

Researchers use burn victims' own cells to regrow skin up to 30 percent quicker

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Human skin structure. Credit: Wikipedia

University of Toronto researchers are planning to give burn victims live stem cells from their own burned skin in an effort to speed up recovery and increase their chances of surviving fires and industrial accidents.

And they're preparing to begin human trials by early 2019.

Saeid Amini-Nik and Marc Jeschke, researchers at the Faculty of Medicine, were the first to find live stem cells in the discarded dermis layer of the skin of burn victims, and to apply these cells for faster skin regrowth in animal models. They published their results in *eBioMedicine*.

Currently, physicians remove burned skin and discard it. They add a collagen dressing to the burned site, and hope the new skin regrows before the patient gets a fatal infection – a process that can take months.

"With cells added to the collagen, we expect the process of healing would be very fast – possibly days instead of weeks or months," says Amini-Nik, an assistant professor in the department of laboratory medicine and pathobiology. "For burn patients, time is very important: With the open wound and the need to change dressings, their chance of infection is high, and sometimes they die of sepsis.

"Much faster healing would be a major step forward."

Scientists have long attempted to use stem cells for burn healing, but always using cells from other people's organs, such as umbilical cords. Rejection rates are high. Surgically removing undamaged skin or bone [marrow stem cells](#) is tough because the people most in danger of dying from their wounds are those who have burns covering more than half of their bodies, and are already at great risk of infection.

Until now, almost nobody thought of looking for viable cells in the burned skin itself, which is normally considered medical waste. When the U of T researchers began looking in the first pieces of discarded skin, they hoped to find even one living cell. They were exhilarated by the discovery of thousands of cells – in some cases up to one million cells.

Next came the preclinical trial, in which they found that [human stem](#)

[cells](#) added to the animals' collagen dressing hastened skin regrowth by 30 per cent. There were no problems with rejection, and the cells – harvested from the collagen-rich dermal layer – seemed to create more natural skin. With human trials, they hope for even higher regrowth, since they will be using [human cells](#) on people.

"Because we're using actual [skin stem cells](#), and not from some other part of the body, we believe the quality of the skin will be better," says Amini-Nik, who conducted the study at the Sunnybrook Research Institute where Jeschke is a principal clinical researcher. He is also a professor in the Faculty of Medicine.

"You want skin that stretches normally. In burn patients skin gets scarred and they have trouble moving joints because skin is not elastic.

"We also believe this will be better for quality of life: Itching and inability to sweat are big problems for burn patients. We believe if we use the stem [cells](#) from the very same organ, we'll grow better [skin](#)."

Using a patient's own [stem cells](#) also won't raise ethical issues, he says.

"Our goal is no death, no scar, and no pain," adds Jeschke. "With this approach we come closer to no death and no scar."

More information: Saeid Amini-Nik et al. Stem cells derived from burned skin - The future of burn care, *EBioMedicine* (2018). [DOI: 10.1016/j.ebiom.2018.10.014](https://doi.org/10.1016/j.ebiom.2018.10.014)

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