

IFL Science!

World's First Lab-Grown Human Blood Vessels Are a "Game Changer" for Millions of People

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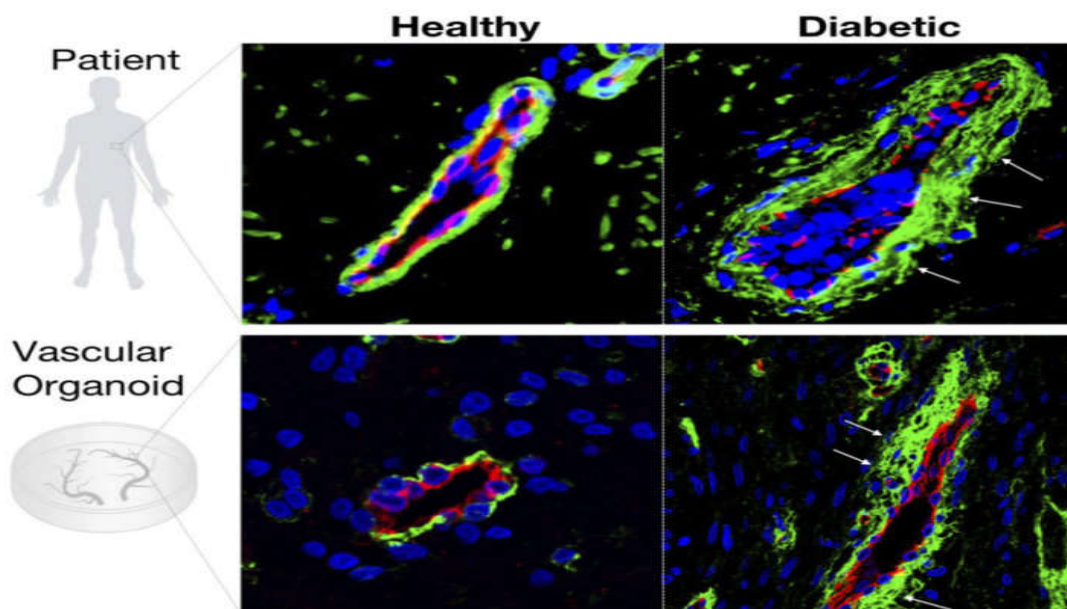
By Tom Hale

For the first time, scientists have grown “perfect” human blood vessels in a petri dish, a feat that the researchers say is a “game changer” for people with diabetes and other conditions that meddle with blood vessels.

A team from the Austrian Academy of Sciences and the University of British Columbia created the three-dimensional organoids using stem cells, which are a bit like blueprint cells capable of morphing into hundreds of different cell types found in our bodies. As reported in the journal *Nature*, the lab-grown blood vessel organoids were then transplanted into mice – and they functioned perfectly, just like normal.

“Being able to build human blood vessels as organoids from stem cells is a game changer,” senior author Josef Penninger said in a statement.

Diabetes affects more than 420 million people around the world. The condition, although often manageable, can lead to some real difficulties with blood vessels due to damage caused by elevated glucose levels. As a result, people with severe diabetes can go on to suffer blindness, heart attacks, strokes, kidney failure, and even amputation of limbs. However, very little is known about how or why diabetes and elevated glucose levels can lead to vascular problems.



The basement membrane (green) around the blood vessels (red) is enlarged in people with diabetes (white arrows). The human vascular organoids that were made “diabetic” in the laboratory can now be used as a diabetic model to identify new treatments. IMBA

Previously studies have shown it's possible to culture a number of different human-celled organoids, which can potentially be used research health, illnesses, and drug treatments. As for the blood vessel organoids, they could be used to research the underlying causes of vascular diseases, then use that to develop and test new treatments for patients.

The blood vessel organoids were also sunk into a "diabetic" environment in a petri dish. Remarkably, they reacted just like a diabetic patient's blood vessels, with the basement membrane showing distinct signs of thickening, which makes it harder for nutrients and oxygen to access the cells. Their lab-grown vessels have already shed some light on the problem. Anti-diabetic medications did not prevent blood vessel thickening, however, they discovered an inhibitor of γ -secretase enzymes did appear to have a positive effect.

"What is so exciting about our work is that we were successful in making real human blood vessels out of stem cells," first author Reiner Wimmer, a postdoctoral research fellow at the Austrian Academy of Sciences. "Our organoids resemble human capillaries to a great extent, even on a molecular level, and we can now use them to study blood vessel diseases directly on human tissue."