

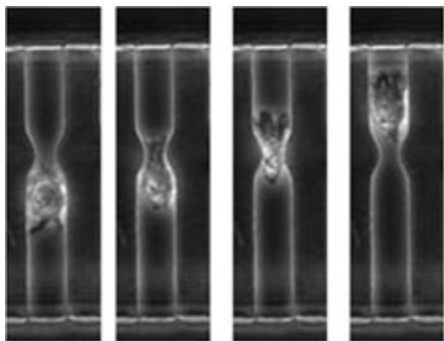
Cosmetics Testing without Animals

A microfluidics device connects artificial skin and lymph node.

By [Rachel Kremen](#)


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Researchers at [Hurel Corporation](#) have reached a major milestone in their quest to create a chip to replace skin allergy testing on animals. Working with cosmetics firm [L'Oreal](#), Hurel has developed a working microfluidic portion of the chip. While there is still much work to be done before they have a whole chip ready for commercial use, the researchers say this is a major step toward eliminating allergy testing on animals.



Step by step: The series of images above shows dendritic cells as they move across a chemical gradient. Researchers still have to work on an artificial skin and lymph node and get these parts to work together.
Credit: Hurel

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 [Watch dendritic cells move through a chemical gradient in a microfluidic device.](#)

skin allergy testing because rodents aren't covered under the U.S. Animal Welfare Act and therefore no records need to be filed with the government regarding their use. But he estimates that at least 10,000 animals are used in America each year for such tests. "It's a very commonly performed test," he says.

When a living animal experiences a skin allergy, dendritic cells from the skin migrate via lymphatic fluid to the lymph node, where they launch an allergic response by stimulating T cells. Those conducting the tests look for outward allergic reactions, such as skin irritation.

Hurel's test, which will not require any animal involvement, will mimic the interaction between the skin and the lymphatic system in response to a chemical. To build the chip, cells will be

"One important benefit in moving away from animal testing is the cost savings," says Robert Freedman, Hurel's chief executive officer. He said tests on small animals can run as high as \$1,000 an animal. Ultimately, these chips should prove to be far less expensive. There's also increasing political pressure to eliminate animal testing, particularly in Europe, where a complete ban on animal testing for cosmetics sold there will take full effect in 2013.

"There is, beyond that, the powerful ethical demand ... that it just shouldn't be done," Freedman says, adding that using the device one time would save 25 animals' lives. "If we're smart enough to go to the moon, then we should be smart enough to test chemicals without hurting other creatures."

The chip is intended to replace one kind of test, called a local lymph node assay, that is often done on new chemicals used in cosmetics. Today, the tests are generally performed on female mice. (Though some labs use an older method involving guinea pigs.)

Chad Sandusky, director of toxicology and research at [Physicians Committee for Responsible Medicine](#), says it's difficult to know exactly how many animals are used for

cultured to create an artificial lymph node--essentially tissue that can simulate a human immune-system response--a short distance away from an artificial skin construct made from cultured human cells. The artificial lymph node will be connected to the skin via a microfluidic system made of channels filled with a specially maintained chemical gradient.

To use the chip, the chemical product being tested would be put in contact with the artificial skin. If an allergic reaction occurred, dendritic cells would migrate toward the artificial lymph node in response to the chemical gradient, where they would stimulate the T cells.

Maish Yarmush, Hurel's chief scientific advisor, says the company still has to determine how the test will be read. "We will need to monitor the response of the T cells," Yarmush says. That could involve monitoring T cell proliferation or secreted molecules or both.

Determining how an allergic response will be measured is just one of many challenges for the team. "The microfluidic signaling piece has been developed," Freedman says, "but we have to develop all [the] pieces and get them to work together."

Regardless, Freedman said he expects to have a working prototype "complete and functional" by late 2011. The goal is to have the product on the market in time to meet the needs of cosmetics companies, which need a working animal substitute by 2013.

Sandusky notes that once complete, the Hurel test would also have one clear scientific advantage over animal tests: it would eliminate the issue of trying to extrapolate data gathered on animals to humans. "I'm very intrigued with Hurel's approach," says Sandusky. "We would love to see this thing really pan out."

Source: <http://www.technologyreview.com/biomedicine/24384/page1/>