

# AUBURN UNIVERSITY

## INNOVATION ADVANCEMENT & COMMERCIALIZATION

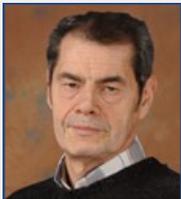
### Contact

Troy Brady  
Auburn University  
Innovation Advancement  
& Commercialization  
334-844-4977  
[troy.brady@auburn.edu](mailto:troy.brady@auburn.edu)  
<https://iac.auburn.edu/>  
Reference: Heat Stress Probiotic

### Inventors



Dr. Iryna Sorokulova  
Department of Anatomy,  
Physiology & Pharmacology



Dr. Vitaly Vodyanov  
Department of Anatomy,  
Physiology & Pharmacology

### Reference:

[Thesis publication](#)

[Click here](#) for a listing of Auburn's available life science technologies

Follow Auburn IAC



Auburn University is an equal opportunity educational institution/employer

## Probiotic for heat stress

### Overview

Heat stress can affect the body's defenses and barriers to bacteria, allowing microbes in the gut to slip past and enter the blood, organs, or other areas and induce inflammation and other immune responses. Clearing the bacteria and repairing resulting damage slows the body's recovery from heat stress. A new probiotic has been shown to help maintain the integrity of the intestinal lining and block the movement of microbes from the gut into blood during heat stress. By taking this probiotic prior to heat stress, a person or animal can be better protected against the effects of heat stress and recover more quickly to full health. Such protection could be beneficial for athletes, workers, soldiers, animals, and others.

### Advantages

- Prevents movement of bacteria from the gut to blood during heat stress
- Helps maintain the intestinal lining (reduces shrinkage of intestinal villi and mucosa)
- Inexpensive to produce, easy oral administration, and can be stored at room temperature

### Description

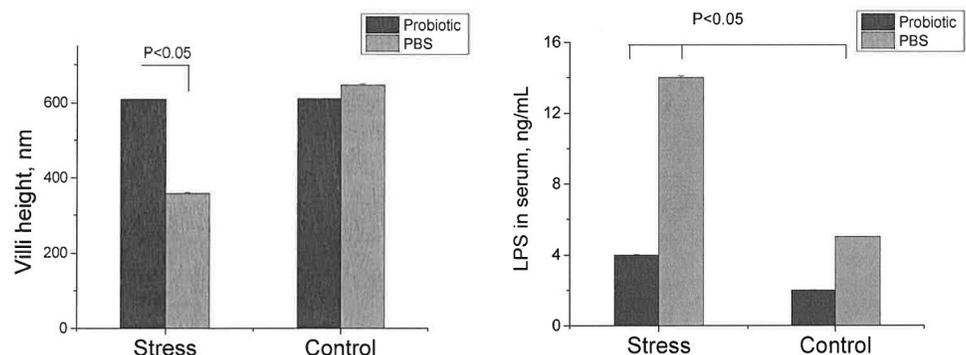
Rats were administered probiotic spores of *Bacillus subtilis* orally two days before exposure to 45°C (113°F). Body core temperatures reached 40°C (104°F), a temperature that is reached in humans and animals during fever or active exercise. Treatment with the probiotic helped to maintain normal intestinal villi height and mucosal thickness, reduced translocation of bacteria from the gut to circulating blood (measured by LPS and colony counts), reduced breakdown of red blood cells, and maintained normal or reduced levels of cytokines associated with heat stress.

### Status

- Protective effects against heat stress demonstrated in rats
- No signs of adverse effects

### Licensing Opportunities

- This probiotic is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture



**Protection of the Intestinal lining by a strain of *Bacillus Subtilis*.** (Left) Comparison of intestinal villi height after heat stress, with and without bacillus probiotic treatment. Short villi is an indication of poor intestinal health. PBS does not contain probiotic. Controls were not heat stressed. (Right) Comparison of lipopolysaccharide (LPS) in blood following heat stress. LPS are found in bacterial cell walls and are used to detect the presence of bacteria.