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IBBR Collaborates with Integrated BioTherapeutics to Advance a Novel Approach to Treating Infectious Disease

A single therapeutic simultaneously targets bacteria and neutralizes toxins

(Rockville, MD, August 14, 2019) Institute for Bioscience and Biotechnology Research (IBBR) Fellow Dr. Daniel Nelson (Associate Professor, Department of Veterinary Medicine, University of Maryland, College Park) is working on an innovative approach to treating bacterial disease in collaboration with Dr. Rajan Adhikari, Assistant Director of Bacteriology at Integrated BioTherapeutics (IBT), and George Mason University's Dr. Ramin Hakami (Associate Professor, School of Systems Biology and National Center for Biodefense and Infectious Diseases). The group recently received a $3M Phase II STTR award from the National Institutes of Health that will fund advancement of their novel immunotherapeutic into non-human primates, as well as optimization of a cell line for biomanufacturing the drug.

Most people are familiar with taking antibiotics to treat bacterial infections, and know that some infections can be prevented with vaccines. Vaccines cause the body to make antibodies - proteins that bind pathogens and signal the immune system to destroy them. Researchers are also engineering antibodies as drugs called immunotherapeutics.

Illustration of *Bacillus anthracis*, causative agent of anthrax

All of these approaches attack the pathogens, but some bacteria release toxins with dangerous capabilities to cause damage far from the site of infection. Since

patients can still be in danger even after the bacteria are killed, the current treatment for such toxemias is two-pronged: antibiotics to kill the bacteria and antibodies to neutralize the toxin.

But, what if one therapeutic could do both?

Nelson and his collaborators have engineered and pre-clinically tested a single immunotherapeutic composed of a humanized antibody that binds toxin, and a protein that binds tightly to the bacterial surface. Together, these components specifically direct the antibodies to the site of the infection where they neutralize toxin and signal the immune system to kill the bacteria. The surface-binding component is derived from a bacteriophage endolysin protein characterized in Nelson's laboratory.

"This Phase II award is an important step toward translating Dr. Nelson's academic endolysin research from the lab to the market," notes IBBR Director Dr. Thomas Fuerst. "The advancement of this technology moves us closer to providing a more efficient and effective treatment for bacterial infections."

This work is supported by NIH awards R41AI122666 and R42AI122666 to industry partner IBT. The awards are part of the federal Small Business Technology Transfer (STTR) program, which aims to facilitate cooperation between small businesses and US research institutions to bridge the gap between basic research and commercialization.

About IBBR

IBBR is a joint research enterprise of the University of Maryland, College Park, the University of Maryland, Baltimore, and the National Institute of Standards and Technology. IBBR is also financially supported in part by the University of Maryland Strategic Partnership: *MPowering the State*, an initiative designed to achieve innovation and impact through collaboration. The Institute sits at the nexus of academic research and commercial application, bringing together critical elements necessary to inspire transformative discoveries in the field of biotechnology that provide innovative solutions to major scientific and engineering challenges important to society. IBBR researchers seek to advance the fields of disease pathways and biomolecular targets, biomolecular measurement sciences, and biomolecular engineering, including structure-based design of vaccines and therapeutics. The Institute also serves to expand the economic base of science and technology in the state of Maryland. For more information: www.ibbr.umd.edu

About IBT

IBT is a biotechnology company focused on the discovery of novel vaccines and therapies for emerging infectious diseases with a pipeline that includes promising product candidates for bacterial and viral infections including vaccines for Staphylococcal infections, unique pan-filovirus immunotherapeutics and vaccines, and a variety of other product candidates for emerging pathogens. Located in Rockville, MD, IBT has a close working relationship with United States Government agencies including

the National Institute of Allergy and Infectious Diseases (NIAID/NIH), National Cancer Research Institute (NCI), Department of Defense (DOD), United States Army Medical Research Institute of Infection Diseases (USAMRIID) as well as many biotechnology and pharmaceutical companies and academic laboratories.

For more information and collaborative opportunities at IBBR, contact:

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