

# Ink-jet printers inspire scientists to make skin

February 20 2011

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A medical worker cleans a surgery room. Ink-jet printing technology has inspired scientists to look for ways to build sheets of skin that could one day be used for grafts in burn victims, experts said Sunday.

Ink-jet printing technology has inspired scientists to look for ways to build sheets of skin that could one day be used for grafts in burn victims, experts said Sunday.

One technique involves a portable bioprinter that could be carried to wounded soldiers on the battlefield where it would scan the injury, take cells from the patient and print a section of compatible skin.

Another uses a three-dimensional printer combining [donor cells](#), biofriendly gel and other materials to build cartilage.

The 3-D printer was shown at work, building a prototype of an ear during a half-hour demonstration at a Washington science conference.

Hod Lipson of Cornell University in New York said it worked much like an ink-jet printer.

"It spits out plastic to gradually build an object layer by layer... after a couple of hours you end up with a real physical object that you can hold in your hand," he said.

"Just imagine -- if you could take cells from a donor, culture them, put them into an ink and recreate an implant that is alive and made of the original cells from the donor -- how useful that would be in terms of avoiding rejection," said Lipson.

"That is where we are going. Let's see how far we can go."

Studies using the technology in animals have shown promise, particularly with printed [cartilage](#), which is relatively simple in its construction and is tough so it can withstand the rigors of printing.

"There are very severe limitations," Lipson said. "We are right now limited to cells... that can handle being printed."

Scientist James Yoo of Wake Forest University in North Carolina said his team's approach to printing skin has shown positive results in repairing skin in mouse and pig models.

"One approach is to directly deploy cells to the wound site and the other approach is to build a tissue construct outside the body and transfer it into the body," said Yoo.

The technology works in part via a scanner that takes a measure of the

affected area and identifies the depth and extent of the injury, informing the bioprinter of how many layers of [cells](#) need to be made.

Both scientists said the advances were still in their early stages and required more research and refinement before they are ready for human patients.

"One of the challenges that we will eventually face is like anything else, when you are trying to transfer the technology into the body, how can we create and connect those tissues?" said Yoo.

"Whatever you put in the body has to be connected with the body's blood vessels, blood supply and oxygen."

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Citation: Ink-jet printers inspire scientists to make skin (2011, February 20) retrieved 24 April 2024 from <https://medicalxpress.com/news/2011-02-ink-jet-printers-scientists-skin.html>

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