Inkjet-like device ''prints'' cells right over burns

(Reuters) - Inspired by a standard office inkjet printer, U.S. researchers have rigged up a device that can spray skin cells directly onto burn victims, quickly protecting and healing their wounds as an alternative to skin grafts.

They have mounted the device, which has so far only been tested on mice, in a frame that can be wheeled over a patient in a hospital bed, they reported Wednesday.

A laser can take a reading of the wound's size and shape so that a layer of healing skin cells can be precisely applied, said the team at Wake Forest University in Winston-Salem, North Carolina.

"We literally print the cells directly onto the wound," said student Kyle Binder, who helped design the device. "We can put specific cells where they need to go."

Tests on mice showed the spray system, called bioprinting, could heal wounds quickly and safely, the researchers reported at the Translational Regenerative Medicine Forumb.

"We were able to close the entire wound in two weeks," Binder said. Mice with plugs of skin removed that were not treated took five weeks to heal, he said.

The team will eventually seek U.S. Food and Drug Administration approval to test the device on humans, said George Christ, a professor of regenerative medicine at the school.

They are working with the U.S. Armed Forces Institute of Regenerative Medicine to come up with ways to help soldiers wounded in Iraq and Afghanistan. It could be used to close various types of wounds as well as burns.

Binder and colleagues dissolved human skin cells from pieces of skin, separating and purifying the various cell types such as fibroblasts and keratinocytes.

They put them in a nutritious solution to make them multiply and then used a system similar to a multicolor office inkjet printer to apply first a layer of fibroblasts and then a layer of keratinocytes, which form the protective outer layer of skin.

The wound on the mouse was completely closed by three weeks, they reported. Experts say victims of massive burns usually die of infection within two weeks unless they receive skin grafts, and normal grafting often leaves severe scars.

The sprayed cells also incorporated themselves into surrounding skin, hair follicles and sebaceous glands, probably because immature cells called stem cells were mixed in with the sprayed cells, the researchers said.

"You have to give a lot of credit to the cells. When you put them into the wound, they know what to do," Binder said.

The next step is to try the system on pigs, whose skin more closely resembles the skin of humans. Binder said it may also be useful for treating diabetic foot ulcers, a common problem.

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