



# HELPING BURN SURVIVORS HEAL

## Clinical Trial Spotlight

**PHOTO:** Kevin Bolusi who participated in the trial

**Clinical trials are the driving force behind medical progress, offering hope to patients, saving lives through innovative treatments, and propelling the boundaries of scientific knowledge.**

**The Stem Cell Network (SCN) sat down with Dr. Véronique Moulin to discuss her team's groundbreaking research and clinical trial that is focused on using stem cells and tissue engineering to reconstruct skin damaged from severe burns.**

## Rebuilding Skin Using the Body's Own Cells

Severe burns are among the most devastating injuries a person can experience, often requiring multiple surgeries, painful skin grafts, and years of recovery. For patients with extensive burns, there may not be enough healthy skin left on the body to support traditional treatment methods.

At Université Laval's LOEX Centre, in the specialized clean rooms of the research center of CHU de Quebec-Université Laval and affiliated burn units across Canada, Dr. Véronique Moulin and her team are working to change that reality through regenerative medicine. Dr. Moulin's research focuses on creating lab-grown "Self-Assembly Skin Substitutes (SASS)" using a patient's own cells. The innovative treatment aims to enable the closure of wounds in severe burn survivors who would otherwise remain for many months in specialized burn units while awaiting wound closure.

The Stem Cell Network (SCN) is a Canadian not-for-profit that supports stem cell and regenerative medicine research; training the next generation of highly qualified personnel; enabling knowledge mobilization of research; and enhancing the commercialization readiness of stem cell and RM innovations. From the lab to the clinic, SCN's goal is to power life-saving therapies and technologies through regenerative medicine research for the benefit of all.



**PHOTO:** Dr. Moulin

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**We have found the right conditions to reconstruct skin. And for this skin to survive in the long term, once it is grafted, you need the right conditions to support the stem cells. We think we have found the winning conditions for finding, cultivating, and maintaining them in a culture.”**

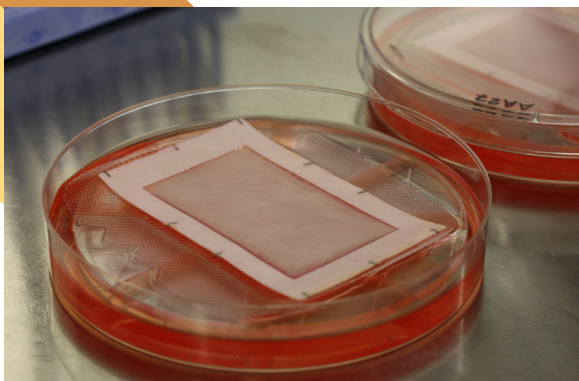
— DR. VÉRONIQUE MOULIN

Traditional treatment for deep burns often relies on autografting, a process where surgeons remove healthy skin from another part of a patient’s body to cover the damaged area. While lifesaving, the procedure creates additional wounds and can be extremely painful. In cases where patients suffer burns over large portions of their bodies, there may not be enough healthy skin available.

Dr. Moulin’s team has developed a solution that uses a small biopsy of a patient’s skin — roughly the size of a toonie — to generate large quantities of replacement skin in the laboratory over the course of two months.

The process combines tissue engineering and stem cell science to reconstruct both layers of the skin: the dermis and the epidermis. Researchers isolate the patient’s skin cells and cultivate them under carefully controlled conditions that encourage the cells to behave as they naturally would inside the body.

“We essentially create the right environment for the cells to do what they are already programmed to do,” explained Dr. Moulin. “The cells themselves build the tissue.”



**PHOTO:** SASS reconstructed skin.

## Expanding a Clinical Trial Across Canada

Dr. Moulin’s team first treated patients using the technology in 2005 under special authorization from Health Canada. In 2015, researchers launched an early-stage clinical trial to scientifically evaluate how the skin substitutes compare to traditional autografts.

With support from SCN, the clinical trial expanded beyond Quebec to include eight burn units across Canada, with a ninth unit in the process of joining. To date, approximately 40 patients have received the treatment, and roughly half of those treated in the clinical trial were minors under the age of 18.

The results are very encouraging. Not only do patients report that areas treated with the skin substitutes feel more supple and comfortable, but the benefits are profound for younger patients who typically require multiple operations due to pathological scarring and their growing bodies. Surgeons report that after receiving skin substitutes, patients do not develop pathological scars and the skin grows with them. “Surgeons are definitely interested in our substitute, because it has nothing but advantages,” said Dr. Moulin.



**PHOTO:** Mathieu was burned over 80% of his body. He was treated with autografts and 3 batches of SASS (legs, flanks and a shoulder).

# Overcoming Challenges Beyond the Lab

While the research has progressed significantly, bridging the gap from discovery to clinical trial was difficult because of the management involved. Dr. Moulin described navigating complex logistical, regulatory, and manufacturing requirements designed for large pharmaceutical companies rather than hospital-based academic research teams.

Early in the project, Dr. Moulin's team personally transported skin substitutes between hospitals in Quebec. Expanding the trial nationwide required the development of a specialized shipping system capable of protecting product safety and quality.

She credits SCN with helping ease the transition thanks to its supports for managing and funding projects, meeting regulatory requirements, and facilitating collaboration in the research community.

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**Management is very demanding. In our field, most researchers are university scientists who test their products in hospitals. And Health Canada's production rules are industry rules, so it's always a big deal for our small teams. Without help with management or production, I'm afraid that one day it will take away the possibility of furthering the research, because our hospitals aren't able to support the cost of producing our substitute.”**

— DR. VÉRONIQUE MOULIN



**PHOTO:** A research professional working in the SASS production rooms.



**PHOTO:** The SASS product in its shipping box, ready to be shipped anywhere in Canada. The pink part is a gel that nourishes the SASS during transport.

## Where to next?

Looking ahead, Dr. Moulin has high hopes that regenerative medicine will continue transforming patient care across Canada.

After more than 30 years working in skin healing research, she said the field has evolved from “the realm of dreams” to “a dream come true”. “Now, I see that it’s happening. We’re reaching a point where we’ll be able to treat patients and help them.”

For Dr. Moulin, meeting burn survivors and hearing how the treatment has improved their quality of life remains the most rewarding part. “We get involved in health research to treat people and to make a difference in their lives. And in our field, we have a direct impact.”

Her team continues to refine the skin substitute technology while working toward broader accessibility for patients who need it most.



**PHOTOS:** Final stage of SASS production: placement in shipping boxes, and Véronique Moulin and those involved in SASS production and clinical trial management.



### DID YOU KNOW?

Since 2016, the Stem Cell Network has funded or catalyzed 30 clinical trials run by members of our clinical research community across Canada.