Tests to use human not animal skin

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STRETCHED out across the top of a vial, the thin cream-coloured material feels almost like rubber. Barely a centimetre in diameter; this is a sample of Episkin—a reconstructed human skin which has been approved for testing if cosmetics are likely to irritate the skin. It is the first complete replacement for animal testing. Although cosmetics and skincare giant L'Oréal has been developing reconstructed skin since the 1990s, the search for animal alternatives became urgent in recent months with the introduction of two pieces of legislation. In December 2006, the European Union introduced REACH, which calls for more than 10,000 chemicals used in cosmetics to be tested for skin irritancy by 2009. At the same time, the EU’s cosmetics directive bans the use of animals in such tests from 2009. “Europe is in conflict with itself, calling for both a decrease in animal testing and for significantly more products to be tested,” says Estelle Tesonneaud, who developed Episkin with her colleagues at L’Oréal’s labs in Lyon, France. “People don’t have any choice but to adopt alternative methods.”

Tesonneaud’s team grows the skin layers on collagen, using skin cells called keratinocytes left-over from breast surgery (see Diagram). The team can test the safety of cosmetics by simply smothering the skin in the product. They can then check the proportion of cells that have been killed off by adding a yellow chemical called MTT which turns blue in the presence of living tissue. “To be validated we had to show that we could reproduce results as effectively as animal tests,” says Patricia Pineau, scientific director at L’Oréal. Independent tests showed that in some cases Episkin was able to predict more accurately how a person would react to products than animal tests, she says.

Episkin improves on animal testing in other ways too. For example, it can be adapted to resemble older skin by exposing it to high concentrations of UV light. Adding melanocytes also results in skin that can tan, and by using donor cells from women of different ethnicities, the team has created a spectrum of skin colours which they are using to measure the efficiency of sunblock for different skin tones.

“Europe is a great advance—-a real breakthrough for animals but it will be an absolute disaster for people who will finally have a safety test that is relevant to them,” says Kathy Archibald of the anti-vivisection group Europeans for Medical Progress, London. She says animal skin often differs dramatically from human skin in terms of sensitivity.

Chris Flower of the Cosmetic Toiletry and Perfumery Association in London also welcomes the move. “The fact that it has taken 20 years of research to come to this point shows just how difficult it is to replace animal testing,” he says. “Now it has been validated it can potentially be applied, not only to testing new shampoos and cosmetics, but more widely, in medical research.”

L’Oréal already has a skin in a vial to help study a rare genetic disease that affects so-called “moon children”, who are hyper-sensitive to sunlight (Photochemistry and Photobiology, DOI: 10.111/ j.1751-1052.2005.00373.x). Tesonneaud and her colleagues are also working on a skin substitute for treating major burns and ulcersations.