Health & Medicine

Medical Breakthrough Could Increase Supply of Donor Organs

By
David J. Craig
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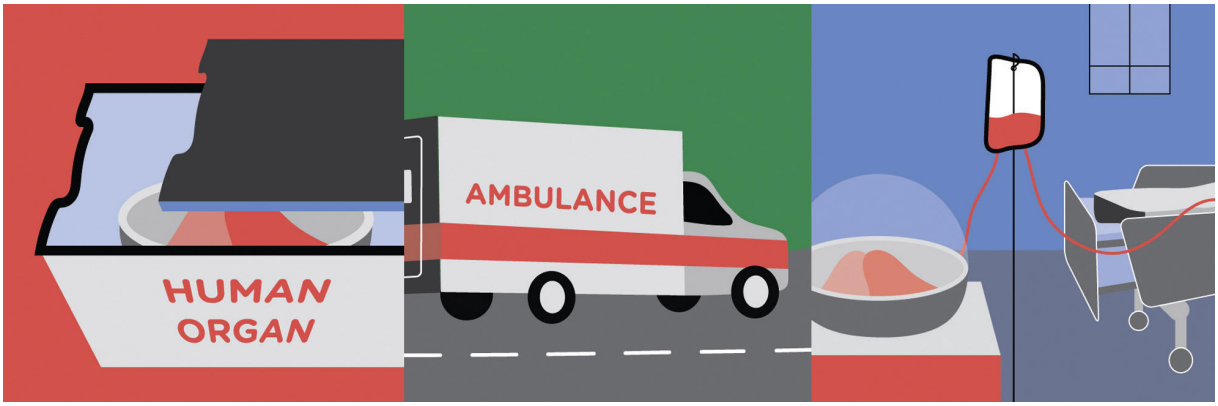

A donor organ is put on ice, delivered to the recipient, and then infused with that person's blood and stem cells before surgery

Every year, thousands of Americans die awaiting organ transplants. Donor shortages are a problem, but another is that organs deteriorate quickly: by the time they are harvested, packed in ice, and transported to where they are needed, many are no longer usable.

Now researchers led by Gordana Vunjak-Novakovic, a Columbia professor of biomedical engineering and medical sciences, and Matt Bacchetta, a Columbia associate professor of surgery, have developed a procedure that they say could enable physicians to repair the damage that donated organs incur en route, thereby dramatically increasing the number that can be transplanted. Their approach, which begins at the bedside of the intended recipient, calls for placing the organ into a hermetically sealed chamber and infusing it with blood and stem cells derived from that patient. They say that after a few days in this apparatus, an organ could be restored to near-perfect health and be ready for transplantation.

“The organ would receive a continuous flow of the recipient’s blood so that its dried-out capillaries and veins would open up and function properly again,” says Vunjak-Novakovic. “At the same time, any parts of the organ with extensive cellular damage would be restored by the growth of new tissue developing out of the stem cells.”

Vunjak-Novakovic, Bacchetta, and colleagues recently tested their procedure on a pig lung, successfully restoring its function after having allowed it to deteriorate for several days. They say their technology — which is currently designed for transplanting lungs but could be adapted for other organs — should be ready for human trials within two to three years.

“We’ve chosen to focus on lungs at first because they are especially fragile: more than 80 percent of donated lungs are deemed unusable by surgeons when they arrive at their destination,” Vunjak-Novakovic says. “We think that if we can restore lungs, we could also restore livers, kidneys, pancreases, and even hearts.”

Illustration by Annalisa van den Bergh

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