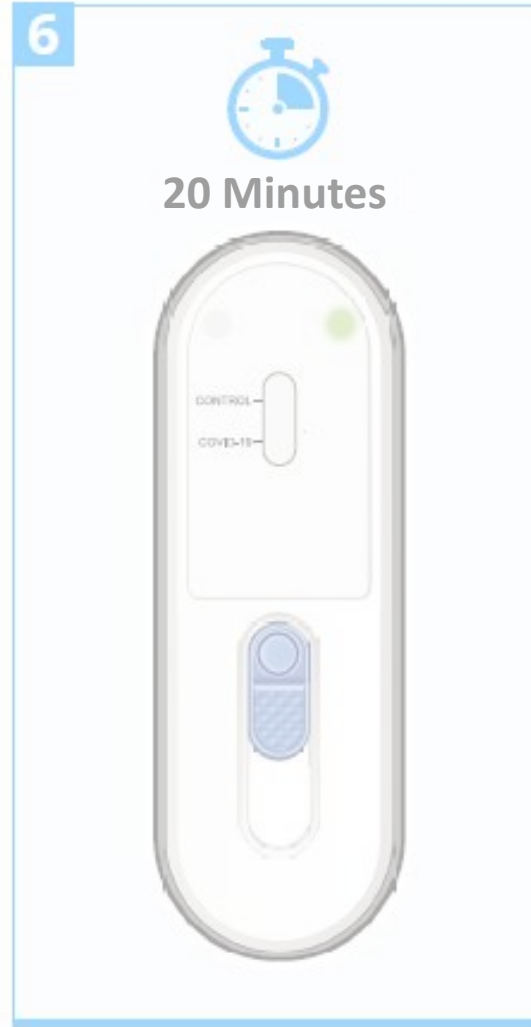
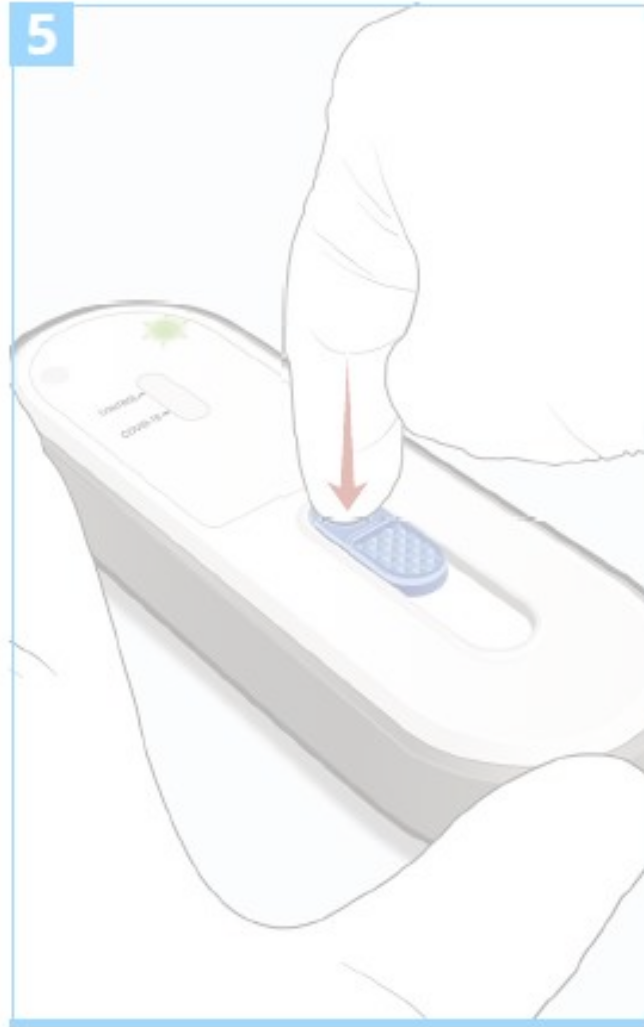

Device operation

CAUTION:
Pause at first click.

CLICK CLICK

PAUSE

Do not push down hard while sliding the lid.



Example Results

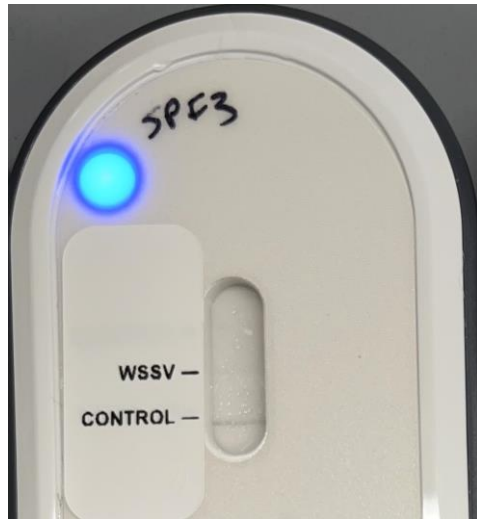
No template control

- (-) for WSSV
- (-) internal control



No WSSV

- (-) for WSSV
- (+) internal control



WSSV-infected

- (+) for WSSV
- (+) internal control



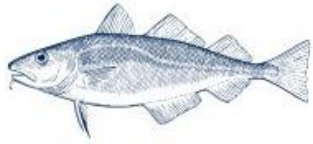
Comparison to gold standard PCR

	Traditional PCR or qPCR
Limit of Detection	100 copies
Sensitivity	100%
Specificity (accuracy)	100%
Time to Result	3 hours to 5 days
Price per Test	\$10-\$100 per sample
Intended User	Lab personnel
Multiplexing capability	Yes

Comparison to gold standard PCR

	Traditional PCR or qPCR	Sherlock/GMGI Diagnostic Device
Limit of Detection	100 copies	10 copies
Sensitivity	100%	100% (35/35)
Specificity (accuracy)	100%	100% (24/24)
Time to Result	3 hours to 5 days	< 30 minutes
Price per Test	\$10-\$100 per sample	\$10-\$100 per sample
Intended User	Lab personnel	Anyone
Multiplexing capability	Yes	>=2 targets

Acknowledgements



GLOUCESTER MARINE
GENOMICS INSTITUTE

Merry Moore
Dr. Andrea Bodnar

GMGI team



Dr. Mary Wilson
Kristen Shytle
Dr. Heike Boisvert
Dr. Beth Fiore
Jim Scavone
Carolyn Simmons



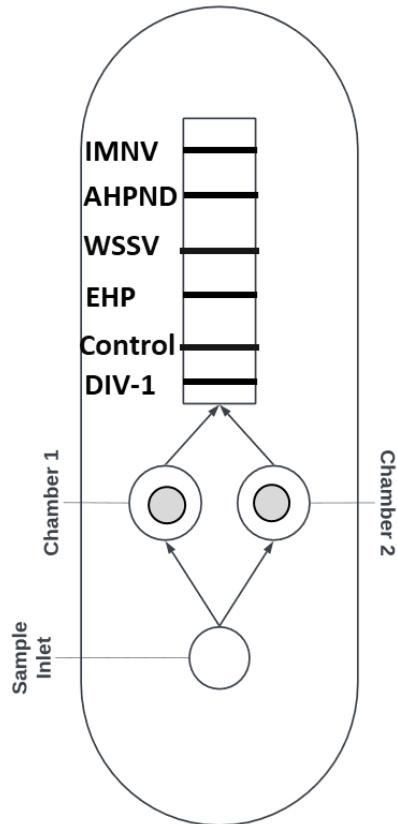
George Chamberlain
Shrimp Summit 2024
Organizers



What's next?

Apply for Phase II USDA funding (March 2025) to support research

Multiplex with more targets



High volume validation testing



Develop commercialization plan with specifics on market needs

XX users would use XXXXX tests annually

This would save XX dollars, XX time, and improve production by XX%

Call for volunteers

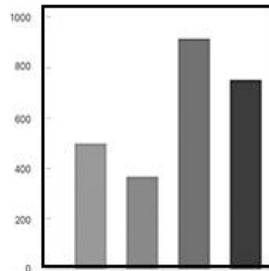
Fill out survey or schedule an interview to provide market insight

Link to survey



Share survey or refer others for an interview

Be a beta tester, provide results and feedback



Serve as or refer potential investors



Contact:
shelly.wanamaker@gmgi.org



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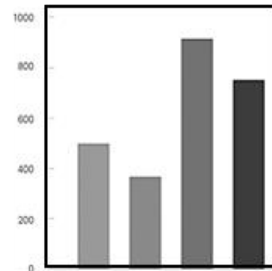
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