

Pig tissue scaffolding allows hearts to be rebuilt post-implant

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Prof. Marcelle Machluf

(Medical Xpress)—Using tissue from pigs, scientists at the Technion-Israel Institute of Technology have created a "scaffold" that preserves the infrastructure of natural blood vessels and supports human stem cells. The result a rebuilt heart that could be used as a post-heart attack implant.

To create their scaffold, the team led by Prof. Marcelle Machluf, of the Faculty of Biotechnology and Food Engineering, used extracellular matrix proteins, the outer part of animal tissue that, among other functions, provides structural support to cells. They made sure their matrix was as free as possible from components that could provoke immunological rejection, while still retaining its inherent vasculature.

"We used pig heart tissue, as it is physiologically similar to the human heart," said Prof. Machluf. "Its [protein composition](#) is 98 percent identical to human heart tissue, so the scaffold (and other transplanted pig organs) is not rejected by the [human immune system](#)."

Heart attacks are a leading cause of death and disability in the Western world. When they strike, the blood supply to the myocardium (the middle of the three layers forming the wall of the heart) is impaired and, as a result, a scar is formed in the affected area. Since it does not have the ability to pump blood, the [scar tissue](#) significantly burdens the healthy parts of the heart.

Current clinical treatments for heart attacks employ drugs and/or surgery to improve [heart function](#) after a heart attack, and to prevent any recurrence. But these treatments cannot change scar tissue into healthy myocardial tissue, so the only current options for end-stage [heart patients](#) are [heart transplants](#) or pacemakers. Both options are costly and limited in terms of availability.

Use of scaffolds for replacing damaged tissue with healthy transplanted cells should have biomechanical properties that are compatible with those of the myocardium, support the cells and the rehabilitating tissue, provide the required biochemical signals, and break down as the natural extracellular matrix is secreted.

The findings were published in the October issue of *Tissue Engineering*.

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