INTRODUCTION

Skin sensitisation is the induction of an allergic immune response following skin exposure to a subset of chemicals. Allergic contact dermatitis (ACD) is the clinical condition resulting from skin sensitisation which is a delayed-type hypersensitivity reaction induced by small reactive chemicals (haptens). Recently, a refined and reduced method, the murine local lymph node assay (LLNA) has been employed and the sensitiser potency information generated can be used to predict a safe level of human exposure. There are, however, increasing public and political concerns regarding the use of animal testing for the screening and the safety assessment of new chemicals. Consequently, the development of in vitro, in chemico or in silico models for predicting the sensitising potential of new chemicals is receiving widespread interest. These tests will need to resume the complex interactions of a chemical with the different compartments of the immune system: The chemical must penetrate the skin and react with endogenous proteins. Some chemicals, termed prohaptens, require activation through skin metabolism in order to become haptons capable of binding to skin proteins. Haptenated carrier-proteins are internalised and processed by immature DCs that become activated. The activated DCs start to migrate from the epidermis into the draining lymph node, complete maturation and present fragments of the haptenated carrier-proteins to T-helper cells, resulting in an antigen-specific immune response.

There are currently several large programs of research ongoing that aim to deliver new non-animal test methods for skin sensitization. Colipa, the European Cosmetics Industry trade association, intensively participates to this international research effort through continuous funding of research to explore the processes governing the induction of skin sensitization and the development of new methods incorporating the acquired knowledge.

The Skin Tolerance TF Research & Development

Our ongoing research portfolio (9 different research and method development projects) continues to provide new insights into the biological processes driving skin sensitization and have already led to the successful development of three in vitro test methods for the detection of potential sensitzers: the Direct Peptide Reactivity Assay (DPRA), the human Cell Line Activation Test (h-CLAT) and the Myeloid U937 Skin Sensitization Test (MUSST) that are now being pre-validated by the European Centre for the Validation of Alternative Methods (ECVAM).

Development of a non-animal toolbox capable of replacing the need for animal test data

In parallel, a focused evaluation of other available test methods is being conducted. This comprehensive research and development program is aiming at the definition of a toolbox of test strategies capable of characterizing skin sensitiser potency and safety without the need for new animal test data.

Conclusions

The knowledge gained by this global research effort and the synergies that should appear will allow the development of novel in vitro approaches for the identification and characterization of skin sensitizing chemicals. Moreover, the overall strategic goal of this program is to develop a battery of in silico / in vitro predictive assays that could be used in concert and allow skin sensitization risk assessment decisions to be made without the need for new animal test data.