



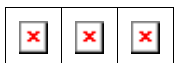
## In vitro chips offer alternative to animal testing

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The lab rat of the future may have no whiskers and no tail -- and might not even be a rat at all.

With a European ban looming on animal testing for cosmetics, companies are giving a hard look at high-tech alternatives like the small, rectangular glass chip professor Jonathan Dordick holds up to the light in his lab at Rensselaer Polytechnic Institute.

The chip looks like a standard microscope slide, but it holds hundreds of tiny white dots loaded with human cell cultures and enzymes. It's designed to mimic human reactions to potentially toxic chemical compounds, meaning critters like rats and mice may no longer need to be on the front line of tests for new blockbuster drugs or wrinkle creams.



Dordick and fellow chemical engineering professor Douglas Clark, of the University of California, Berkeley, lead a team of researchers planning to market the chip through their company, Solidus Biosciences, by next year. Hopes are high that the chip and other "in vitro" tests -- literally, tests in glass -- will provide cheap, efficient alternatives to animal testing.

No one expects the chips to totally replace animals just yet, but their ability to flag toxins could spare animals discomfort or death.

"At the end of the day, you have fewer animals being tested," said Dordick.

Medical advances ranging from polio vaccines to artificial heart valves owe a debt to legions of lab rats, mice, rabbits, dogs, monkeys and pigs. Animals -- mostly mice -- are still routinely used to test the toxicity of chemical compounds.

Animal testing also still has an essential role in making sure new pharmaceutical products are safe and effective for humans, said Taylor Bennett, senior science adviser to the National Association for Biomedical Researchers. Animal studies generally are needed before the federal Food and Drug Administration will approve clinical trials for a drug.

"The technology is not yet there to go from idea to patient application without using animals," Bennett said.

Animal testing can be slow, though, and some researchers question how well an animal's response to a chemical can predict human reactions.

In addition, the public is increasingly queasy about animal testing, especially the idea of inflicting pain for products like new lipsticks or eye shadows. The movement against animal testing has been especially strong across the Atlantic, where the European Union is set to enact its ban on animal testing for cosmetics in March 2009.

Cosmetics companies have greatly reduced animal testing, though they still may use it to test the safety of a new ingredient, said John Bailey, executive vice president of the Personal Care Products Council, an industry group.

Alternatives to animal tests include synthetic skin substitutes and computer simulations. But in vitro products show the most promise because they can be efficient, fast and easy to manipulate, said Dr. Alan Goldberg, director of the Center for Alternatives to Animal Testing at Johns Hopkins University.

"There's no question that it's the strategy of the future," Goldberg said.

Bailey agrees that in vitro chips hold the most promise, but said the chips still need to be validated before companies can have more confidence in them. He noted that chips have limitations when it comes to risk assessment, such as determining if particular doses of a substance pose a cancer risk.

The product developed by Dordick and Clark consists of two glass slides. The first, called the MetaChip, has rows of little blots containing human liver enzymes. The other slide, the DataChip, contains an identical array of blots which, depending on the test, could be live human bladder, liver, kidney, heart, skin or lung cell cultures. Sandwiched together, the two chips mimic the human body's reaction to compounds.

If the cells die or stop growing, it's a sign that a toxin was present.

Troy-based Solidus has received about \$3 million in federal money, including grants from the National Institutes of Health and the National Science Foundation. Dordick said a pharmaceutical company and a cosmetic company are testing the chip and they hope Solidus will have a product on the market by late 2009.

Goldberg notes that the movements toward in vitro and away from animal testing is incremental -- even optimistic assessments measure progress in decades. But he still believes there may well be a day when the lab rat becomes a thing of the past.

"At some time in the far future my suspicion is yes," he said, "because we're doing it stepwise by stepwise."

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