

## GARD<sup>®</sup>skin Dose-Response

*In vitro* skin sensitization potency assessment



**With broad applicability to complex mixtures and new raw materials with challenging properties, GARD<sup>®</sup>skin Dose-Response offers a powerful non-animal solution for skin sensitization potency assessment.**

The assay enables derivation of a Point-of-Departure (PoD) for Quantitative Risk Assessment (QRA), establishment of safe dose levels, and subclassification of candidate ingredients, to support both product development and regulatory decision-making.

By estimating the threshold concentration at which a test substance induces skin sensitization, the assay provides quantitative potency information. Its readout supports the prediction of:

- LLNA EC3 values.
- Human skin sensitizing potency NOEL/NESIL.
- UN GHS/CLP potency subcategorization 1A or 1B.

### Typical use scenarios

- Define safe dose levels for materials with expected sensitizing potential.
- Derive reference NESIL values to support confirmatory human patch test design.
- Establish a PoD for quantitative risk assessment.

### Features and Benefits

#### Test system

- Human dendritic-like cell line: SenzaCell<sup>®</sup>.

#### Solvents

- Standard: DMSO and H<sub>2</sub>O.
- Other available solvents: Acetone, DMF, isopropanol, ethanol, glycerol, olive oil, sesame oil

#### What it measures

- Response values in a titrated range of multiple concentrations in GARD<sup>®</sup>skin.

#### Readout and prediction

- Hazard readout: Skin sensitizer or non-sensitizer.
- Potency readout: cDV<sub>0</sub>\*.
- Potency prediction: LLNA EC3 value; human potency NOEL/NESIL; GHS/CLP classification 1A or 1B.
- Dose-response curve.

#### Broad applicability to challenging samples

- Complex mixtures, natural extracts, UVCBs.
- Hydrophobic substances (Log P > 3.5).
- Solid materials.

#### Short turnaround time

- 6-8 weeks for standard studies.
- Fast track available.

#### Low sample requirement

- 0.5g (solid) or 1ml (liquid).

#### Compliance

- Adapted from GARD<sup>®</sup>skin (OECD TG 442E) and included in the OECD Test Guideline Program (TGP 4.106).
- GLP-compliant laboratory.

\*cDV<sub>0</sub> is the threshold concentration for the test substance to induce a positive response in GARD<sup>®</sup>skin.

# Scientific expertise and personal support

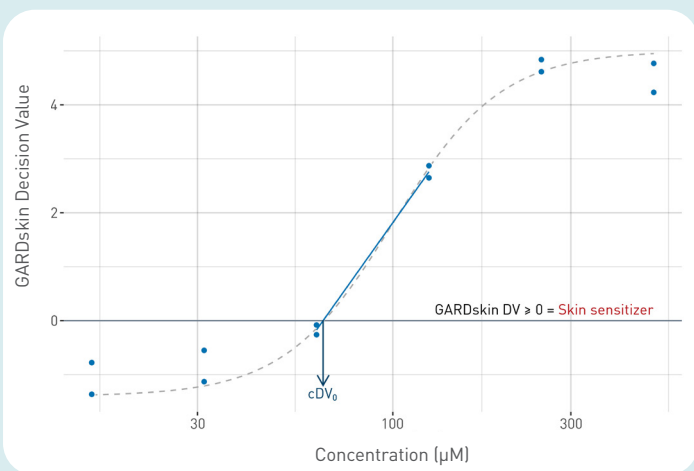
## Top reasons customers test with us

### How it works

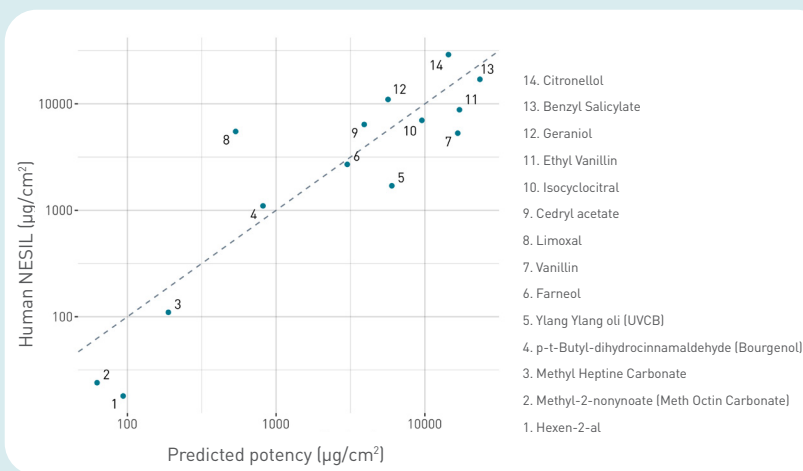
The GARD<sup>®</sup>skin Dose-Response investigates the GARD<sup>®</sup>skin response values in a titrated range of multiple concentrations in a dose-response manner to find the threshold concentration required to induce a positive decision value.

This threshold concentration,  $cDV_0$ , is used to estimate the inherent sensitizing potency of a chemical. A low value indicates high inherent skin sensitizing potency, while a high value indicates low inherent skin sensitizing potency (Figure 1).

The  $cDV_0$  value can also be used to predict the traditional EC3 value from Local Lymph Node Assay, the human skin sensitizing potency NOEL/NESIL (Figure 2), and UN GHS/CLP classification 1A or 1B, depending on the need.



**Figure 1.** Illustration of the dose-response curve from testing a single chemical with GARD<sup>®</sup>skin Dose-Response. The readout,  $cDV_0$ , represents the estimated skin sensitization potency and corresponds to the lowest dose required to elicit a positive response in GARD<sup>®</sup>skin.



**Figure 2.** Comparison of GARD<sup>®</sup>skin Dose-Response predicted human NESIL values with benchmark reference NESIL values for 14 fragrance materials (Donthamsetty et al., 2024). The predicted NESIL values showed strong correlation with reference values (Pearson correlation = 0.906,  $R^2 = 0.821$ ). The dashed line represents the identity line ( $y = x$ ).

### Scientific publications

**IDEA\* QRA-NAMs Working Group:** Natsch et al., Derivation of a Point of Departure using NAMs for application in Quantitative Risk Assessment of fragrance materials, *Regulatory Toxicology and Pharmacology* 2026.

**Jointly with L'Oréal:** Gradin et al., In Vitro Prediction of Skin-Sensitizing Potency Using the GARD<sup>®</sup>skin Dose-Response Assay: A Simple Regression Approach, *Toxics* 2024.

**Jointly with RIFM and IFF\*:** Donthamsetty et al., GARD<sup>®</sup>skin Dose-Response Assay and its Application in Conducting Quantitative Risk Assessment (QRA) for Fragrance Materials Using a Next Generation Risk Assessment (NGRA) Framework, *Regulatory Toxicology and Pharmacology* 2024.

**Proof of concept study:** Gradin et al., Quantitative Assessment of Sensitizing Potency Using a Dose-Response Adaptation of GARD<sup>®</sup>skin, *Nature Scientific Reports* 2021.

\* IDEA: International Dialogue for the Evaluation of Allergens; RIFM: Research Institute of Fragrance Materials; IFF: International Flavors & Fragrances.

This study provides peer-reviewed evidence that SenzaGen's single-assay method GARD<sup>®</sup>skin Dose-Response, alongside the multiple-assay approaches, delivers PoDs that well align with established human and animal reference potency data, within the expected biological variability.

