GARD®skin Medical Device

In vitro skin sensitization testing for medical devices and solid materials

GARDskin Medical Device offers an *in vitro* alternative for skin sensitization testing as a part of the Biological Evaluation of Medical Devices according to ISO 10993.

As an adaptation of GARDskin (OECD TG 442E), the assay can directly test extracts of medical devices and solid materials, classifying the test item as either a skin sensitizer or non-sensitizer:

- Human relevant with high accuracy.
- The test system supports both polar and non-polar extraction vehicles as recommended in ISO 10993-12.
- Demonstrated ability to handle complex mixtures.

To meet the demand for 3R, the test is human-relevant, highly accurate and efficient, with markedly shorter turnaround time compared to the traditional animal study.

Use both saline and oil as extraction vehicles

Features and Benefits

Test system
- Human dendritic-like cell line: SenzaCell™.

Extraction vehicles
- Saline, Olive oil, Sesame oil, Cell culture media

What it measures
- Gene expression profile of 200 genomic biomarkers.

Readout
- Binary prediction: Skin sensitizer or non-sensitizer.

High performance
- 94% accuracy for skin sensitizing hazard prediction.*

Short turnaround time
- 4-6 weeks for standard studies.

Low sample requirement
- 1 ml extracts from the test sample.

Compliance
- GARD is included in ISO 10993-10:2021 in Annex C.
- GARDskin Medical Device is an adaptation of GARDskin, which is approved by OECD as part of Test Guideline 442E for *in vitro* skin sensitization.
- GLP or non-GLP.

*Johansson H. et al. Validation of the GARDskin assay for assessment of chemical skin sensitizers – ring trial results of predictive performance and reproducibility. Toxicological Sciences. 2019.

How GARD® works

GARDskin Medical Device is an adaptation of the GARDskin assay. The test uses a human dendritic-like cell line, SenzaCell™, which mimics a critical part of the human immune system and is able to recognize allergens. For each test sample, prior to performing the standard GARDskin protocol, an additional extraction step is performed to prepare extracts from the test items (solid materials or final devices) according to ISO 10993-12.

The cells are then exposed to the extracts after which genomic biomarker signature is measured. The gene expression pattern of the exposed cells is compared to existing patterns induced by well-known chemicals and analyzed by pattern recognition and machine-learning technology. As a result, the test item is classified as a sensitizer or non-sensitizer.

All the GARD assays are based on the same technology platform. Read more about the GARD technology platform and assay development principles on www.senzagen.com/science.

In-house validation study

Method

An in-house validation study of GARDskin Medical Device was performed to validate the assay's ability of testing extractables from medical devices in polar and nonpolar solvents (saline and oil respectively).

Test samples were model materials spiked with strong, moderate and weak sensitizers. Three additional medical grade materials were used as control materials. Extracts from the materials were prepared according to ISO 10993-12:2012; 0.2 g/ml, 37 ± 1 °C for 72 ± 2 h.

Results

All model materials were correctly classified, the spiked materials as sensitizers, and the non-spiked materials as non-sensitizers. The control materials were all classified as non-sensitizers. The study results are shown in Figure 1.

Material	Chemicals	Sensitizing potential		GARD™skin Medical Device		
		LLNA	HP	Saline	Olive oil	Sesame oil
Silicone	none	N/A	N/A	NS	NS	NS
	2-aminophenol	Strong	cat 2	S	S	S
	cinnamic aldehyde	Moderate	cat 2	S	S	S
	propyl gallate	Strong	cat 2	S	S	S
	phenyl benzoate	Weak	cat 3	S	S	S
TPU	none	N/A	N/A	NS	NS	-
	2-aminophenol	Strong	cat 2	S	S	-
	cinnamic aldehyde	Moderate	cat 2	S	S	-
Silicone tube	-	N/A	N/A	NS	NS	NS
TPU tube	-	N/A	N/A	NS	NS	NS
PVC tube	-	N/A	N/A	NS	NS	NS
Vehicle control	-	Negative	Negative	NS	NS	NS
Positive control	p-Phenylenediamine	Positive	Positive	S	S	S

Figure 1. Results from an in-house validation study testing of model materials with GARDskin Medical Device. Sensitizing potential for LLNA (as listed in the CE STTF database) and Human potency classification (HP) for the chemicals (Basketter et al. 2014).

NS: non-sensitizer, S: Sensitizer, -: not tested.

GLP compliant laboratories

SenzaGen's laboratory in Lund is accredited by the Swedish national accreditation body, SWEDAC, for the conduct of *in vitro* toxicity studies with cell systems in compliance with Good Laboratory Practice (GLP).

GARD is also available at selected CRO partners in compliance with GLP.