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Sweet technique makes blood vessels using sugar and 3-D printer

By Jon Bardin, Los Angeles Times / For the Science Now blog

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It's the most exciting use of the 3-D printer since the [burritoBot](#): Scientists have figured out a way to make networks of blood vessels out of sugar that can be surrounded by living cells, bypassing what had been a major roadblock in the path to creating organs for transplant, or even lab-made prime steaks.

Researchers have made significant progress toward the production of living tissue in the lab, but the studies

have been plagued by an inability to successfully fill the tissues with vasculature. As a result, the cells on the inside of the tissues, away from the surface, do not receive enough blood and die, a process called necrosis. So scientists have been limited to producing very thin strips of cells, prohibiting the production of whole organs and synthetic steaks.

In the new study, carried out by researchers at the University of Pennsylvania and MIT, scientists used a 3-D printer to produce a lattice made out of sugar that cells — such as liver cells — could be grown on. Once the cells link together and the lattice is no longer needed, it can easily be dissolved, leaving a hollow set of vessels that can be perfused with blood within minutes, drastically limiting the necrosis seen in previous methods. A video demonstrating the technique is at the top of this post.

Writing in the journal *Nature Materials*, the scientists even showed that blood vessel cells passed through the vascular network would sprout new blood vessels, extending the reach of the vascular network deeper into the tissue and promoting its survival.

While the study improved the process of creating tissue in the lab, the researchers acknowledge that there is still a long way to go before they are ready to produce organs from scratch. They still need to learn how to connect these vascular networks to existing vasculature in a living body, for example, and they will also need to create a system that can continue to support ever larger amounts of cells.

But the researchers are optimistic that their method, which can be carried out by any scientist with access to a 3-D printer, will speed up progress in the field so that, before long, doctors can call for a lab-grown liver and diners can order a lab-grown steak.

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