

Why animal testing in cosmetics will soon be a thing of the past

[Katherine Martinko](#) (@feistyredhair), [Living](#) / [Organic Beauty](#)

January 29, 2018



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Dr. Catherine Willett explains how advances in biology are finally allowing ethics to catch up with science.

Every day, humans slather and spray an estimated 127 chemicals onto their body, in the form of toothpaste, sunscreen, makeup, soap, hand sanitizer, and hair spray, to name a few common sources. But how do we know these chemicals are safe?

That is the [job of toxicologists](#), scientists who study chemicals that could cause harm to humans. Toxicologists are interested in how chemicals, either naturally-occurring or lab-created, affect everyone from humans to

livestock to microbes. They perform tests in order to determine which chemicals are safe enough to be added to your favorite hand soap or eye shadow.

What toxicologists do is important work, but there is considerable concern about *how they're doing it*. Chemical tests usually involve animals, and this carries significant ethical concerns for many people.

(There is also great concern about the lack of chemical regulation in the U.S. cosmetics industry, which allows thousands of chemicals to be considered safe till proven guilty; but that's another issue altogether.)

An estimated 500,000 mice, rats, guinea pigs, and rabbits are used each year for [cosmetics testing](#). Tests include assessing irritation, by rubbing chemicals into animals' eyes and skin; measuring toxicity, by force-feeding chemicals to animals to determine if they cause cancer or other diseases; and lethal dose tests, which determine how much of a substance is needed to kill an animal. Many of these animals die, and all suffer.

Is there a better way to do things?

Dr. Catherine Willett, director of regulatory toxicology at the Humane Society of the United States and coordinator of the [Human Toxicology Project Consortium](#), believes there is. She spoke with TreeHugger at the [2017 Lush Prize](#) in London last November, where she was awarded a prize for her work in developing animal-free testing methods.



© K Martinko -- Dr. Catherine Willett receives a Lush Prize for her work in November 2017

Willett explained that animal testing is not only inhumane, but it's also outdated. Animal tests are not predictive of human reactions to chemicals, which is why 92 percent of new drugs fail in human trials after passing animal tests. Some drugs that are toxic to animals, like aspirin, are enormously helpful to humans. In other words, it does not make sense to perform chemical safety assessments on creatures so biologically different from ourselves.

Animal tests are difficult to replicate and often give results that are confusing and hard to use. They are enormously expensive. A test for a single chemical ingredient in a pesticide costs millions of dollars, takes ten years to complete, and requires more than 10,000 animals.

The good news is, alternatives do exist and they're getting more sophisticated and accessible with every year that goes by. Willett described some of them:

Artificial Tissues

These could be reconstructed tissues or human skin left over from plastic surgeries. They are grown in cell cultures and allow scientists to administer tests on isolated cells. Willett said that these are more accurate than animal tests because they show how a single gene changes in response to exposure to a chemical.

"With tissue cultures, you can apply a chemical to the skin and actually see how their structure changes. This is similar to what you'd do to an animal, but far more humane."

Organs on a Chip

Taking artificial tissues a step further, [organs on a chip](#) provide a more sophisticated system for looking at cellular interactions. The concern with looking at isolated cells is that researchers miss seeing how they interact, whereas organs on a chip allow different kinds of cells to grow beside each other, so that they look like a real organ.

As Willett explained, the science has gotten to the point where we now have livers on a chip; they function the same way, but they're artificially grown. "It's a more complex way of being able to look very specifically at what chemical exposure does to an organ."

Pathway-based Toxicology

Willett is most passionate about the development of a "pathway-based approach" to toxicology, the goal of which is to make animal testing obsolete, rather than replace it with artificial tissues. The idea is to bring together all the information we

have about biological mechanisms and use it to make *better predictions* about how chemicals will react in the human body.

According to the [Human Toxicology Project Consortium](#), which Willett heads, the pathway-based approach is an attempt to chart "a more complete map of biology, allowing us to build a deeper understanding of the complex chain of interactions that happen once chemicals make their way inside our body." There are three general steps, also explained in [this infographic](#):

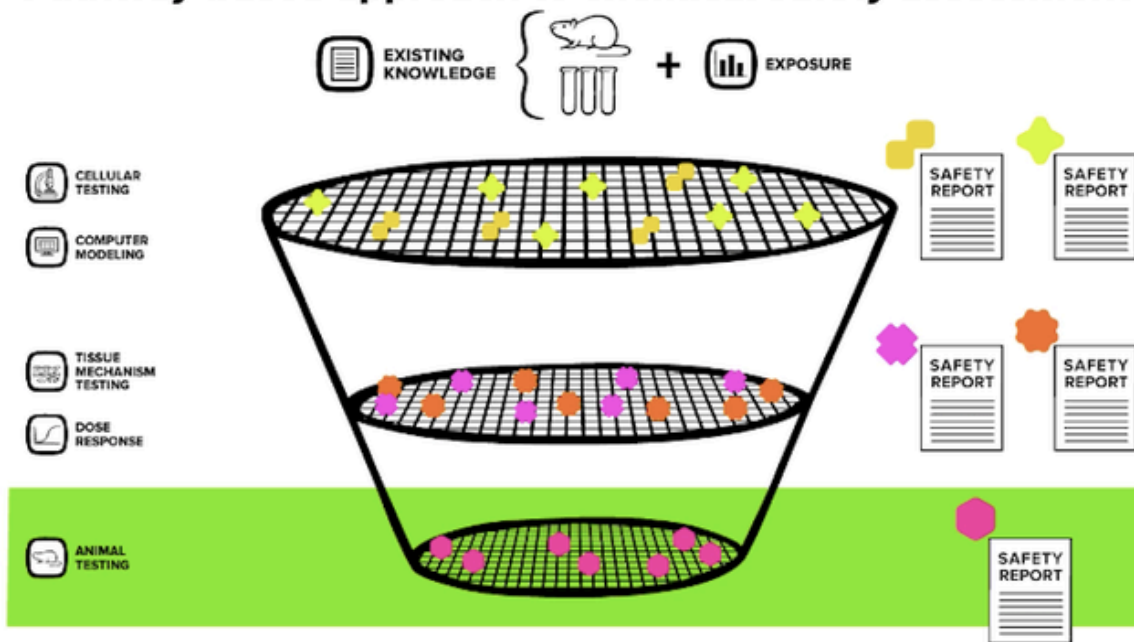
1) *Collect all existing information, including results from toxicity and exposure tests, to*

determine what we do know and what else is needed.

2) *Learn more about a chemical's activity by using fast, cell-based tests and predictive computer programs to identify. The most active chemicals can be tested using specific, non-animal tests that look at its activity inside cells or tissues, dose response, and how that may compare to actual human-level exposure.*

3) *Only those chemicals for which more information is needed would go on to be tested on animals -- at least, until these tests can be eliminated completely.*

Pathway-based approach to chemical safety assessment



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As Willett concluded, **"The goal is to the change the way we use information to make predictions about everything. Then we won't have to test."** She believes that, in twenty years, the vast majority of animal toxicology testing will be a thing of the past.

This is something that UK-based cosmetics company [Lush](#) has been working toward for years, with the presentation of the Lush Prize every fall to scientists advancing non-animal testing methods. When I spoke to Willett, she

was being awarded £ 50,000 for her work with the Human Toxicology Project Consortium. She is a member of a lobby group, the [Humane Society Legislative Fund](#), that also won a £ 50,000 Lush prize for its work passing animal protection laws at the state and federal levels.

TreeHugger was a guest of Lush Cosmetics at the Lush Prize award ceremony in November 2017.