Researchers getting closer to growing a human heart

March 25 2013, by Bob Yirka

Image: Wikimedia Commons

(Medical Xpress)—Researchers in Spain, led by doctor Francisco Fernandez-Aviles, are blazing a trail in bioengineering that could result, the *Wall Street Journal* reports, in human hearts, or parts of them, being grown in a lab and transplanted into live patients, within the next decade. It's all due to advances in technology that have seen organs such as bladders and windpipes grown and implanted into patients, replacing those that have been damaged due to disease.

Bioengineering is the process of building or growing real human organic parts for use in real human beings. It's all based on coaxing stem cells into growing into whatever body part is desired. To accomplish that feat, researchers are trying several techniques. One way is to build or acquire

what is known as a scaffold, which is the underlying structure that causes an organ to have a particular shape. With an ear for example, the scaffolding is made up of cartilage—a softer organ, such as the heart also has scaffolding, though it's made up of collagen and several types of proteins.

The first successful creation of an organically grown human body part came about in a lab in North Carolina in 1996—there a team successfully grew a human bladder. Since that time, more bladders have been grown and have been successively implanted into patients, as have wind pipes, noses, urethras, tear ducts, and arteries. Scaffolds are built using natural resins, fibers and other materials, in mold casings. Once built, they are covered with stem cells (taken from the patient's bone marrow, fat, etc.), which are then coaxed, using various chemicals, into growing into the material that normally covers the scaffolding. Growing organs has evolved to the point that implanting them into patients around the world has become nearly routine. But not so for some organs, primarily the heart, which is unique for several reasons. One of them is because it's so vital—if it fails, the person dies. Another is because it's vastly more complex than an ear, nose or larynx. It's taken a lot of trial and error by researchers such as Aviles and his team at the Gregorio Marañón hospital in Spain to make small inroads. The team there, using research done by Doris Taylor, is testing a way to use the scaffolding from a donor as the basis for growing a new heart, and then teasing individual components into growing into the needed parts, e.g. those that beat, form blood vessels, conduct electrical signals, etc. One of those components, a successfully grown coronary artery is to be implanted into a live patient as early as late this year.

In looking at the pattern of success the team has achieved, Aviles and his team say they are confident that they will be able to grow a working heart within five years, and should be ready to implant one into a patient within a decade's time.

© 2013 Medical Xpress

Citation: Researchers getting closer to growing a human heart (2013, March 25) retrieved 23 April 2024 from https://medicalxpress.com/news/2013-03-closer-human-heart.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.