



„AUVA Stunde“

Österreichische Gesellschaft für Arbeitsmedizin
Jahrestagung 2020 in St. Pölten

01.-03.10.2020

Roswitha Hosemann



Übersicht:

- **Prof. Johannes Grillari: Ludwig Boltzmann
Institute for Experimental and Clinical Traumatology**
-
- **Hautkrebs**
- **Infektionskrankheiten**

Modellsysteme zur Untersuchung der Haut

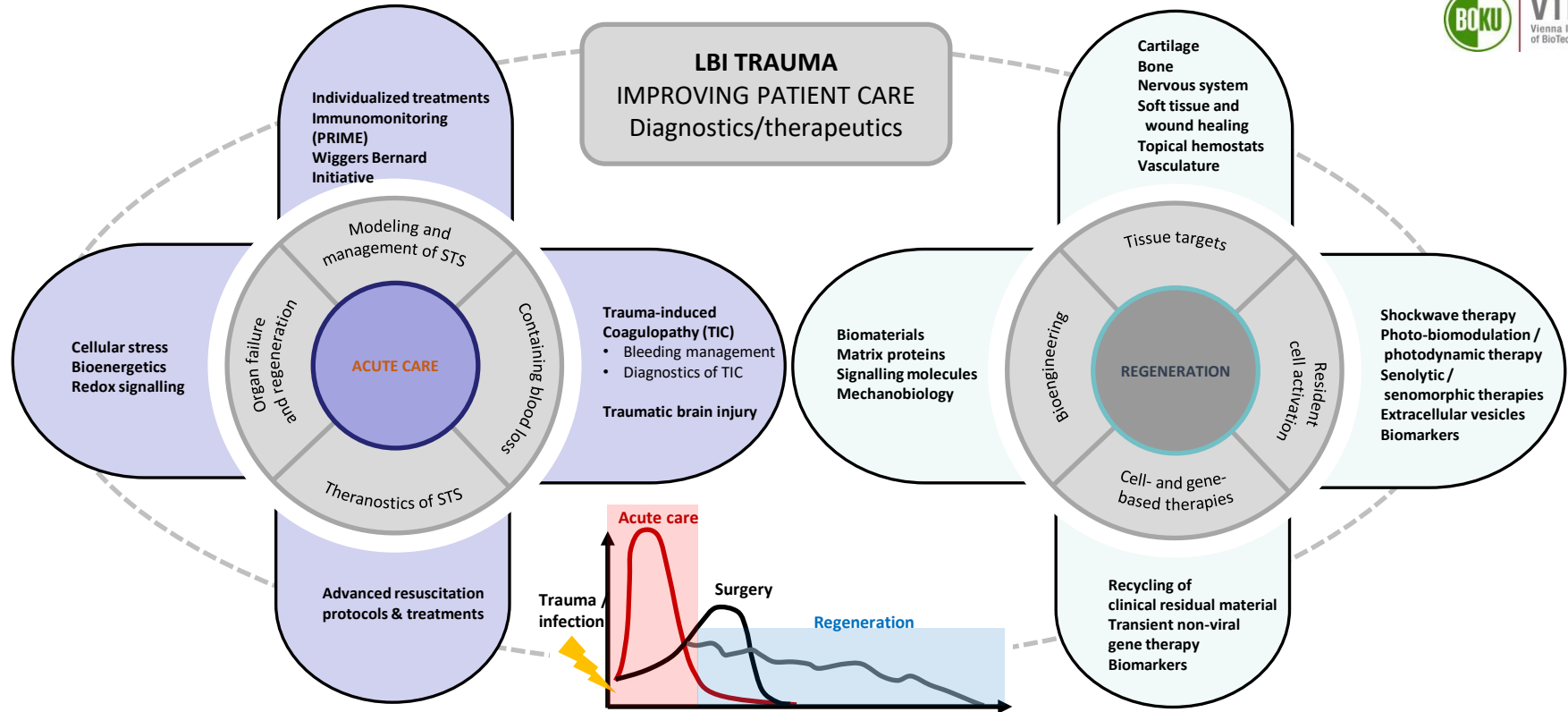
Johannes Grillari

LBI Experimental and Clinical Traumatology

Christian Doppler Laboratory on Biotechnology of Skin Aging- BOKU

Mission LBI Trauma

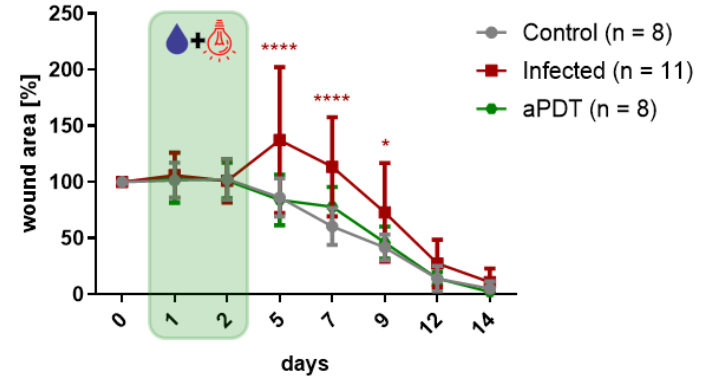
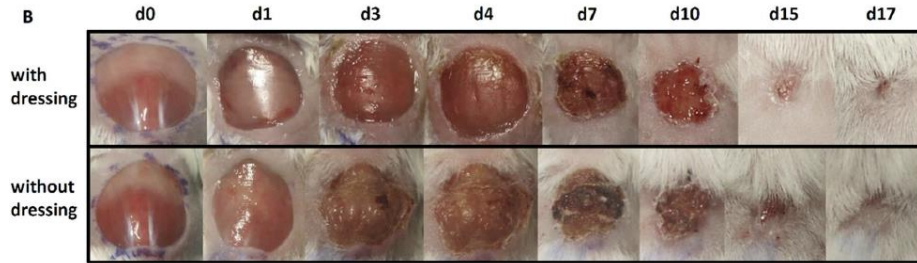
- Verbesserung diagnostischer und therapeutischer Maßnahmen in Unfallchirurgie und Intensivmedizin
 - vom Trauma zur Regeneration
 - von Molekülen zur Klinik und zurück
- Forschungszentrum aller Trauma und Rehab Zentren der AUVA



Forschungsgebiete

- Intensivmedizin
 - Schock
 - Trauma-Koagulopathie
 - Sepsis
 - Mol. Mechanismen
- Geweberegeneration
 - Lokale Hämostase, und Wundheilung
 - Neuro
 - Knorpel / Sehnen
 - Knochen / Bänder

Verschiedenste Wundheilungsmodelle und therapeutische Strategie etabliert



Karner et al. Sci Rep 2020

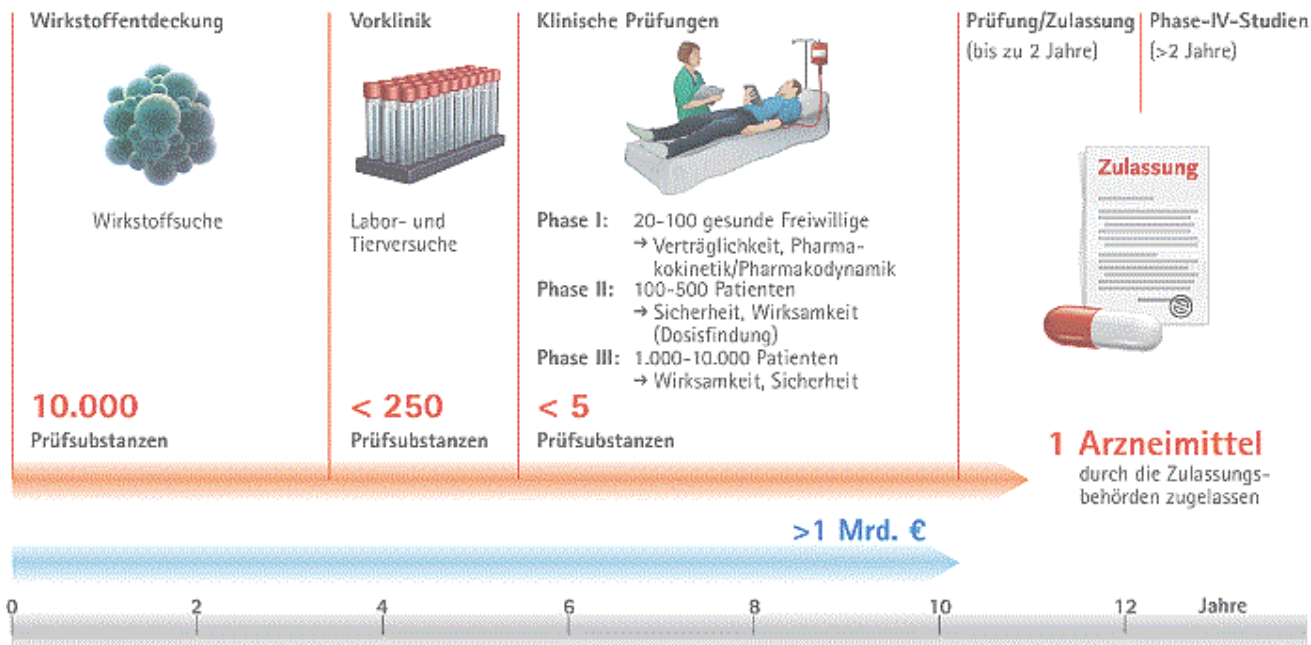
Karner et al. Photochem Photobiol Sci 2020

3R Konzept

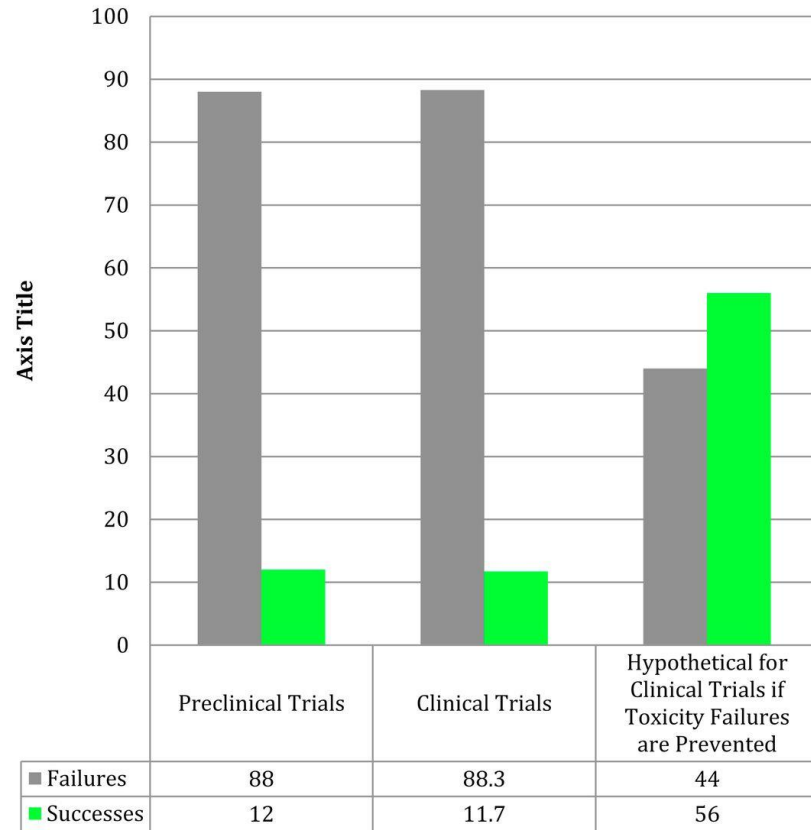
Reduction, Refinement,
Replacement von Tierversuchen

Vom Molekül zum Medikament – ein Testmarathon

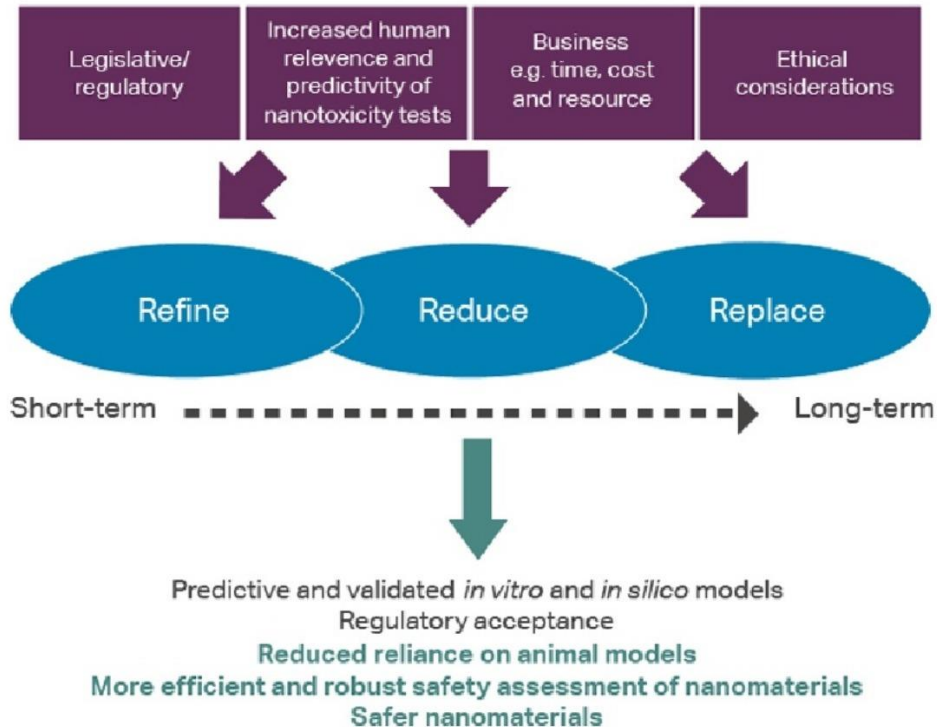
Der Weg vom aussichtsreichen Wirkstoff bis in die Apotheke gleicht einem Marathon, der nicht nur exzellente Partner, sondern auch viel Durchhaltevermögen erfordert. Haben Bayer-Forscher einen vielversprechenden Kandidaten für ein neues Arzneimittel gefunden, muss er in mehreren Studien getestet werden. Das dauert rund zehn Jahre und erfordert oft Investitionen von mehr als einer Milliarde Euro.



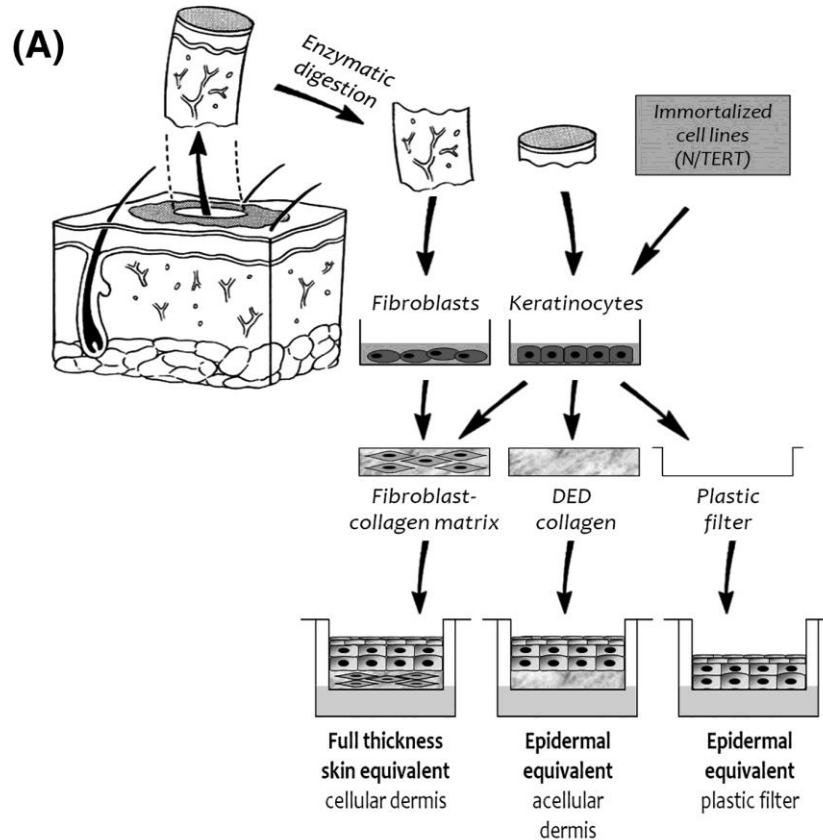
Percentage of Failures of Drugs That Advance Beyond Pre-Clinical and Clinical Trials

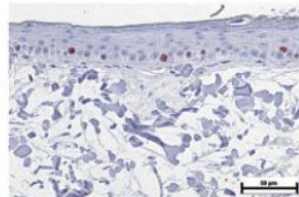
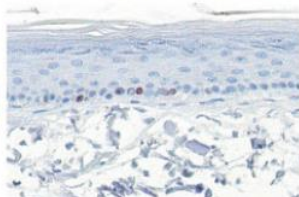
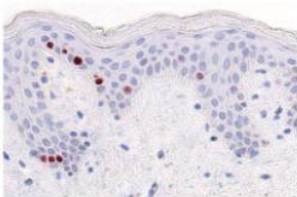
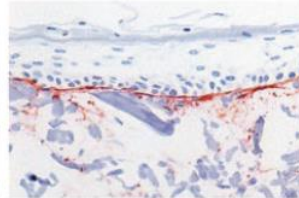
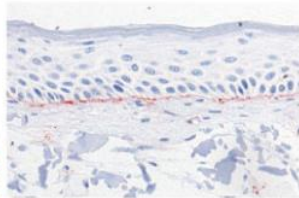
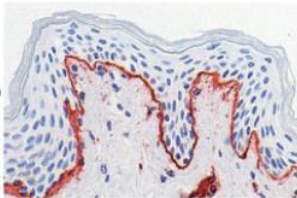
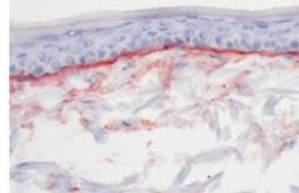
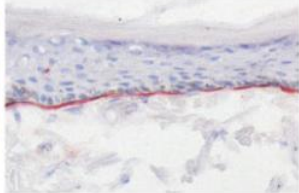
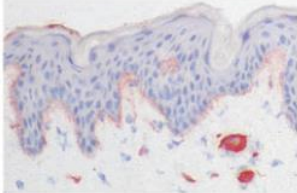
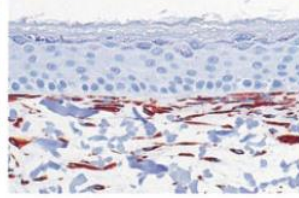
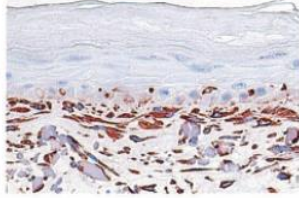
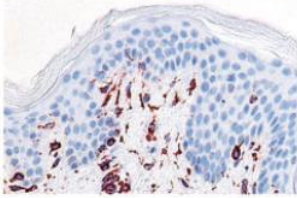
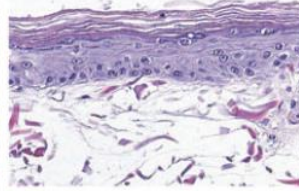
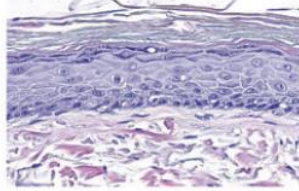
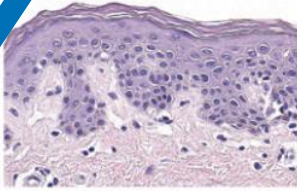


Drivers to re-evaluate animal-based approaches



3D skin models for 3R research: The potential of 3D reconstructed skin models to study skin barrier function



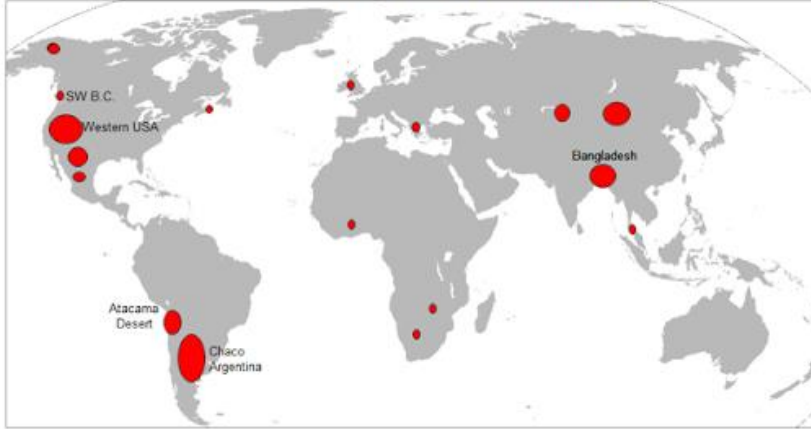


Skin sensitization
Skin corrosion
Skin irritation

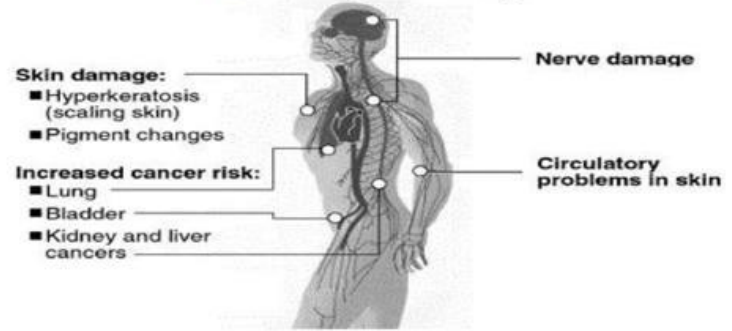
Phototoxicity

Chronic arsenic poisoning

Areas with High Arsenic Issues

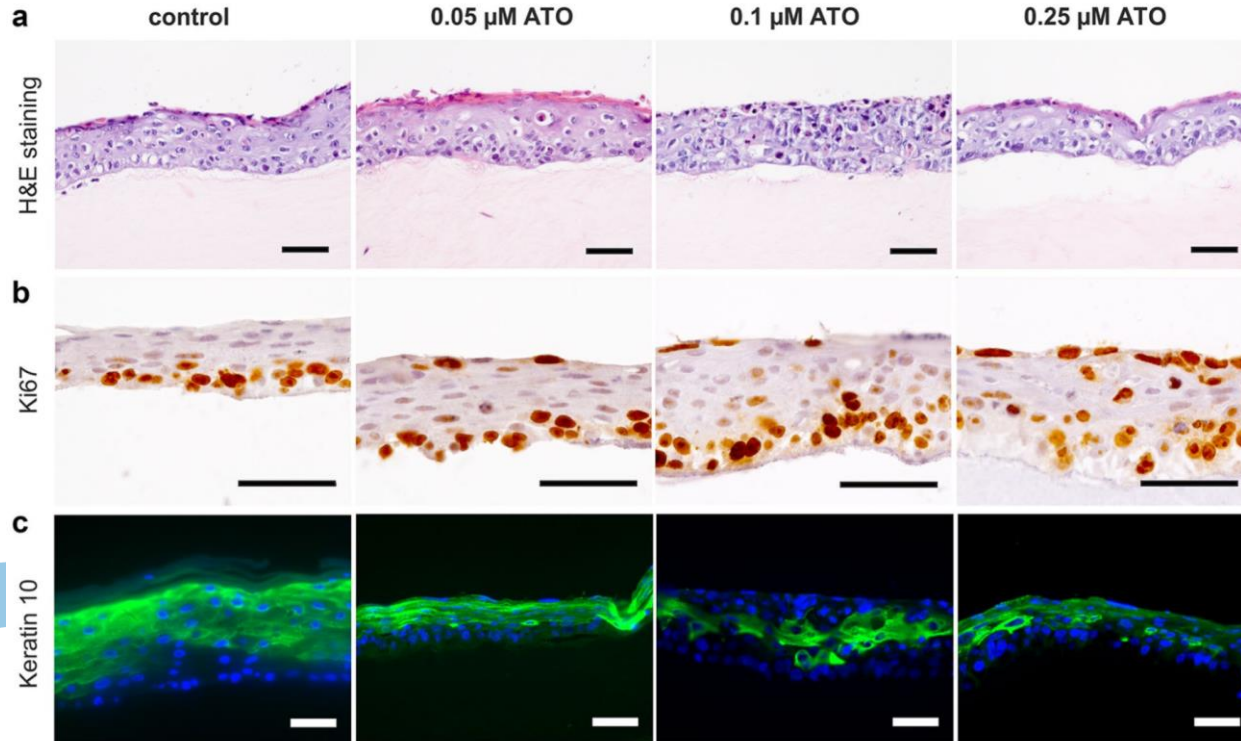


Arsenic poisoning



Human cells as in vitro test systems

Telomerized cells – toxicity studies



Telomerized cells allow to study long-term toxicity for Arsenic: no animal model available (for hyperkeratosis)

Keratinocytes were exposed to arsenic (ATO) for 6 months before generating skin equivalents

Defects in differentiation /stratification!

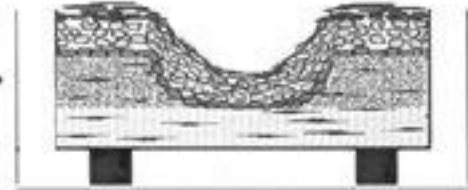
Wound healing models in vitro



1. Generation of wound in human skin equivalents

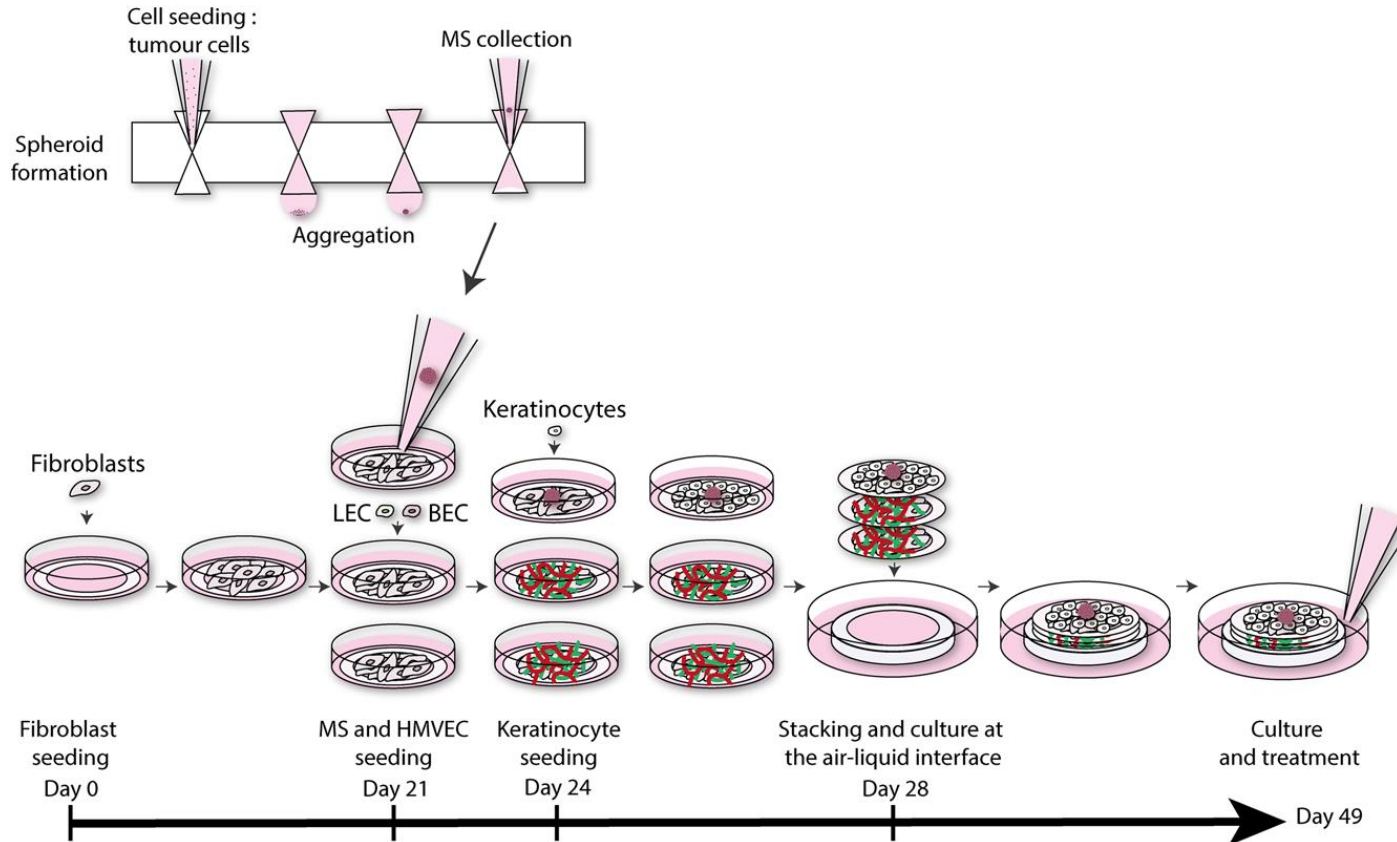


2. Re-epithelialization of the wound bed

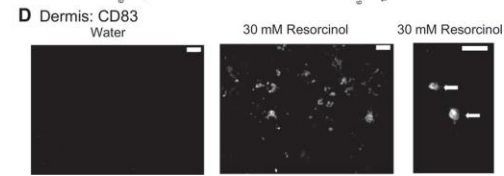
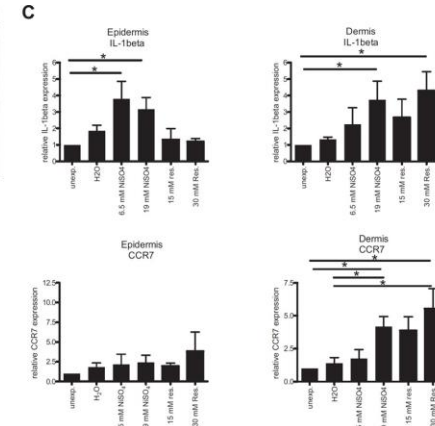
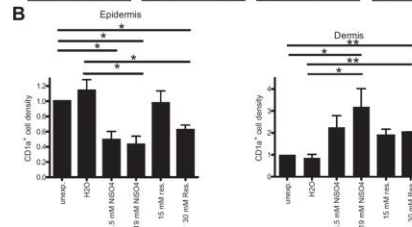
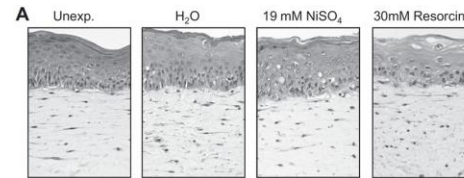
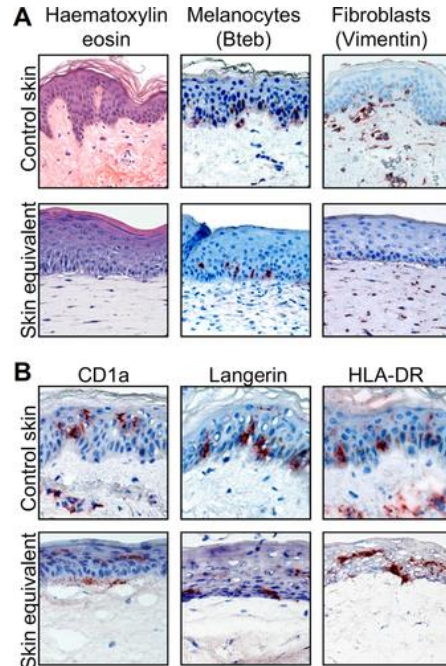


3. Total closure/healing of the wound by the keratinocytes

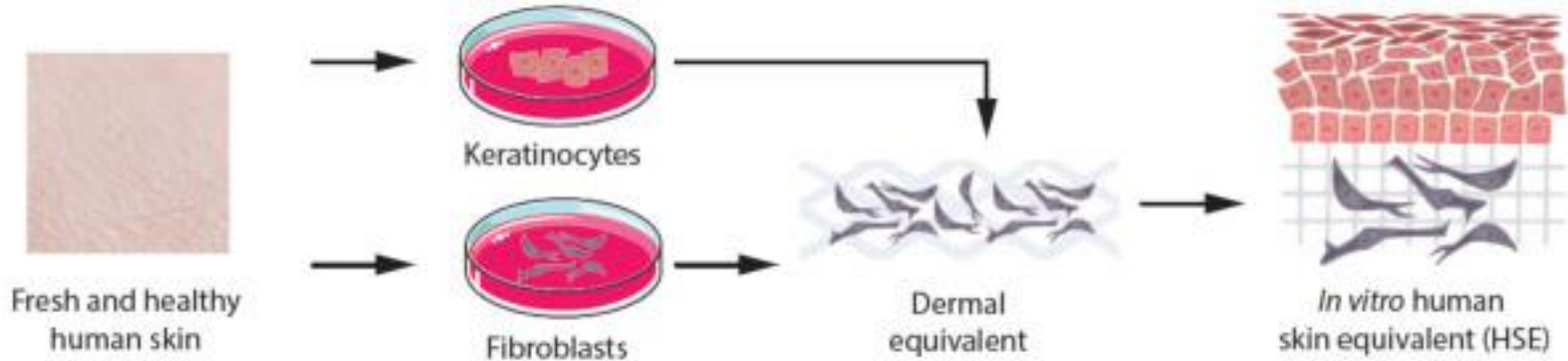
Hauttumor Modelle...



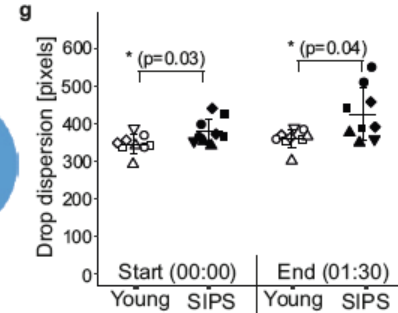
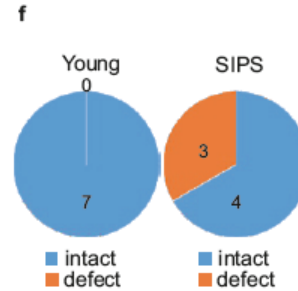
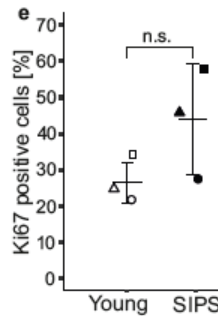
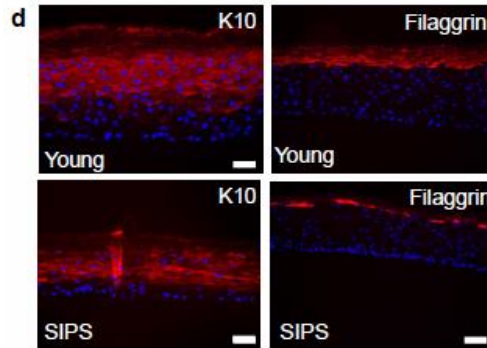
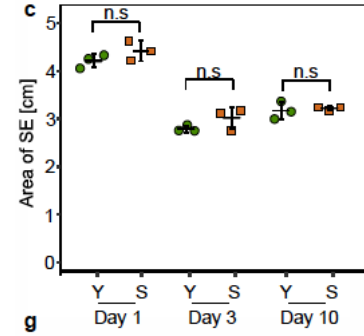
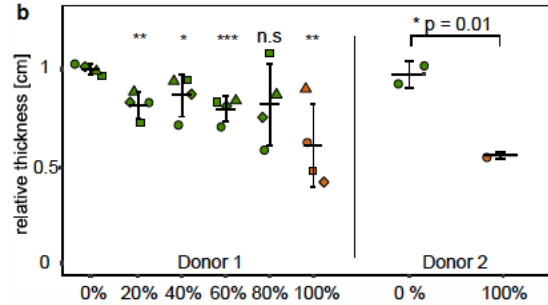
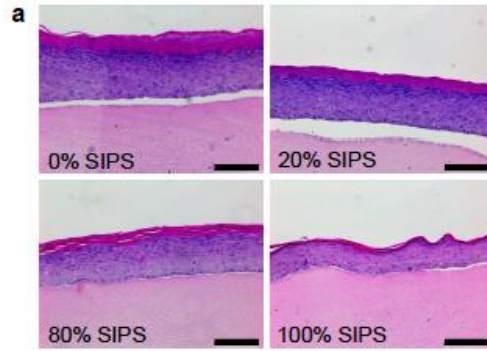
Skin sensitization Modelle



Modell für Hautalterung?



Senescent fibroblast decrease epidermal thickness / keratinocyte differentiation in skin equivalents

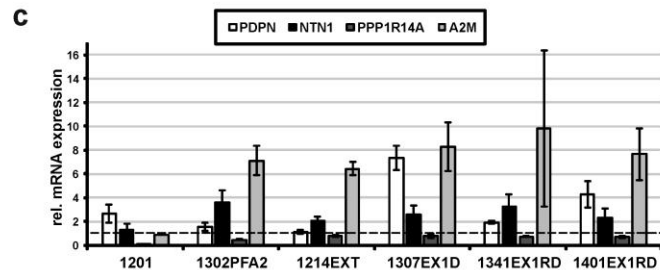
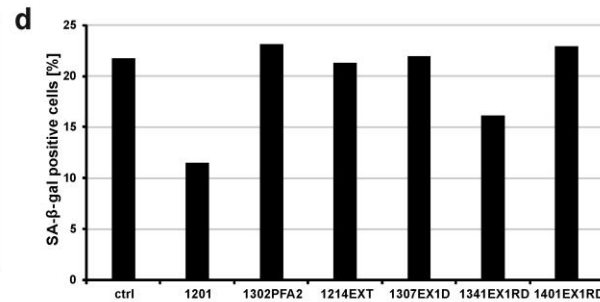
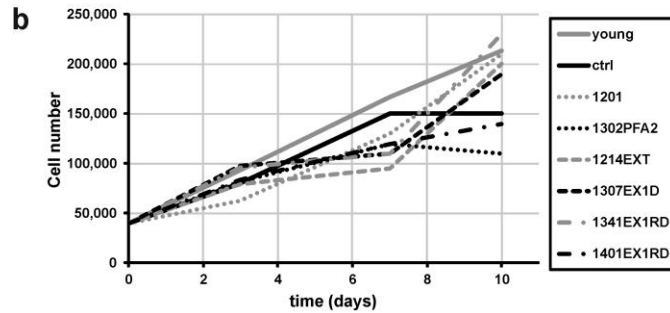
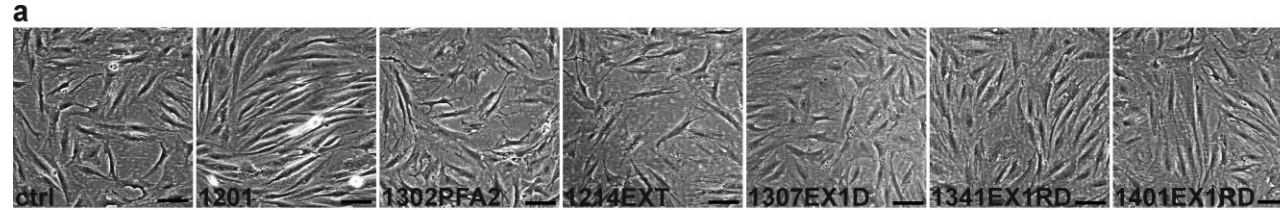




Can we counteract?

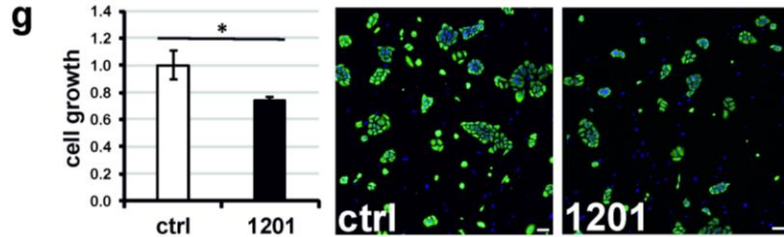
Solidago vigeana alpestris extract (1201)...

Identification of plant extracts with senescence altering properties

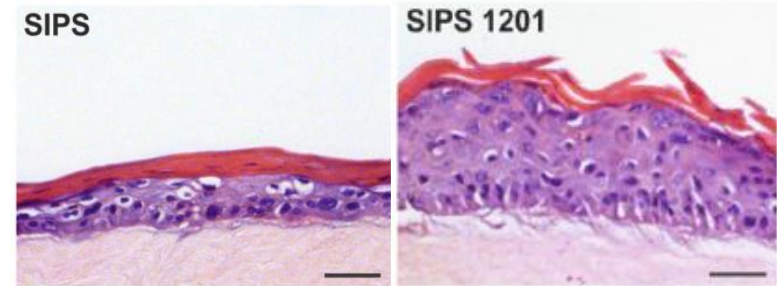


1201 (*Solidago vigaurea*) treatment reduces SASP factors and restores epidermal thickness

HaCat cell proliferation



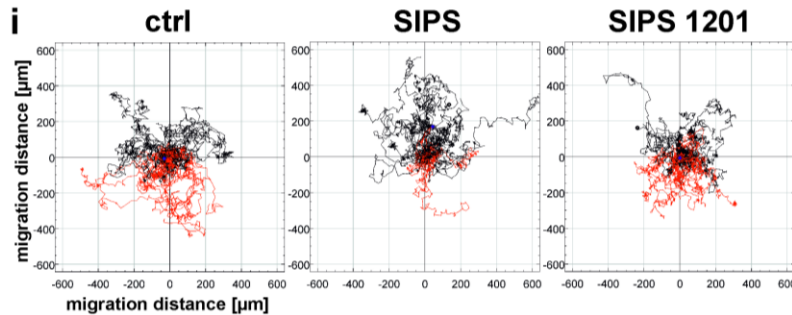
Full thickness skin equivalent



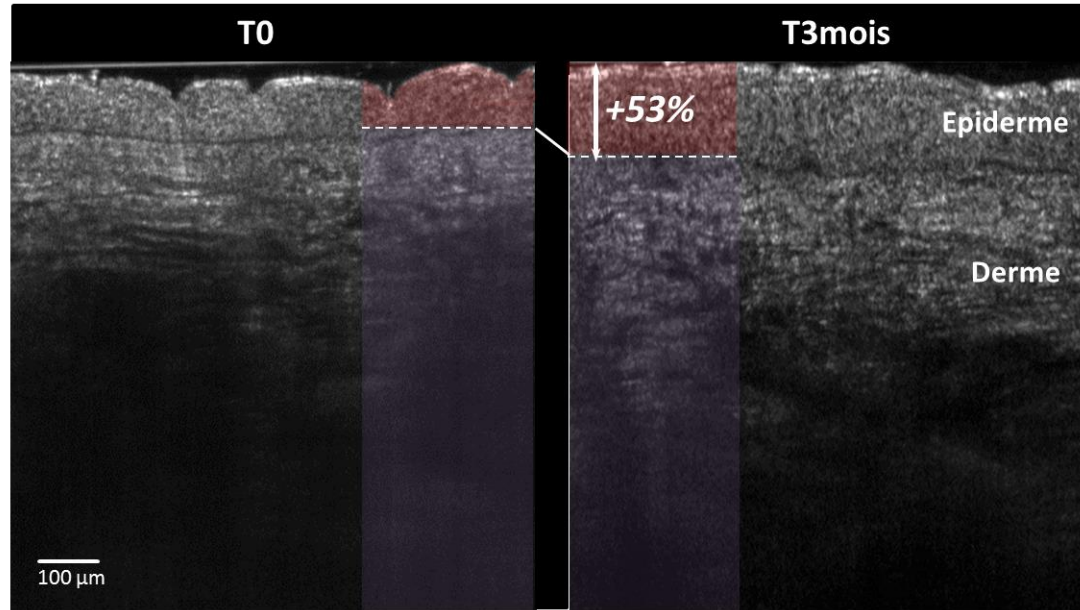
100 % senescent cells, control

100 % senescent cells, treated 4 days with 1201

T cell migration



...TO IN VIVO EVALUATION OF PRODUCT EFFICACY...



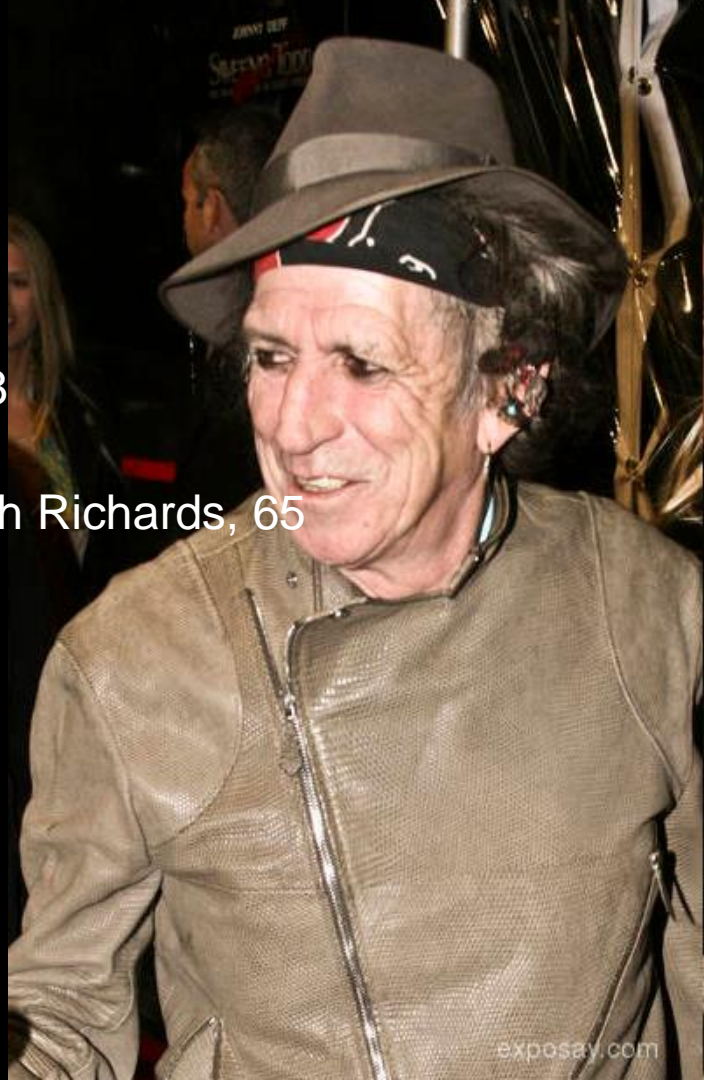
In vivo study: Instrumental evaluation (LC-OCT - *Line-field Confocal Optical Coherence Tomography* OCTAV® IR 2D) on the cheekbone of 27 caucasian women.
Illustration from subject n° 21

After 3 months use of a cream containing solidago extract,
Epidermis thickness increase by 20% compared to baseline

Image courtesy of Chanel



Tina Turner, 68

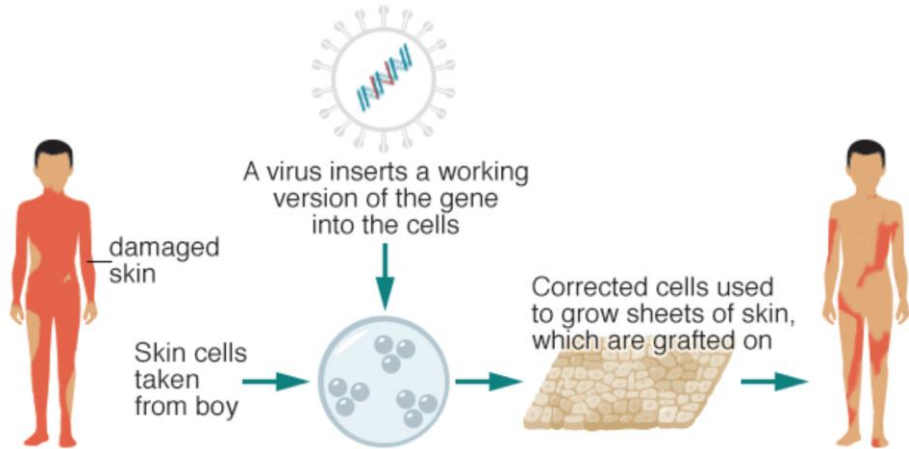


Keith Richards, 65

Skin equivalents in clinical use...

For wound closure in use...

Rare skin diseases: Schmetterlingskinder



The Schosserer/Grillari Lab @ BOKU

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Ingo Lämmermann
Selma Osmanagic-Myers
Clemens Heissenberger
Fabian Nagelreiter
Vera Pils
Lisa Liendl
Elena Stelzer
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Teresa Krammer
Moritz Weigl

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Agata Strajerju
Susanne Neuber
Zahra Mazidi
Claudia Lindner

Medical University Vienna

Florian Gruber
Marie Sophie Narzt

Erwin Tschachler
Peter Pietschmann

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CDG
EU
FWF
AUVA

CHANEL Research and Innovation

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Julie Latreille
Sandra Forestier
Irina Berlin

Buck Institute

Judy Campisi

Austrian Cluster for Tissue Regeneration

Karolinska Institutet

Samir El Andaloussi
Andre Görgens

UCSF

Thomas Link
Ursula Helmreich
Ann Schwartz

Icelandic Heart Association

Guðný Eiríksdóttir
Vilmundur
Gudnason

Universtitätsklinikum Essen

Bernd Giebel

Mayo Clinics

Tamara Tchkonja
Jim Kirkland

KH Barmherzige Schwestern, Vienna

Heinrich Resch
Roland Kocijan

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Moritz Weigl



Erwin Tschachler
Peter Pietschmann

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Thomas Hausner

Austrian Cluster

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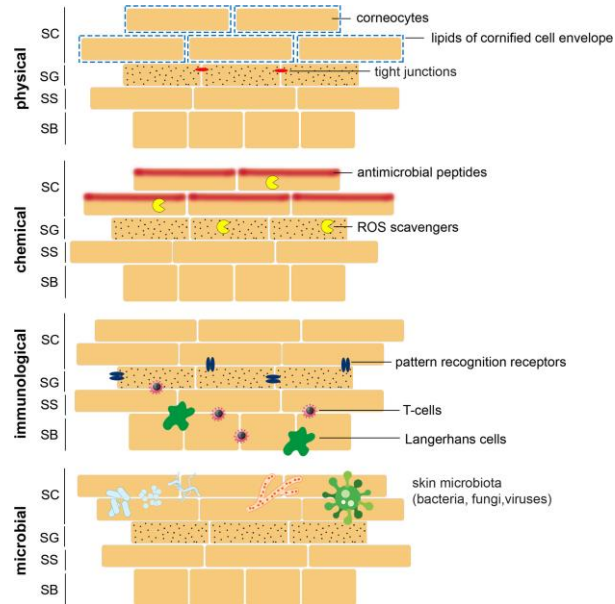
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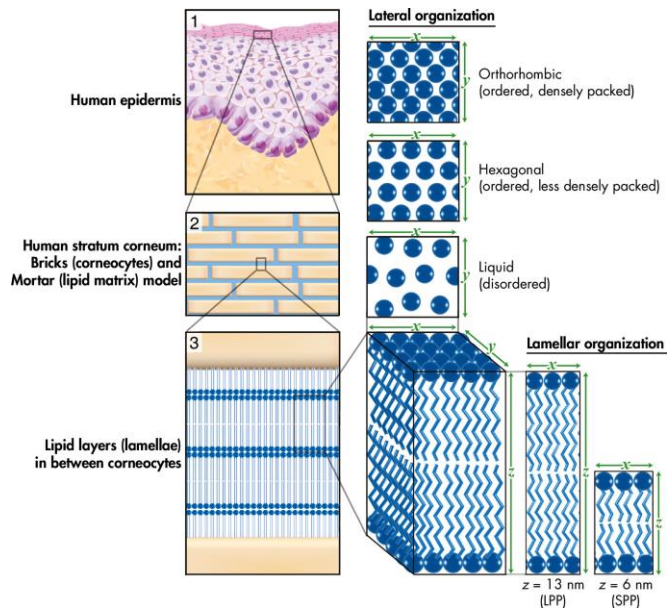


Icelandic Heart Association

Guðný Eiríksdóttir
Vilmundur
Gudnason

**Universtitätsklinikum
Essen**





Bedeutung für AUVA

- **Bessere Patientenversorgung**
 - Direkt
 - Indirekt
 - Neue Verfahren
 - Fortbildung
- **Kostensparnis**
- **Medizin. Führungsnachwuchs**
- **Unterstützung Wirtschaft**
 - Technologie
 - Produktideen/-entwicklung
 - Austestung von Produkten
 - Ausbildung