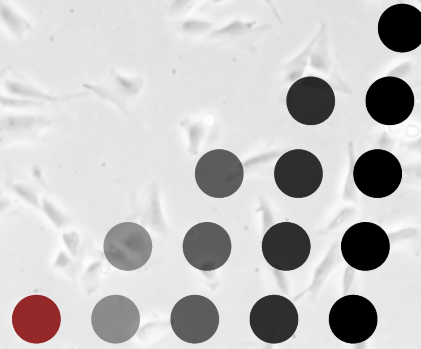


Skin Reactor

From biopsy to personalised skin transplants
Automated culturing system for autologous bio-engineered skin

ETH zürich

pd|z Product Development Group Zurich
Produktentwicklungsgruppe Zürich

tissue biology research unit

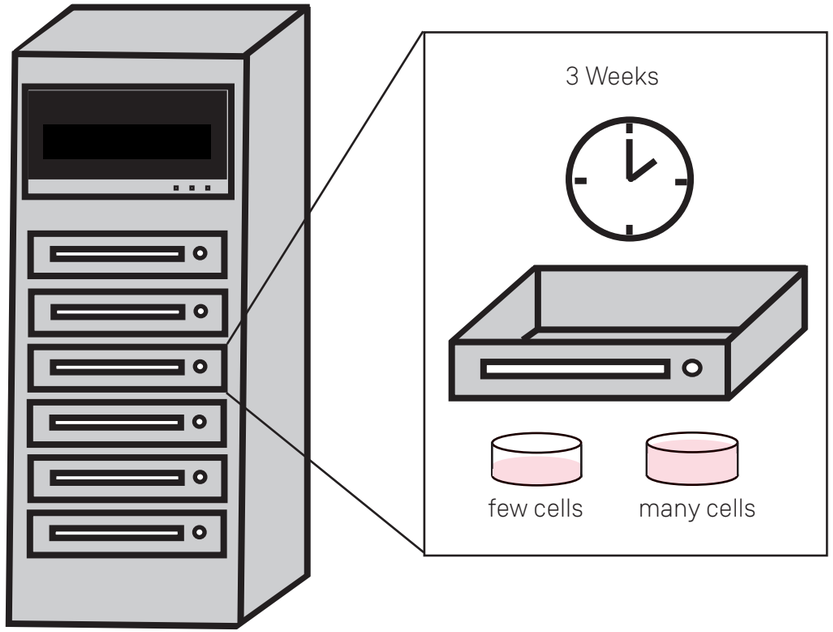
Z

hdk
Zürcher Hochschule der Künste

Vision

The skin is the largest organ of the human body. It protects the whole body and performs various vital functions. Its damage can lead to a protracted healing process. Severe skin burn, skin loss or chronic skin diseases are often associated with multiple surgeries and defacement. Patients suffer from physiological and psychological pain.
Our development is based on the achievements of the Tissue Biology research Unit in Zurich undertaking presently clinical studies with novel bio-engineered human skin.

The SkinReactor will enable autologous, self-growing, and patient-specific skin patch production for replacement of damaged skin while decreasing health care costs. Skin patch supported healing will significantly improve the patients' quality of life.
Our development focuses on safe, efficient and automated proliferation of human skin cells.



New clinical standards in skin disease treatment by automation of cell culturing for autologous bio-engineered skin.

Motivation

Children are adventurous and their curiosity can lead to an accident with severe skin injury. Nowadays, a child with a conventional skin transplant need to be re-operated every two years. The global standard is the treatment wit split skin grafting. Frequent surgeries are necessary due to the growth of the child and the inability of the skin graft to grow with it.
Autologous bioengineered skin can grow with the patient. Hence, this skin can avoid multiple surgeries and scar formation.

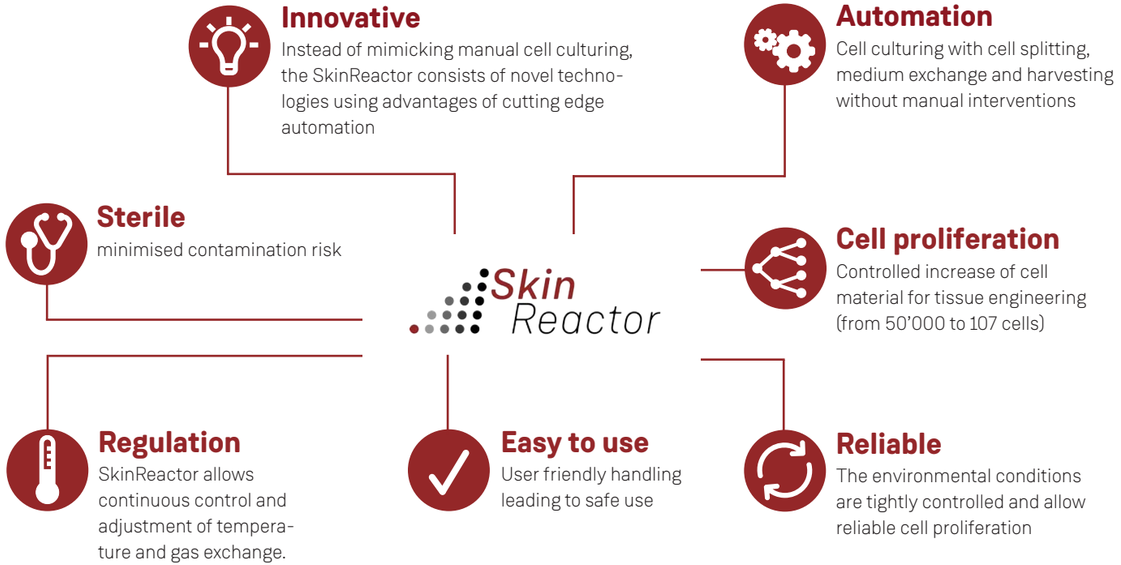
The formation of the bioenineerged skin starts with a small cell biopsy. Currently, the critical step is to multiply this small amount of cells to get enough to form a skin transplant. SkinReactor offers automation of cell culturing for autologous bio-engineered skin and thereby accelerates and improves the personalized skin production. An automation of this bioengineering process allows a cheap and fast manufacturing. **Thus, safe skin grafts can be made available for every patient.**

Innovation

Cell proliferation is a natural process and follows a natural time scale. Manual cell culturing is time-consuming and not standardized. Quality control is difficult. Automatisation addresses these problems.
SkinReactor addresses the interdisciplinary challenge to develop a novel automated culturing system for skin cells.

With support of tissue engineering and product development experts we will create an integrated solution for the automation of:

- cell nutrition and waste management
- detection and control of the cell
- environment including heat, gas, pH and humidity
- securing sterility to avoid contamination
- a smart cell harvesting mechanism
- a user friendly handling of the device



Team

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Sponsoring

Partner Status	Diamond	Platinum	Gold	Silver	Bronze
Donation (in CHF)	≥ 15'000	≥ 10'000	≥ 5'000	≥ 2'500	≥ 1'000
Your Logo on SkinReactor Website	huge	big	normal	small	name
Logo on Team-Shirt	big	big	big	small	name
Report	✓	✓	✓	✓	short info
Facebook post	✓	✓	✓		
Information-Apéro	✓	✓			
Logo on SkinReactor	big	small			
Acknowledgment at presentation	✓				
Open to suggestions	✓				

Material & Production
Sponsors (service, product, material sponsor) will **receive all benefits** according to the table.

Be a SkinReactor partner

and help making skin grafts available for every patient in the near future.

Public Appearence

Skin grafts in public media

Tagesanzeiger: A second skin from the laboratory (06.09.2016)

MEDINSIDE: Zurich should become the worldwide leading center of skin research (09.10.2016)

NZZ: New skin for burned victims (06.09.2016)

SRF: First transplantation of laboratory-skin into children (07.09.2016)

Roll-Out

At the 'Focus Roll-out', the teams will present and demonstrate their development projects. The presentations are public and take place on May 30 2017 in the big hall of the ETH main building.

For further information, visit us on our website:
www.skinreactor.com

Or like us on facebook:
www.facebook.com/SkinReactorDevice/

Support

pd|z – engineering development

SkinReactor is a project of the product development group (pd|z) at ETH Zurich. The pd|z focuses on human-centered product development and cross-links research and industry.
SkinReaktor is a project within the collaboration with TBRU called SkinCreator to invent new technological principles to the faster availability of autologous bioengineered skin for clinical routine.

Prof. Mirko Meboldt

Stephan Fox
PhD Student

Seraina Dual
PhD Student

Thomas Benedek
Student Coach

TBRU – Tissue Research

The Tissue Biology Research Unit (TBRU) is a basic science oriented laboratory of the Department of Surgery of the University Children's Hospital Zurich.
Professor Ernst Reichman's group developed an autologous dermo-epidermal skin composite that can be used to cover skin defects. They are worldwide leading experts in skin biology and provide the biological knowledge to the SkinReactor development.

Prof. Ernst Reichmann

Thomas Biedermann
PhD Student

ZHdK – Industrial Design

Under the leadership of Nicole Kind and Sandra Kaufmann critical designers are trained in the Bachelor Industrial Design at the Zurich University of the Arts, who can understand complex relationships and are able to contribute to innovation processes in a creative way. In this course, the proximity to industry and the focus on the three key aspects of social relevance, ecology and technology play an essential role.

Nicole Kind
Design Coach

ETH Focus Project

The ETH Focus-Project is a development project of engineering students at ETH Zurich. In this project we have the unique opportunity to transfer our theoretical knowledge into a fully functional device. Over one year this project builds most of the curriculum. The focus-project enables students to create know-how in a self managed project within a supported learning environment.

The project involves the whole development process from the first idea, to design, construction, building, testing and marketing of the final device.

The goal of this focus project is to develop a fully functional biomedical device ready to be used at June 2017.

Budget

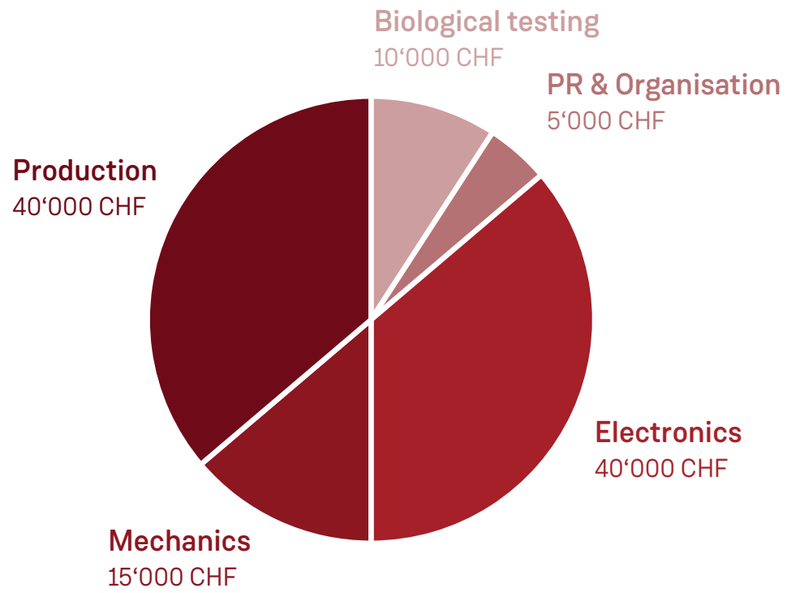
Electronics
Only with high accuracy we are able to create an optimal environment for cell culturing. The fully automation and the sensor technology tend to be major elements of expenditure.

Production
Cell culturing for medical use has high demands on sterility. All materials getting into contact with cells have to be biocompatible, sterilizeable and smoothly exchangeable.

Biological Testing
Our development process is guided by continuous testing to guarantee a biologically safe function of our device.

Marketing and Organization
A well targeted marketing strategy is required to present our project at public events and in media.

Mechanics
The high requirements on accuracy and sterility demand the purchase of high-quality components.



Total 110‘000 CHF

Contact

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