Genomic assay as an alternative to animal testing

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The method developed by the group in Lund is based on human cells grown in a laboratory. The cells are exposed to a chemical and then parts of their genetic content are filtered out and transferred to a microchip.

"Using the chip, we can then read which genes reacted to the chemical and how they reacted. This provides a 'signature' of gene expression that shows whether the substance is allergenic", explains Malin Lindstedt.

The test has now been submitted for prevalidation to the EU agency that approves alternatives to animal testing. In the future, it could also be used in connection with the EU's chemicals legislation, REACH, which requires extensive testing of new chemicals. Under the rules in REACH, tens of thousands of chemicals will have to be tested, meaning many animal experiments – to investigate the substances' potential allergy risk alone is estimated to require over 800 000 animals.

For allergy tests, guinea pigs and mice are the most commonly used animals. With guinea pigs, the test substance is injected under the skin to see if it produces redness, swelling or blisters. With mice, the substance is injected into the skin of the ear. The mice are put down a few days later so that the immunological reaction in their lymph nodes can be analysed.

Using animal experiments is ethically problematic. However, it also takes a lot of time and is therefore expensive. What is more, the results are not always reliable.

"The tests we have developed are more relevant for our health because they are based on human cells. Animal tests sometimes produce misleading results, which is only discovered afterwards once a substance has already caused allergic reactions", says Malin Lindstedt.

The Lund group started by developing a test for contact allergies. Subsequently, another test has been developed that can determine which substances could produce respiratory allergies, which often affect those who work in the chemicals industry.

"We are also developing the technology itself, to make it simpler and easier to manage. It will soon be possible to screen hundreds of chemicals at a time, which will be much, much quicker and cheaper", says Malin Lindstedt.

More information: Henrik Johansson, who has been a doctoral student in the group, recently presented a thesis on GARD: www.lu.se/lup/publication/3736973

Provided by Lund University

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