With Scaffold for Regenerating Arteries, Cardiovate Raises $350,000

Xconomy Texas — San Antonio — An early stage San Antonio startup that aims to repair or replace clogged arteries with regenerated tissue has closed a small financing round from angel investors, The University of Texas Horizon Fund, and Targeted Technology, according to its CEO.

Cardiovate, founded in 2012, closed a $350,000 round of convertible notes from the investors in August, according to CEO Mark Standeford, who joined Cardiovate in 2014. The company plans to use that money, as well as an additional $150,000 it may seek, for patent legal work and to start a year-long animal study of its medical device, Standeford says.

The device is a type of bioabsorbable material called polycaprolactone (PCL), which are commonly used in tissue engineering or repair. Cardiovate's PCL is a cylindrical scaffold is intended for people who suffer from peripheral arterial disease—blockages in blood vessels that carry blood from the heart to the body's extremities, like the legs.

The condition impacts some 8.5 million Americans and predominately older individuals,according to the Centers for Disease Control. It blocks the flow of blood in the artery and can result in anything from severe pain to nerve damage to the loss of a limb, as well as high blood pressure and potential cardiac diseases, Standeford says.

The most common first treatment is to bypass the clog in the artery with another blood vessel from a patient or a cadaver, typically a vein since they're more abundant. If that isn't possible—it isn't for about half of the patient population, Standeford says—physicians will look to restore blood flow with angioplasty. The physician in essence opens up the blocked artery with a balloon, and places a small mesh tube there (a stent) to keep blood flowing.

Using another blood vessel is generally preferable to a synthetic stent because the body's immune system can react against the foreign material, and the clog can reform in the stent, Standeford says. Cardiovate's scaffold aims to act more like another blood vessel, and would be implanted similarly. The scaffold also bypasses the clog, connecting on either end of the artery. Its circular shape allows blood to flow through it, and as the blood does, the scaffold's design helps regenerate new artery tissue, according to Standeford.

The inside of the scaffold has curved fibers, which help generate new endothelial lining for the artery—the tissue on the interior of a blood vessel—as the blood flows through the scaffold, he says. Meanwhile, the exterior of the scaffold has linear fibers, which Standeford says encourage the growth of smooth muscle cells that encourage growth of the exterior of the arteries. Once the artery has regenerated, the PCL scaffold gradually dissolves.

The company has had success in a very early, small 30-day trial, Standeford said, which was funded by a $150,000 SBIR grant from the National Science Foundation. Cardiovate hasn't released the results yet. Standeford says the goal was to prove the scaffold could be not only better than synthetic products, but as good or better than harvested blood vessels.
"We're going head-to-head with vein vascular bypass with the hopes that we would actually show some superiority because we're actually developing arterial blood vessels," Standeford says.

The company plans to apply for a second $750,000 grant from the NSF in January to help pay for its pending one-year animal study. It would be three to four years before the product could be considered for commercialization, he says.

The innovation and patentable part of the device—having circular or linear fibers to promote cellular growth—was developed by a University of Texas at San Antonio biomedical engineering student, Jordan Kaufmann, and her two advisors. Kaufmann is now the chief technical officer of Cardiovate. Her advisors, who are on the company's board, were UTSA biomedical engineering professor Mauli Agrawal, and Steven Bailey, the chief of UT Health Science Center at San Antonio's cardiology division.

Kaufmann won $50,000 from the UT Horizon Fund at a 2012 pitch competition.

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