An "off-the-shelf" biological vascular graft

Tissue engineered vascular grafts hold great promise for clinical treatment, but have been difficult to develop for human use. In a new paper published in *Science Translational Medicine*, Robert Tranquillo and colleagues report the successful development of a biological "off-the-shelf" arteriovenous (AV) graft capable of recellularizing in large-animal models (*Sci. Transl. Med.* **9**, eaan4209; 2017), which they hope will one day translate well into humans. The team had done similar work in sheep, but to convince himself the strategy could work in humans, Tranquillo wanted to develop a graft from human cells, and show that it would take in a human-like model system.

"When we got to the point where we had generated results that we thought were quite successful in the sheep model, then I had to ask the question, what do we have to do in order to get into the clinic," said Tranquillo. Using human dermal fibroblasts encased in a fibrin gel that is remodeled into a collagenous tissue by the fibroblasts in a bioreactor, the team's newly reported graft is then "decellularized" in the lab, creating a scaffold that is completely biological but non-living (and hence the shelf life). Using several methods of evaluation in baboons, the team demonstrated that their grafts can be successfully recellularized by the host after implantation, which is critical to implant durability upon repeated puncture for hemodialysis. Their work moves a new generation of AV grafts closer to the clinic, and provides an example of how using a small number of appropriate animal models can help bridge the translational gap.

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