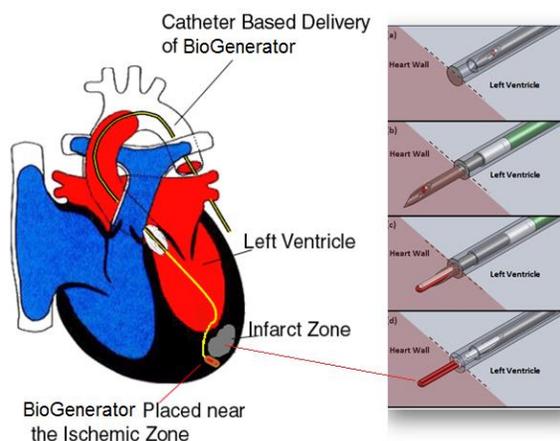


## NuVascular Technologies and Worcester Polytechnic Institute Commercializing Stem Cell Treatment to Repair Heart Damage

*'BioGenerator,' a minimally invasive nanotechnology solution,  
will treat the leading cause of U.S. deaths*

**Ashland, Mass., January 5, 2015** – NuVascular Technologies, Inc. has recently obtained exclusive licensing rights to commercialize a breakthrough medical device that will provide a minimally invasive treatment for heart disease, the No. 1 cause of death in the United States accounting for one in every four deaths.

The BioGenerator stem cell device allows the heart to repair itself and could improve heart function in as little as two to four weeks. NuVascular Technologies is teaming up with researchers at both the Worcester Polytechnic Institute (WPI), and BioSurfaces, Inc. who contributed to the development of this technology. This collaboration resulted in the issuing of U.S. patent 8,691,543.



The BioGenerator is a medical device consisting of two essential parts: a capsule made from BioSurfaces' patented electrospinning technology, and stem cells derived from adult bone marrow at WPI. The BioGenerator can be stitched into the heart muscle wall or injected into the heart muscle itself through a catheter (Figure attached). Both options are minimally invasive, do not require open-heart surgery and allow the heart to repair itself. The encased stem cells release proteins and growth factors that move through the device into the heart

muscle, stimulating the cardiac myocytes to grow and repair damage.

"Our research has given every indication that these devices could be revolutionary in repairing heart damage and treating heart failure," said Dr. Glenn Gaudette, an associate professor in the Department of Biomedical Engineering at WPI, who has been working with BioSurfaces, Inc. on this technology for six years. "While cells contained in the scaffold of the nanofibrous material cannot escape, oxygen and molecules can move through the nanofibrous membrane to stimulate the cells within the damaged heart."

It is especially important to contain the stem cells because they can travel into undesired areas. The electrospun fibers of the catheter and capsule control the dispersion of stem cells and allow removal of the cells at any time.

“Our nanofibrous scaffold will ensure that the therapeutic benefit provided by stem cells will be localized directly to the damaged area of the heart,” said NuVascular Technologies founder and Chief Technical Officer Matthew Phaneuf. “This scaffold will also prevent the cells from leaving the target area while permitting easy removal of the device, if required. We are confident that our devices can provide a minimally invasive, highly effective treatment for heart disease that can actually reverse the damage rather than providing a temporary solution that often comes with complications.”

Another device currently in development by these investigators in conjunction with investigators at Columbia University and Stony Brook University is a biological pacemaker.

Instead of using a battery-powered mechanical device to control the electrical impulses in the heart to beat the correct way, the biological pacemaker uses modified stem cells that serve the same function. This could overcome many of the limitations of mechanical devices, including the need to change batteries and device infection. The scaffold being developed by NuVascular Technologies will help contain the cells in the desired location within the heart.

All of the devices in development are part of NuVascular Technologies’ licensed, patented platform technology currently being developed for a broad range of applications.

Heart failure affects more than 5 million people in the United States alone and costs more than \$39.2 billion per year. It is also the single most common hospital discharge diagnosis. There currently is no cure.

Coronary heart disease, the most common type of heart disease, often results in permanent damage to part of the heart muscle and a reduced ability of the heart to pump blood effectively. Unlike other muscles in the body, heart cells do not spontaneously repair themselves or proliferate on their own. However, recent research has suggested that the human heart can regenerate.

**About NuVascular Technologies:**

NuVascular Technologies, Inc. was established in Ashland, Mass., in 2014. The company was formed to commercialize patented technology developed over the past decade by BioSurfaces, Inc. and to further develop next-generation nanotechnology. Under the direction of an experienced management team, the company is developing medical solutions that mimic natural tissue growth and incorporate targeted drug delivery.

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