Straight from the heart: An elastic patch that supports cardiac cell growth

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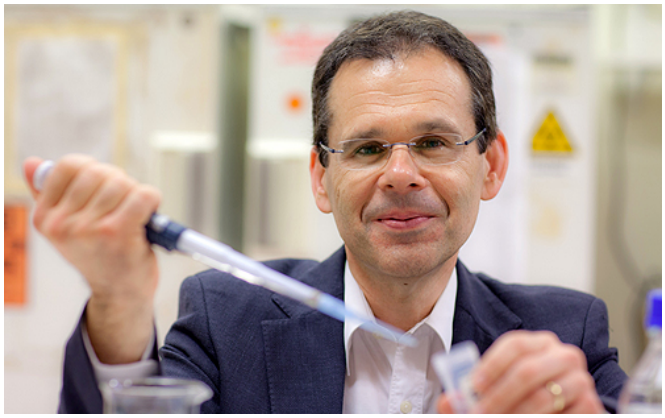

Professor Tony Weiss: "No other elastic material behaves in this way."

(Medical Xpress)—Scientists are a step closer to being able to repair damaged human heart tissue thanks to a world leading research collaboration between the University of Sydney and Harvard University.

Professor Tony Weiss from the University's new Charles Perkins Centre and his colleague from Harvard, Professor Ali Khademhosseini, led the joint research project from their respective labs.

Their research findings have been released today in two international leading journals, *Advanced Functional Materials* and *Biomaterials*.

Professor Weiss said the scientists used a natural elastic protein called tropoelastin, which is found in all elastic human tissues.

"Then, we bathed it in bright light to make highly elastic patches which were made in less than one minute," he said.

"They are amazingly stretchy - up to four times their length. They have superior mechanical properties and usefully support cell growth inside and on their surfaces."

"The patches are patterned to direct the growth of heart muscle cells and allow the cells to beat in synchrony."

The researchers further found the elastic patches then promoted the attachment, spreading, alignment, function, and intercellular communication of heart cells isolated from rat heart by providing an elastic mechanical support that mimics their dynamic properties in vivo. They even beat in synchrony on these elastic substrates and respond to electrical stimulation.

The materials were built, tested and handled by a Research Fellow shared between both the Sydney and Harvard labs, Dr Nasim Annabi. The Australian National Health and Medical Research Council recently recognised Dr Annabi with a prestigious CJ Martin award.

"No other elastic material behaves in this way. It is so powerful because it uses a natural elastin protein. And we can surgically stitch it to help repair tissue," Professor Weiss said.

The international collaborative team has reported their success using the material to successfully engineer cardiac tissue and have applied for a patent.

Provided by University of Sydney