

NSF Awards Grant for Horseshoe Crab “Ranch” in Coastal Georgia

The National Science Foundation awarded a SBIR feasibility grant to Kepley BioSystems for a novel approach to LAL collection from Atlantic horseshoe crabs.

GREENSBORO, NC, UNITED STATES, September 17, 2018 /EINPresswire.com/ -- On September 8, 2018, the National Science Foundation (NSF) awarded a Phase I Small Business Innovation Research (SBIR) feasibility grant to Kepley BioSystems (KBI) for a novel approach to Limulus ameobocyte lysate collection from Atlantic horseshoe crabs (HSC, *Limulus polyphemus*). As a start-up committed to developing disruptive innovations to address global challenges, KBI proposed methods for easing a myriad of pressures on wild HSC populations at prospective Coastal Georgia sites.

To comply with FDA sterility testing protocols, hundreds of thousands of wild HSCs are captured for the biomedical industry to extract a unique component of their blood and then return them to the water every year. Nearly as many are also captured and used for whelk and eel fishing bait. As a keystone species, migrating shorebirds also depend on their eggs as essential nutrition en route to northern nesting grounds. And, imminent extinction of the Asian HSCs (*Tachypleus tridentatus*) poses additional threats to the Atlantic HSCs due to growing demand from companies that had used Asian HSCs for sterility testing when previously more plentiful. KBI highlighted these and other factors impacting HSC viability in the recent article, “The Role of Horseshoe Crabs in the Biomedical Industry and Recent Trends Impacting Species Sustainability” (Krisfalusi-Gannon, et al, *Front. Mar. Sci.* 05 June 2018). The lead authors were also NSF-sponsored, undergraduate interns

working with KBI in 2016, and one of them has remained on the team conducting initial HSC studies funded by a NOAA Sea Grant.

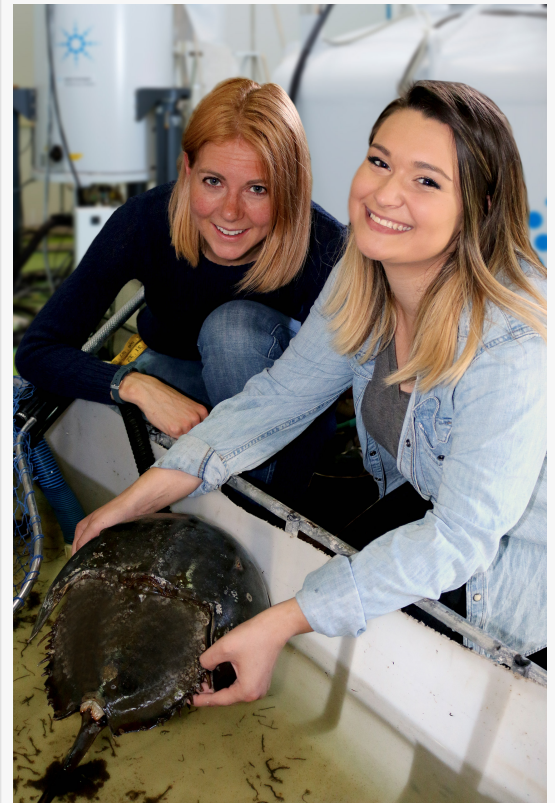
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Working with Lance Toland, the Georgia Department of Natural Resources, the UGA Grant team, and the Jekyll Island Authority all provided vital support for us to develop the HSC ranch proposal.”

Dr. Kristen Dellinger

As an ancient species, HSCs survived several mass extinctions over 450 million years and now provide the “gold standard” to detect gram-negative bacteria; this is especially exigent, given rapidly evolving threats from antibiotic microbial resistance. Notably, the World Health Organization (WHO) sounded an alarm that identified ten of fourteen of the most virulent drug-resistant bacteria as gram-negative. However, HSC blood reacts to a core cellular component of gram-negative pathogens, which

suggests unlikely adaption to elude such detection.



Dr. Kristen Dellinger, principal investigator, and research intern, Jordan Gannon.

Terry Brady, KBI chief inventor, who grew up in Coastal Georgia among HSCs on every beach, remarked, "Having NSF summer interns delving into the plight of HSCs inspired several project innovations that will challenge prior research on HSCs in captivity."

"The importance of this program should not be underestimated given the dangers of super bugs," said KBI president, Dr. Anthony Dellinger. "Everyone should read Jim O'Neill's antibiotic microbial resistance projections of 300 million people dying prematurely by 2050 and consuming over a hundred trillion dollars of global GDP in the process" ("Tackling Drug-Resistant Infections Globally: Final Report and Recommendations", J. O'Neill, May 19, 2016).



Dr. Kristen Dellinger, principal investigator, and research intern, Jordan Gannon, conducting a preliminary assessment of a mature female horseshoe crab.

Red knots are among the beloved migrating shorebirds that feed on HSC eggs to fuel their migration. In related initiatives, KBI is developing synthetic eggs that mimic them as a nutritional supplement for flyover beaches where HSC counts have sharply declined. Additionally, KBI has conducted NSF-funded research to develop a synthetic crustacean bait that is now being proposed for adaptation as an alternative to using HSCs as whelk and eel bait ("[A Synthetic Crustacean Bait to Stem Forage Fish Depletion.](#)" A. Dellinger, et al, *Global Ecology and Conservation* 7, 2016, 2348-244).

Dr. Kristen Dellinger, the principal investigator, observed, "Working with Lance Toland (lead inventor of the synthetic HSC eggs and resident of Coastal Georgia), the Georgia Department of Natural Resources, the University of Georgia Sea Grant team, and the Jekyll Island Authority all provided vital support for us to develop the HSC ranch proposal."

The KBI team is eager to begin this NSF-funded project, "A Novel Horseshoe Crab Device and Approach for a Sustainable Endotoxin Testing Resource," immediately.

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About the National Science Foundation

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..." NSF is vital because it supports basic research and people to create knowledge that transforms the future. This support is a primary driver of the U.S. economy, enhances the nation's security, and advances knowledge to sustain global leadership.

About Kepley BioSystems

Kepley BioSystems (KBI) is a North Carolina-based life sciences start-up operating out of Gateway University Research Park (GURP) in collaboration with the Joint School of Nanoscience and Nanoengineering (JSNN), comprised of a partnership between the North Carolina Agriculture and Technical State University (NCA&T) and the University of North Carolina at Greensboro (UNCG). KBI was founded in 2013 with a mission to emerge disruptive innovations to achieve global solutions. For more information, visit: <http://www.kepleybiosystems.com/>

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