

www.azte.com



Inventors

Cheryl Nickerson

Associate Professor The Biodesign Institute Arizona State University

James Wilson

Assistant Research Professor The Biodesign Institute Arizona State University

C. Mark Ott

Health Scientist NASA MID Continent Tech Transfer Center

Eric Nauman Assistant Professor Purdue Research Foundation

Michael J. Schurr

Associate Professor University of Colorado Health Sciences Center

Intellectual Property Status:

Patent Pending

Contact

Jack Geltosky, PhD

Senior Vice President

Business Development, Life Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1989

F: 480.884.1984

JGELTOSKY@AZTE.COM HEALTHSCIENCES@AZTE.COM

Methods and Compositions Based on Culturing Microorganisms in Low Sedimental Fluid Shear Conditions AzTE Case # M08-016

Invention Description

The low sedimental fluid shear conditions encountered during spaceflight and spaceflight analogue culture uniquely alter the virulence (disease-causing potential), gene expression, stress response, and metabolism of microbial cells in novel ways not observed using traditional culture conditions. Since low sedimental fluid shear environments also reflect conditions encountered by cells during the course of their normal lifecycles, including by pathogens in the human body during infection, analysis of organisms in this environment provides novel insight into how disease occurs and ways to engineer microorganisms for beneficial purposes. This knowledge can be directly translated into new commercial products and strategies. Key markets which could benefit from this technology include biopharmaceuticals, vaccine development, food industry, commercial spaceflight industry, and biotechnology solutions for energy and bioremediation.

Researchers at Arizona State University have developed methods to apply low sedimental fluid shear environments to cells in order to enhance or modify cellular characteristics. Correlating and isolating molecular genetic changes with phenotypic characteristics can provide new insight into the development of novel therapeutic, vaccine, and bioindustrial products. In addition, identifying the causes of spaceflight-induced microbial changes, especially alterations in virulence, holds major potential for solutions for the newly emerging commercial spaceflight industry.

Potential Applications

- Vaccines and therapeutic development
- Food processing and packaging
- Bioremediation and Microbial fuel cells
- Commercial spaceflight tourism

Benefits and Advantages

- Identifies unique cellular biosignatures not possible using other culture systems
- Induces unique cellular phenotypes and metabolic processes not possible using other culture systems