Live and standardized human skin assays
Genoskin works in close collaboration with hospitals and clinics in France and in the United States to efficiently collect human skin samples from healthy donors, immediately after plastic surgery. Our unique, patented and standardized technology maintains donated human skin biopsies alive for up to seven days to enable efficacy and safety testing of your products on real, live human skin.

Skin samples are obtained with the donors’ informed consent and are in full compliance with the Declaration of Helsinki and all other applicable regulations. For each skin sample collected, the serum of the donor is tested for the absence of HIV-1 and -2, and Hepatitis B and C. Genoskin is ISO 9001:2015 certified.

**TYPICAL WORKFLOW**

Genoskin collects the samples required for production just after surgery. All the samples needed are stored at room temperature until production starts (less than 24 hours after surgery). As soon as production is completed, Genoskin kits are shipped to the customer. Orders are usually delivered Wednesdays to Fridays.

*Biopsies might be collected at any time point within the 7 days of culture.*
NativeSkin®
Live and immunocompetent human skin

NativeSkin® testing kits contain round skin biopsies prepared from surgical residue from volunteering adult donors.

NativeSkin® models exhibit normal skin barrier function and a mature stratum corneum. They hold all cell types and skin appendages that are naturally present in in vivo human skin.

Ready. Easy. Standardized.
NativeSkin® is designed as a ready-to-use kit to simplify your testing procedures. The models allow for fast, reliable studies and assays with reproducible results.

NativeSkin® models are easy to manipulate using forceps. The matrix firmly maintains the skin biopsy into the cell culture insert. Genoskin produces NativeSkin® models according to a very strict manufacturing process that is entirely standardized.

Adapted to your needs.
To mimic topical or systemic applications, you can choose to apply your compound either on the skin surface or in the culture medium.

A silicone ring is firmly fixed onto the biopsy to prevent topically applied formulations from leaking into the culture medium.

NativeSkin® comes in different sizes and formats to answer all your study and assay requirements.

Reference description working surface Ø recommended topical volume ex vivo culture duration plate format required volume of medium / day minimum order
NSA08 NativeSkin® Access (no silicone ring) - 8 mm - 7 days 12 wells 1 mL n.a.
NSAII NativeSkin® Access 0.5 cm² 11 mm 5-20 µL 7 days 12 wells 1 mL n.a.
NS004 NativeSkin® Medium 1.13 cm² 15 mm 35-45 µL 7 days 6 wells 2 mL 12 wells
NS005 NativeSkin® Large 1.76 cm² 20 mm 50-70 µL 7 days 6 wells 2 mL 12 wells
NS006 NativeSkin® XL 2.54 cm² 23 mm 100-200 µL 5 days 6 wells 3 mL 12 wells
Genoskin models are supplied as ready-to-use kits. They are packed in a specifically designed box that can be shipped by express airfreight.

**Every kit contains:**
- The required amount of models, which are presented in individual inserts for a 6 or 12-well plate. The inserts are loaded in a transport plate covered by a lid. Every skin biopsy is firmly maintained in our proprietary matrix within the insert.
- The required volume of culture medium to maintain the biopsies alive (storage 4°C).
- A QA/QC lot release certificate with donor information (age, gender, skin type).

Should you encounter any abnormalities on receipt, please call us or send an email to: contact@genoskin.com.

**Preparation on receipt**

Always check the kit for completeness and potential transport damages immediately upon receipt. Before handling the skin biopsies, please follow the instructions below:

1. Take the transport plate containing the models to a sterile room. Under sterile conditions, remove the plastic film from the NativeSkin® transport plate and open the culture dish.
2. Use a pipette to add the required volume of culture medium (at room temperature) to each well according to the volume indicated in the table on p. 5 for NativeSkin®
3. Check that no bubbles are present beneath the porous membrane of the insert when the culture medium is added.
4. Incubate the culture dish for at least 1 hour at 37 °C, 5% CO₂, and 95% relative humidity before performing the first experiment. It is also possible to incubate overnight, in which case, the culture medium needs to be changed before administrating any compounds, products, or formulas.
5. Follow the procedure:
   - for **topical administration**: p. 7 A
   - for **systemic administration**: p. 7 B
6. Cultivate the skin models in an incubator (37 °C, 5% CO₂, 95% humidity) for up to 7 days by renewing the medium every day.
7. Change the culture medium daily, by aspirating the medium and replacing it by new culture medium (at room temperature) for each well.

**How to administrate your compound**

**Topical administration**

1. Collect the desired volume of formulation.
2. Spread the formulation homogeneously with the tip.
3. Put the plate in the CO₂ incubator at 37°C.
4. After incubation remove any excess formulation.

**Systemic administration**

1. Collect the desired volume of compound.
2. Dilute your compound in the required volume of medium.
3. Put the plate in the CO₂ incubator at 37°C.
4. After incubation remove the medium.

* Time is dependent on the experiment.

**Kit content**

<table>
<thead>
<tr>
<th>Other materials required*</th>
</tr>
</thead>
</table>

*Not provided by Genoskin.*
How to cultivate

1. Remove the culture medium from the well.
2. Add fresh culture medium into the well.
3. Put the plate in the CO₂ incubator at 37°C.

Skin models can be cultivated for up to 7 days.

How to collect NativeSkin®

1. Use forceps to grip the edge of the skin biopsy while you hold the insert with another pair of forceps.
2. Use a skin puncher of 8 mm in diameter to punch out the part of the skin biopsy inside the silicone ring. NativeSkin® that do not have silicone rings do not require this step.
3. Use forceps to grip the skin biopsy and cut the skin tissue in two parts using scissors. Process the two samples as required, e.g. fix one part in formalin and snap freeze the other part.

RELEVANT APPLICATIONS FOR NATIVESKIN®

Skin explant culture has a long tradition in investigative dermatology. It is used to conduct in vitro studies on the physiology and pathophysiology of human skin and its epidermal appendages.

NativeSkin® is relevant for the following applications:

- Efficacy testing
- Topical applications
- Dermal studies
- Epidermal studies
- Percutaneous absorption
- Metabolism
- Repeated dose assay
- Langerhans cells studies
- Skin resident T cells studies
- Immune response
- Melanogenesis
- Melanocyte studies

We recommend not to include the part of the skin that is covered by the silicone ring in your analysis.
To analyze the effects of your compound on NativeSkin® models, Genoskin has designed and approved several protocols:

- MTT-based cell viability assay
- Formaldehyde fixation for paraffin embedding
- Epidermal separation with Dispase
- Immunofluorescence
- ELISA
- RNA extraction
- Protein extraction
**A wide range of human skin models**

- **NativeSkin®** Ex vivo human skin biopsies (epidermis & dermis) in a ready-to-use format.
- **HypoSkin®** Ex vivo human skin biopsies with adipose tissue for subcutaneous injection, topical and systemic administration.
- **HairSkin®** Ex vivo human skin biopsies from normal human scalp. This model is available only as an in-house service.
- **InflammaSkin®** Ex vivo human skin biopsies with an induced Th17/Th1 psoriasis-like phenotype. This model is available only as an in-house service.
- **WoundSkin®** Ex vivo human skin biopsies with a wound, suited to assess the efficacy of wound-healing formulations.

**Services that fit your needs**

Genoskin provides custom preclinical R&D services that fit your needs:

<table>
<thead>
<tr>
<th>GENOSKIN</th>
<th>CUSTOMER</th>
<th>GENOSKIN</th>
<th>CUSTOMER</th>
<th>GENOSKIN</th>
<th>CUSTOMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Treatment</td>
<td>Analysis</td>
<td>Production</td>
<td>Treatment</td>
<td>Analysis</td>
</tr>
</tbody>
</table>

Please contact our expert team if you wish to develop a new model or have a custom need.

**Suited tools for various studies**

- **FrozenSkin®** Frozen sheets of human skin for absorption studies with Franz cell diffusion chambers.
- **HistoSkin®** Formalin-fixed paraffin-embedded human skin sections for histological analysis through staining, immuno-staining and immunofluorescence.

---

**References**

De Wever B., Kurdykowski S., and Descargues P., Human Skin Models for Research Applications in Pharmacology and Toxicology. Introducing NativeSkin, the “Missing Link” Bridging Cell Culture and/or Reconstructed Skin Models and Human Clinical Testing. Applied in vitro Toxicology. 1: 26-32, (2015).

