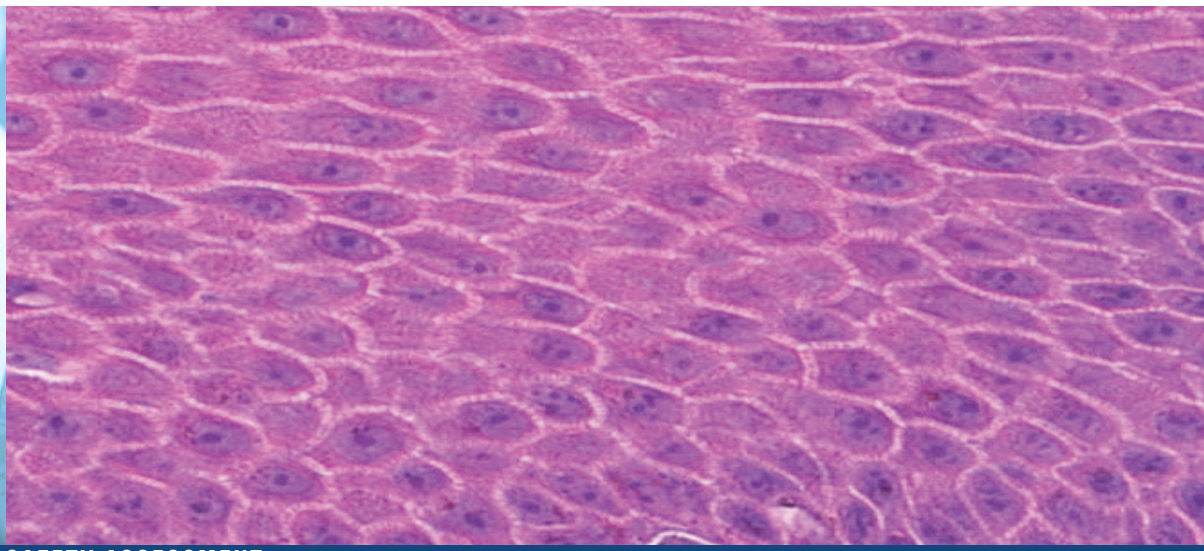
charles river



SAFETY ASSESSMENT

# *In Vitro* Dermal Penetration

### *In Vitro* Skin Penetration Services

- Human skin
- Range of test items
- Formulation testing
- Custom study design
- Diffusion cells
- Bespoke projects

Charles River scientists have been conducting *in vitro* skin penetration studies since the 1980s. Their innovations have been at the forefront in the development of novel methods of study performance and data interpretation, and our scientists are regularly called upon to advise both clients and industry entities on their testing strategies. Our experts are also closely involved in supporting regulatory bodies in the development of guidelines and test interpretation, and they are frequently invited to present at conferences and contribute to scientific papers.

Dermal penetration studies are performed on test items and formulations from the cosmetic, agrochemical, biocidal, chemical, and pharmaceutical industries. Study designs range from generating data used in risk assessments through to formulation selection studies.

### Skin

Human skin is obtained from surgery, either from local hospitals or selected tissue suppliers, with full ethics approval and patient consent.

Skin from toxicology species (rat and minipig) may also be used and, when possible, this is predominantly obtained from control animals in toxicology studies. Skin from domestic pet and farm animal species may also be sourced for veterinary product testing.

### Diffusion Cells

Charles River routinely uses static (Franz type) and dynamic (flow-through) diffusion cells. The systems can be adapted to include a semi-occlusive graphite filter for use with volatile test items. We have an industry leading number of diffusion cells across two facilities to support our clients' ever-expanding needs.

## Related Services

- Research models
- Skin irritation
- Skin sensitization
- Phototoxicology
- Metabolism
- *In vivo* skin penetration
- Dermal toxicology

### Test Item

A radiolabeled test item is routinely used, and Charles River has preferential provider agreements with radiosynthesis vendors. We are happy to manage the radiosynthesis on our clients' behalf.

Increasingly, our clients are creating more complex formulations, and preparing these as radiolabeled formulations is often impossible on a small scale. In such cases, we have a dedicated bioanalytical team to develop and validate extraction and analytical methods from research-grade to full GLP assays.

### Formulations

Test items are applied to skin in a wide variety of test preparations (formulations) including, but not limited to, creams, ointments, gels, solids, liquids, solvents, hair dyes, paints and patches. We also work with sponsors to develop innovative techniques to deliver formulations to the skin, based on their unique study objectives.

### Regulatory Guidance

Risk assessment studies comply with OECD Test Guideline No. 428, OECD Guidance Document No. 28 and the industry guidance:

- Cosmetics – SCCS/1358/10
- Agrochemical - Guidance on Dermal Absorption (EFSA Journal, 2017, 15(6): 4873)
- Pharmaceutical – EMA Draft guideline on quality and equivalence of topical products - (CHMP/QWP/708282/2018) and FDA Draft Guidance on Acyclovir, Revised, December 2016

### Custom Study Designs & Bespoke Projects

Simple and complex exposure and dosing scenarios have been established and successfully tested. Studies are designed to meet full regulatory requirements for safety submissions and/or formulation selection. For formulation selection and screening, skin from the same donor is used for all formulations to generate strong statistical designs.

We can also create experimental designs for quantitative risk assessment related to exposure scenarios. Mechanistic experiments can be performed to generate data for computational toxicology models. We welcome discussion on customized study designs to answer specific scientific and regulatory questions.

### Triple Pack

We offer the triple pack of *in vitro* rat and human (OECD 428) and *in vivo* rat (OECD 427) studies. Preferably, these are performed in series, with the *in vitro* test first. Where there is regulatory need, these can be performed in parallel using the same formulation. Impact on the 3Rs is always considered when discussing these studies.