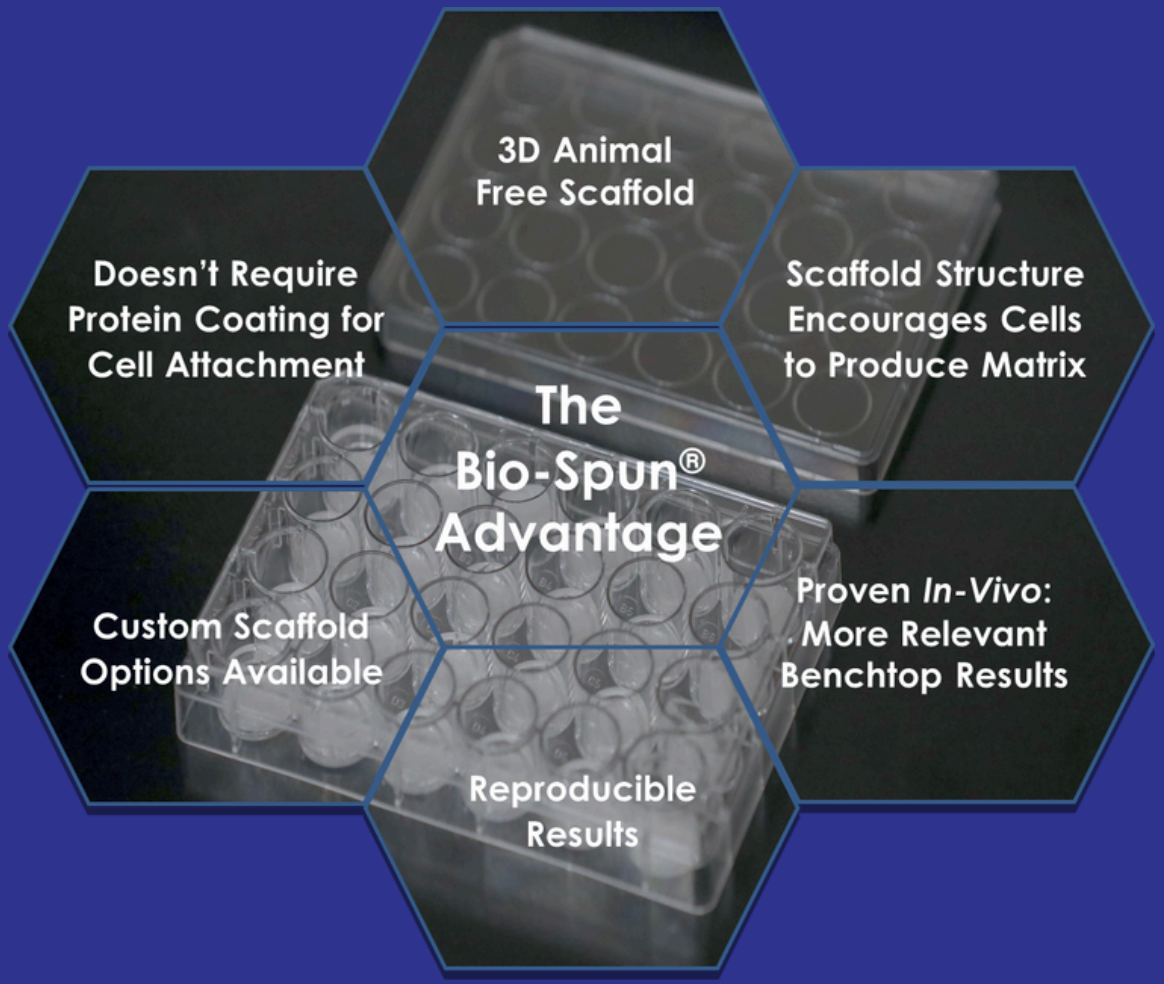
BioSurfaces, LLC



Bio-Spun Scaffolds® – A 100% Animal-Free, Customizable, and Human Relevant Tool for More Accurate Cell Culture Testing

Introduction

The way that cell culture is performed is long overdue for a change. That change is starting to happen now.

2D scaffolds and animal models have been used for over 60 years with little successful innovation. Researchers across all industries have relied on the results via these methods, which simply hasn't translated well to humans. The reason for this is that 2D surfaces or animal related cells are not biologically similar enough to generate success. With a failure rate of about 92% from preclinical to clinical trials, it is evident something needs to change.

Say goodbye to the old way and hello to human relevant data with 3D Bio-Spun® Scaffolds - the customizable solution to all your cell culture needs. Our innovative technology eliminates batch variation caused by animal collagen, reducing both time and cost.

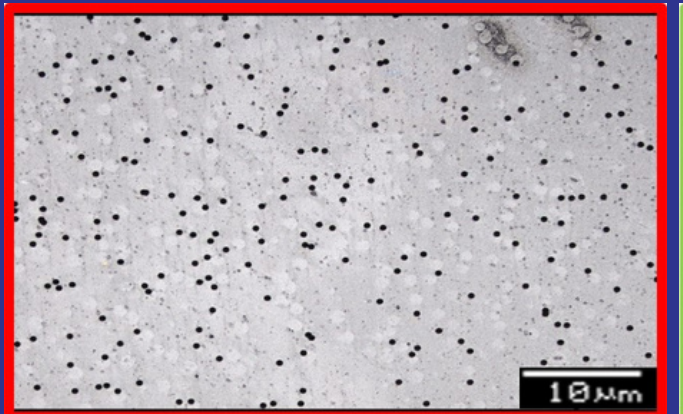
- Bio-Spun® Scaffolds offer a cost-effective, open-source model that ensures consistent data.
- Achieve consistent and reliable release profiles for drugs, growth factors, and proteins, while optimizing cell adherence or non-adherence through surface modifications.
- Go from benchtop to *in vivo*, providing a more accurate representation of *in vivo* interactions for identifying appropriate clones for drug development.
- Create full-thickness, animal-free models by leveraging open-source protocols and purchasing supplies.

Applications

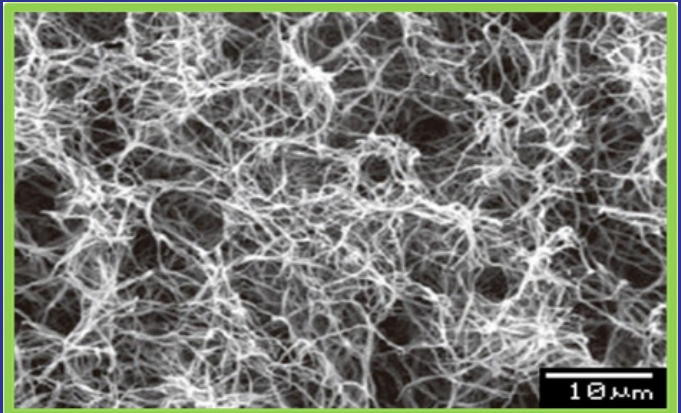
Bio-Spun® scaffolds are made via our patented proprietary electrospinning technology, which creates a randomized, nanofibrous 3D structure that closely resembles the natural extracellular matrix of the human body. The Bio-Spun® scaffolds come in different formats and material types, allowing you to grow whatever cells you need to accurately perform your tests.

Some Applications Already Done Include:

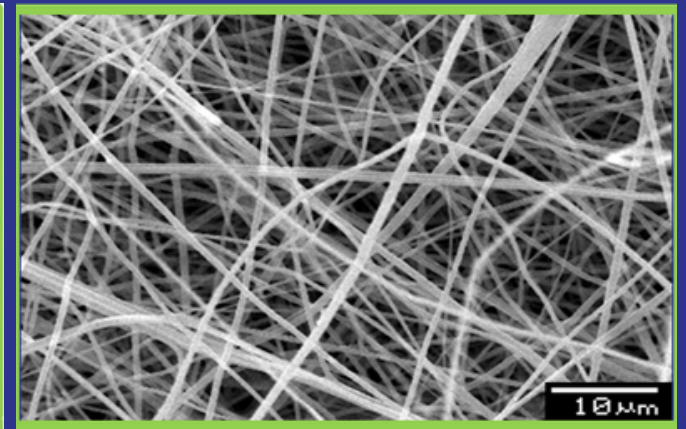
- Dermal (Skin Irritation, Skin Sensitization, Wound Healing)
- Respiratory (Infection, Toxicology, Inhaled Drug-Delivery)
- Ocular
- Cancer
- Skeletal Muscle
- Neuronal
- Blood-Brain Barrier
- Hepatic



Current Industry Standard



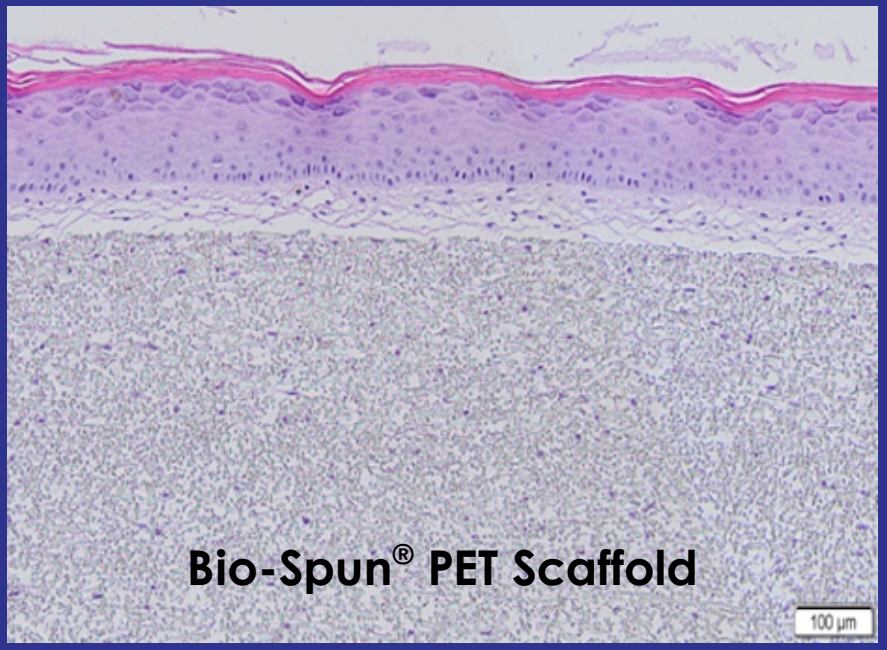
Body's Natural Scaffold



Bio-Spun® Scaffold

Full-Thickness Skin Model –

Synthetic Scaffold vs. Animal-Derived

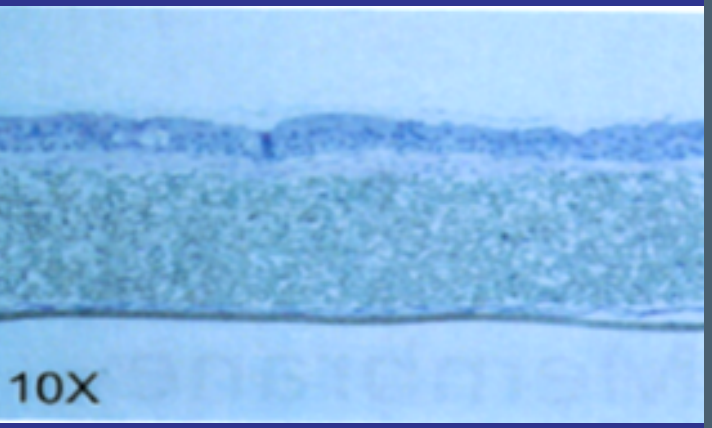


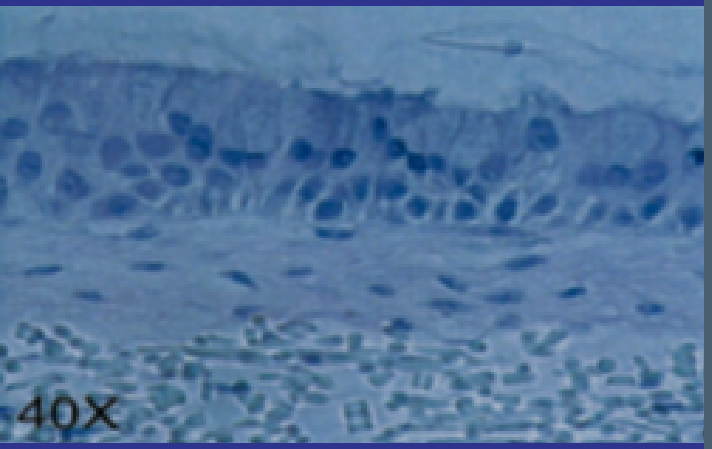
Bio-Spun® PET Scaffold

Rat-Tail Collagen Scaffold

Goal: Form Human-Derived *In Vitro* Skin Equivalent

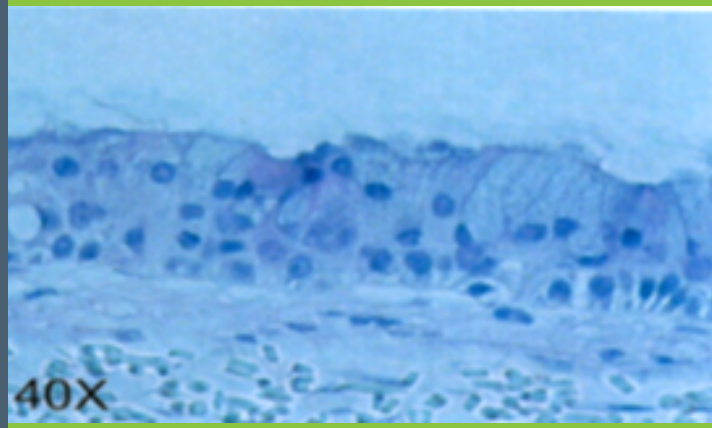
- Bio-Spun® scaffolds are seeded with human skin cells
- Dermal compartment contains human fibroblast-derived matrix components
- Unwanted contraction of dermal component is avoided
- Fully developed epidermis and fibroblast populated dermal development is comparable to animal collagen-derived scaffolds

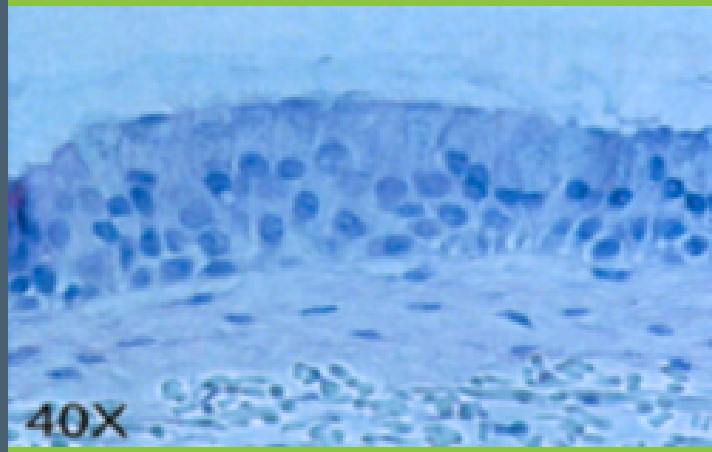




Goal: Form Human-Derived *In Vitro* Airway Equivalent

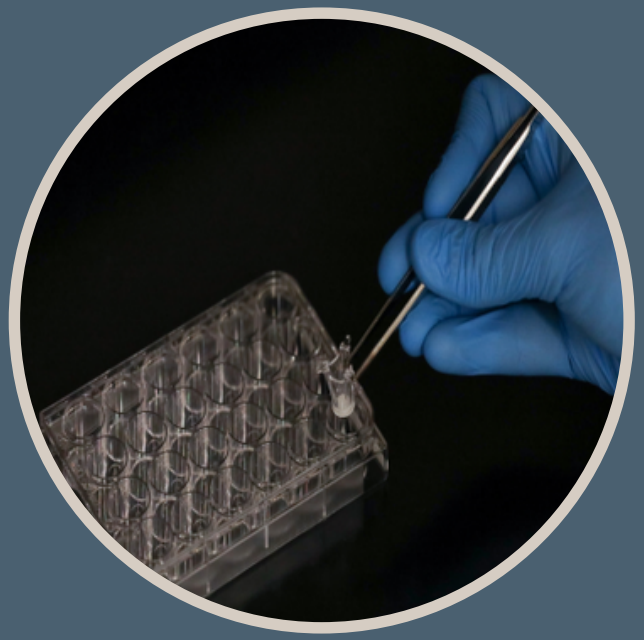
- Bio-Spun® Biomimetic Scaffolds are seeded with human airway cells
- Subepithelial matrix compartment contains human pulmonary fibroblast-derived matrix components
- Unwanted contraction of matrix component is avoided
- Formed fully-developed mucociliary epithelium and fibroblast populated sub-epithelial component
- Research applications include:
  - Respiratory Infection (Viral/Bacterial Pathogens)
  - Drug Delivery
  - Inhalation Toxicology
  - Tobacco Research





BIO-SPUN® PRODUCTS

- 6-Well Individual Insert - PET, PU, or Bilayer (PDLGA/PLLA)
- 12-Well Individual Insert - PET, PU, or Bilayer (PDLGA/PLLA)
- 24-Well Individual Insert - PET, PU, or Bilayer (PDLGA/PLLA)
- 24-Well High Throughput Screening - PET, PU, or Bilayer (PDLGA/PLLA)
- 96-Well High Throughput Screening - PET, PU, or Bilayer (PDLGA/PLLA)



PRODUCT INFO

All Bio-Spun® scaffold products for microphysiological systems (MPS) are readily available with standard thicknesses suitable for various applications. These include 150µm for PET, 20µm for PU, and options of 12µm or 100µm for Bilayer (PDLGA/PLLA). Scaffolds for inserts can be attached to a range of compatible products, including those from Finnadvance to VitroCell. The Bio-Spun™ scaffold can be suitable for any platform as it is very customizable.

DEEP DIVE INTO THE TECHNOLGY

BioSurfaces is a pioneering company in engineering biology with synthetic cellular matrices using patented proprietary electrospinning technology. Their Bio-Spun® materials offer improved biocompatibility and physical properties that can also be shaped uniquely. Controlled thickness, porosity, and fiber size allow for tailored products. Their materials are manufactured at room temperature, enabling easy incorporation of drugs or bioactive agents directly into the nanofibers. These drug-loaded electrospun polymers demonstrate consistent drug release and seamless device integration as proven in both lab and animal testing.

How We Can Help

Don't wait to start your next experiment. The Bio-Spun® scaffolds are a unique, animal-free product that can help you transition better from benchtop to clinical trial. Our scaffolds are one of the only materials to have already been tested and shown positive results in pre-clinical studies, making them more relevant for benchtop experiments. Our scaffolds provide an easier approach to testing, by saving you time and money in the long run. Our dedicated team of experts are happy to help you in any way we can. Interested in customizing or other products? Please feel free to reach out to us to set up a call.

To Learn More About Our Products:

https://www.biosurfaces.us/ivrt

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