

TECHNOLOGY SOLUTION

Health, Medicine and Biotechnology

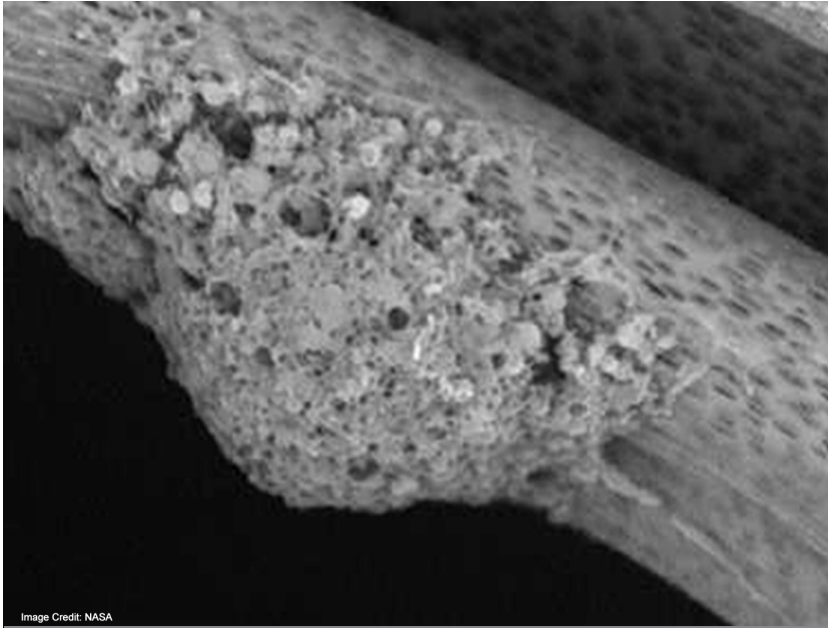


Image Credit: NASA

Electroactive Scaffold

Three-dimensional scaffold that mimics native biological environment

This technology, developed at NASA's Langley Research Center in collaboration with scientists at Duke University, is a novel three-dimensional scaffold structure that utilizes electroactive fibers for tissue and/or stem cell engineering. This invention enables electroactive fibers to be assembled into three-dimensional scaffolds to more closely mimic the native biological environment by providing biochemical, mechanical, and electrical cues.

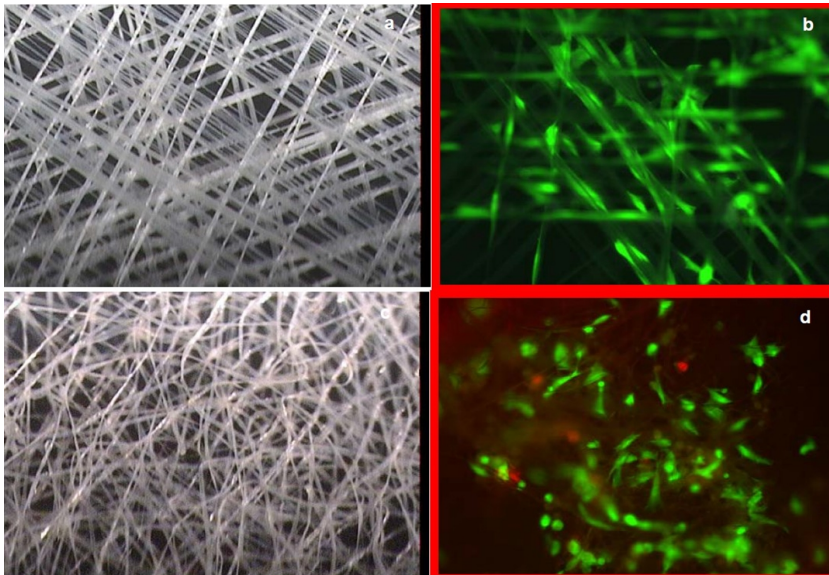
BENEFITS

- Mimics the native biological environment by providing biochemical, mechanical, and electrical cues
- Can be used with adult mesenchymal stem cells



THE TECHNOLOGY

Current scaffold designs and materials do not provide all of the appropriate cues necessary to mimic in-vivo conditions for tissue engineering and stem cell engineering applications. It has been hypothesized that many biomaterials, such as bone, muscle, brain and heart tissue exhibit piezoelectric and ferroelectric properties. Typical cell seeding environments incorporate biochemical cues and more recently mechanical stimuli, however, electrical cues have just recently been incorporated in standard in-vitro examinations. In order to develop their potential further, novel scaffolds are required to provide adequate cues in the in-vitro environment to direct stem cells to differentiate down controlled pathways or develop novel tissue constructs. This invention is for a scaffold that provides for such cues by mimicking the native biological environment, including biochemical, topographical, mechanical and electrical cues.



Live dead assay indicates excellent cell viability on aligned vs. nonwoven scaffold. Image Credit: NASA

APPLICATIONS

The technology has several potential applications:

- Stem cell treatments
- Tissue engineering
- Research and development

PUBLICATIONS

Patent No: 9,005,604; 9,758,761; 10,196,603

technology.nasa.gov

More Information

National Aeronautics and Space Administration

Agency Licensing Concierge

Langley Research Center

Mail Stop 020
Hampton, VA 23681
202-358-7432

Agency-Patent-Licensing@mail.nasa.gov

www.nasa.gov

NP-2015-08-2040-HQ

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

LAR-17789-1, LAR-17789-2, LAR-17789-3, LAR-TOPS-200