A new method for testing allergenic substances without experimental animals

December 20 2011

Contact allergy affects around 20% of the population in the western world. Scientists are working intensively to develop alternative test methods that do not require animal testing. A research group at the University of Gothenburg, Sweden, has now developed a unique test method that enables graded results to be obtained using cultured skin cells.

"We have made several discoveries about the mechanism behind contact allergy, one of which is that allergenic substances react with keratin 5 and 14 in the skin. The skin cells form what are known as "blebs" when exposed to allergenic substances, and this can be used to test whether a substance is allergenic", says Sofia Andersson from the Department of Chemistry at the University of Gothenburg.

Contact allergy affects around 20% of the population in the western world. Metals such as nickel, and substances in perfume and preservatives are among the most common allergenic substances. They are often components of products that are in contact with the skin, such as jewellery, skin lotions and make up. Contact allergy cannot be cured, and an affected person must avoid the allergenic substance, in order to avoid troublesome eczema. This can be a problem if the substance is present in many different products. It is for this reason important to test cosmetic products in order to prevent the development of contact allergy .

The EU has now forbidden the testing of cosmetics and their ingredients

on animals. It is, however, not a simple matter to fully replace animal tests. Until now, animal-free tests have only been able to determine whether a substance is allergenic or not – such tests have not been able to determine the extent to which a substance causes allergy. Thus, much work remains to be done in developing alternative methods.

"Cultured skin cells are exposed to substances for 24 hours in our test, and then photographed. The number of cells with blebs is then counted. The greater the number of blebbing cells, the more powerful is the allergenic potential of the substance. Thus, our new test has the potential to give a graded reply: it can quite simply determine whether an allergenic substance is extremely, strongly, moderately or weakly allergenic", says Sofia Andersson.

The results can then be used to determine safe concentrations of substances in products that are used in contact with the skin. Since the experiments have given very promising results, the scientists are now working together with GU Holding in developing the test and the analysis method.

More information: The thesis Contact Sensitizers Induce Keratinocytes to Release Epitopes - Tools for In Vitro Tests and Implications for Autoimmunity was successfully defended at a disputation held at the University of Gothenburg.

Provided by University of Gothenburg