Porcine ex-vivo wound healing model
(Patent No. 10317400)
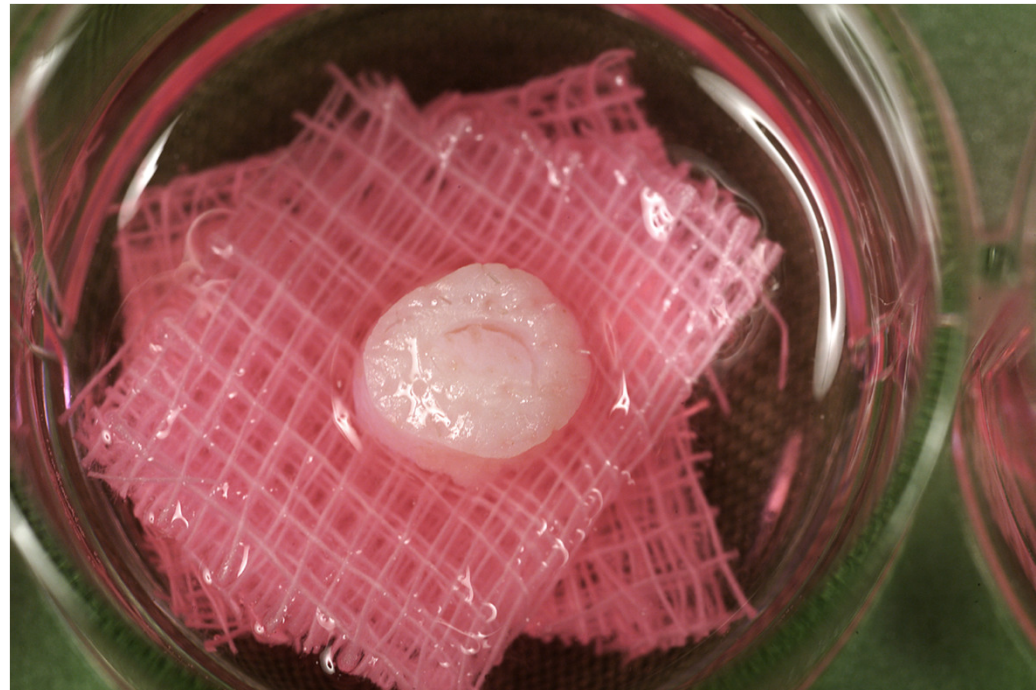
Generation of the wound healing model

Punch biopsy
Ø 6 mm

Pig skin

Removal of the
epidermis and the
upper part of the dermis
in the central area

Application of cells,
substances, cremes,
wound dressings etc.

Epidermis

Dermis
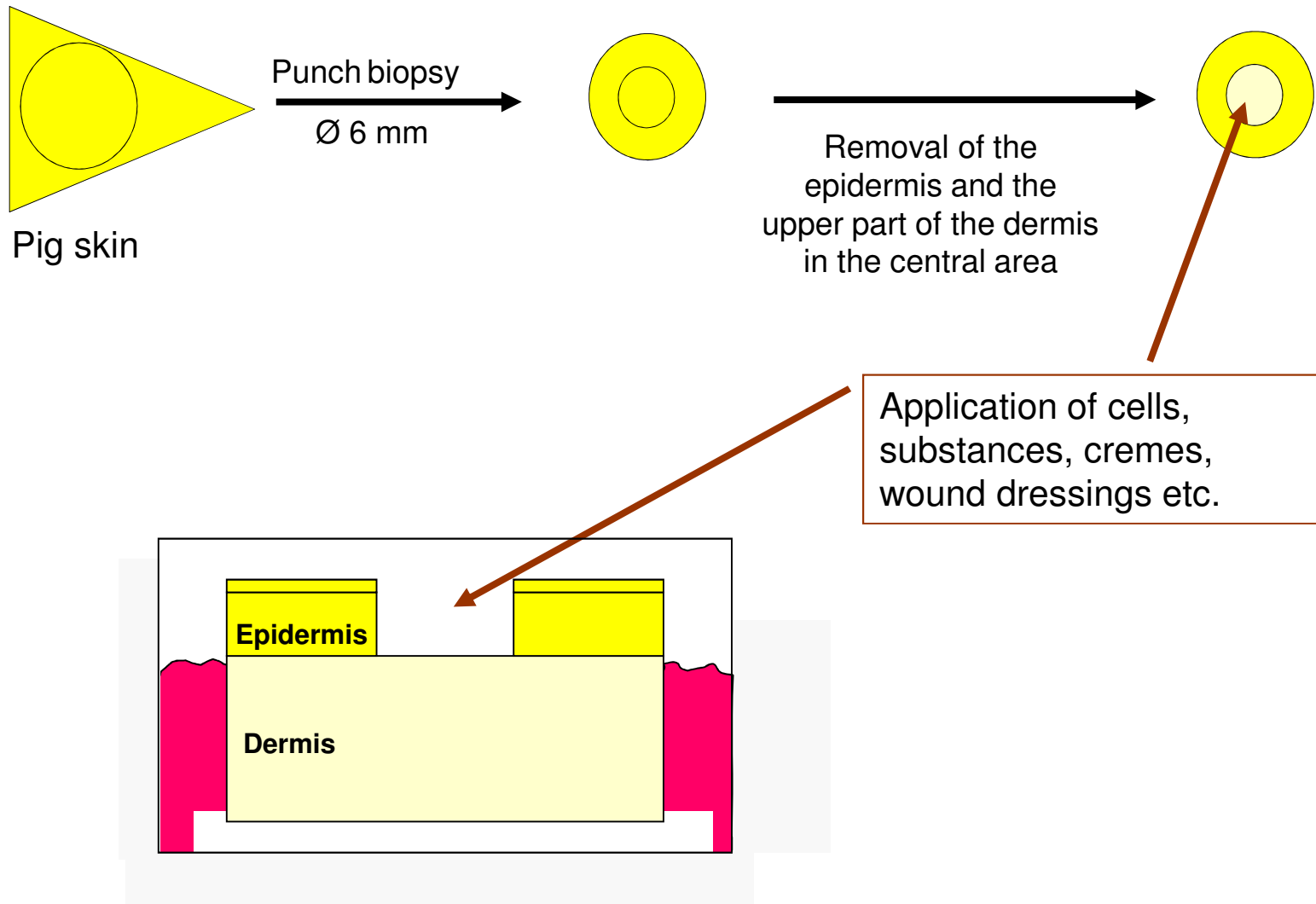
Possibilities of modification:

- **Mode** and **time point** of application

- **Support** of the model with **nurients**

- **time point of evaluation**

- **infection**

- **customer requests**

- transfer to the human model for **selected** tests

Read out parameters

- **Wound healing progress**
  Measurement of the regenerated epidermis

- **Wound margin morphology**

  0: macerated
  1: intermediate wound margin morphology
  2: very good wound margin morphology

- **proliferation rate** at the wound margins/in the regenerating epidermis

- **Number of apoptotic cells** at the wound margins/in the regenerating epidermis

- **barrier function**

- **expression of cytokines**

- **differentiation markers**
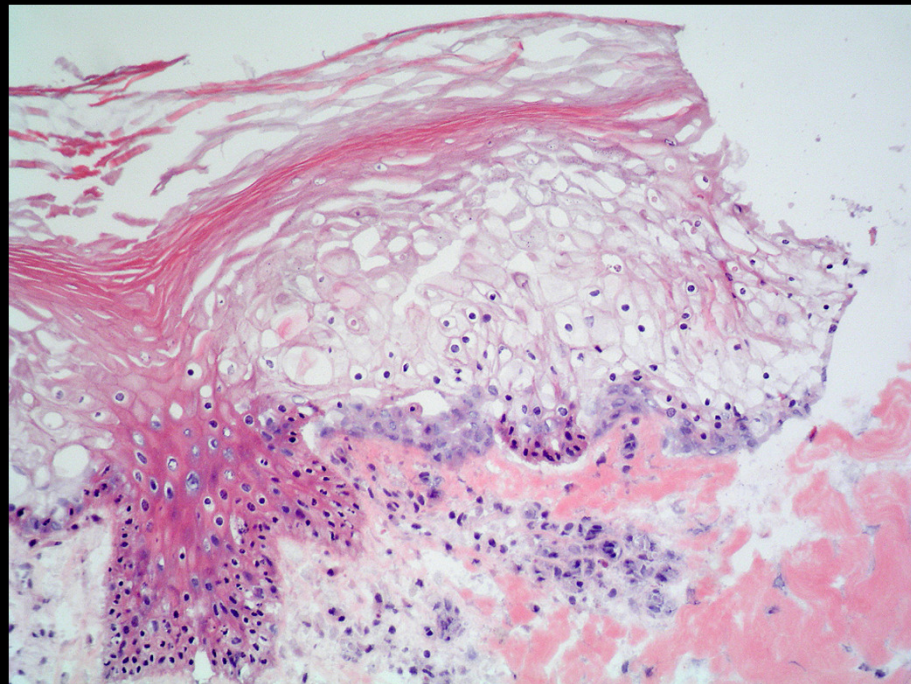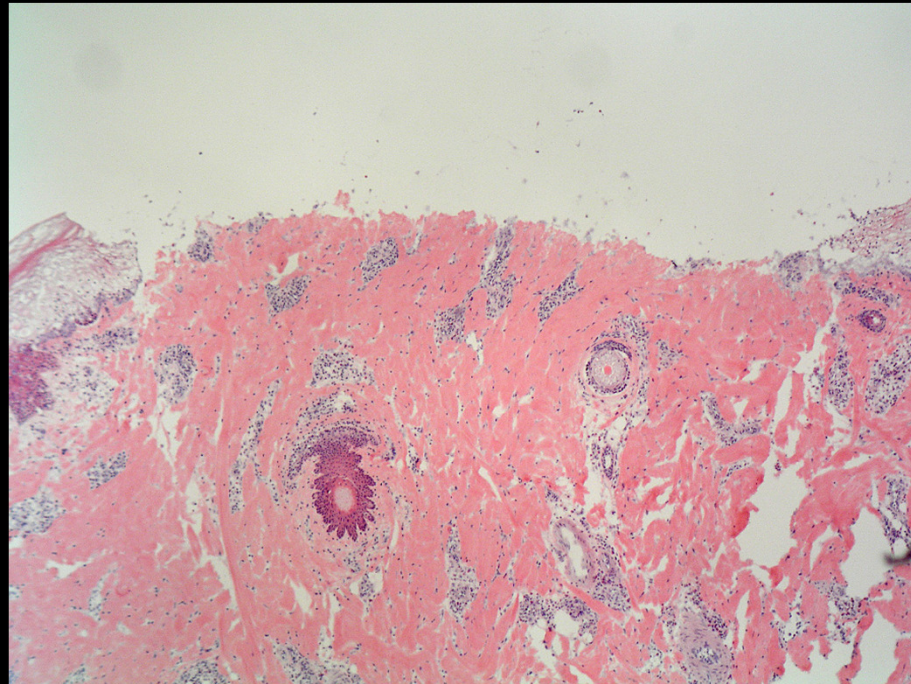
- **customer requests**

Good wound healing

Very good preservation of wound margin (Score 2)
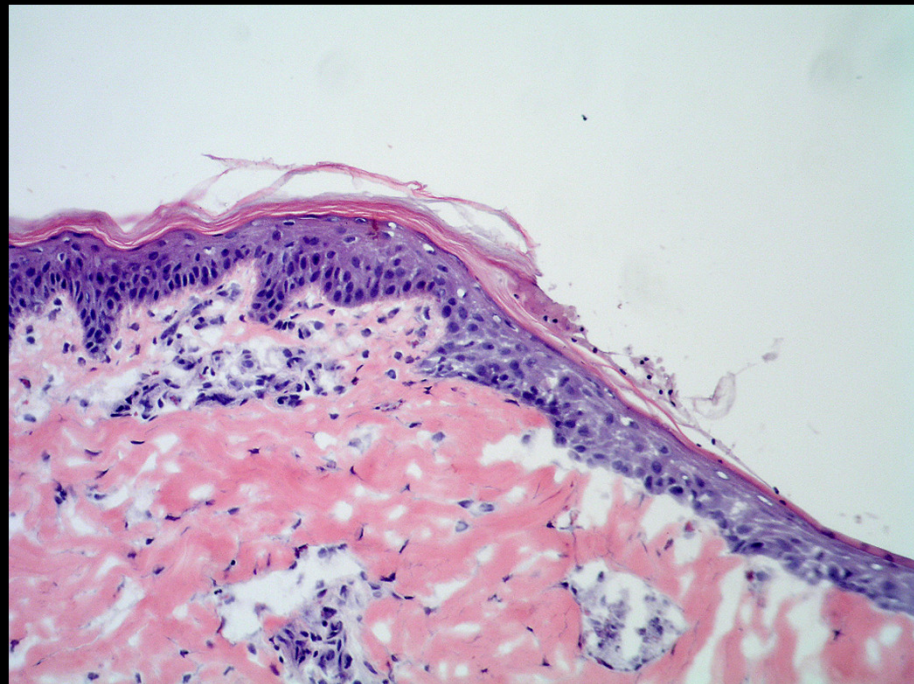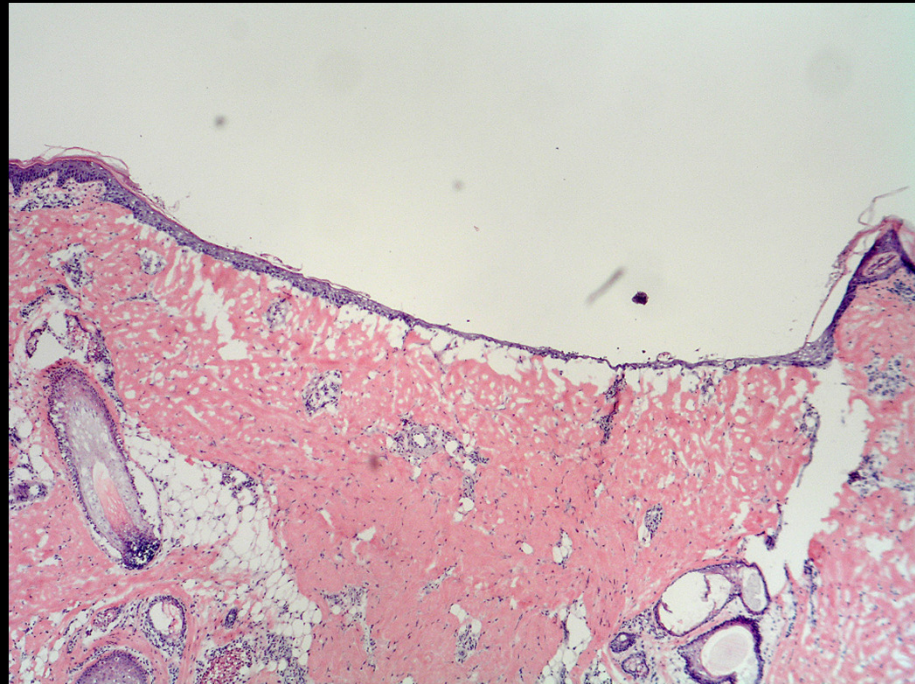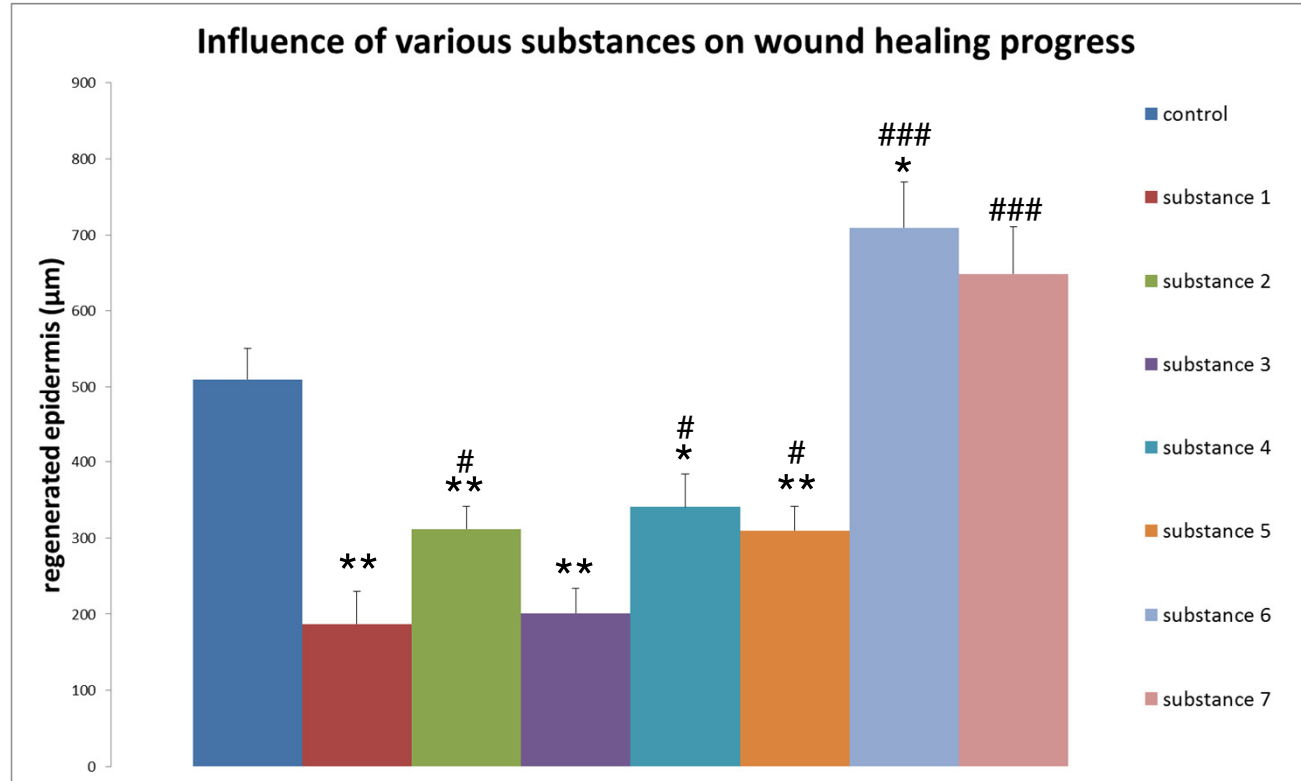
Bad wound healing

Macerated wound
margin (Score 0)

Example for the evaluation of wound healing progress

Influence of various substances on wound healing progress

*: compared to untreated control
#: compared to placebo (Substance 1)

Literature

- Brandner JM, Houdek P, Quitschau T, Siemann-Harms U, Ohnemus U, Willhardt I, Moll I (2006) An Ex-vivo model to evaluate dressings & drugs for wound healing. Example: Influence of lucilia sericata extracts on wound healing progress. *EWMA J.* 6: 11-15
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- Vockel M, Pollok S, Breitenbach U, Ridderbusch I, Kreienkamp HJ, Brandner JM (2011) Somatostatin inhibits cell migration and reduces cell counts of human keratinocytes and delays epidermal wound healing in an ex vivo wound model. *PLoS One* 6(5): e19740
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Interested?

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Why pig?

- Similar **Stratum corneum**

- **Percuteous absorption** very similar between man and pig

- Similar **morphology and histology**

- Many **antibodies** available for immunhistochemistry and immunoblot

- Identical **lokalisation** of the proteins

	pig	**human**
Ki-67	Prol. cells	Prol. cells
CK 1-10	++	++
CK 14	++	++
DPmix	++	++
Connexin 43, Cx 26 Mel 5	+ melanocytes	+ melanocytes
Occludin, Cl1, ZO-1 ß-Catenin, Actin	++ ++	++ ++

- Possibility to perform **large test series**, because of
  good availability of larger amounts of tissue

- **Good reproducability** between different individuals because:
  - same body location
  - same age
  - no underlying diseases
  - same processing from gain of tissue to model generation