

Research will examine whether other methods can replace animal testing

March 14 2017, by Meredith Cohn, The Baltimore Sun

A team at the Johns Hopkins University aims to determine how useful testing on dogs, mice and other animals is in predicting whether drugs and chemicals are toxic to humans.

The research, to be conducted over the next year or so, could accelerate a push to end animal testing already underway for ethical and practical reasons.

All drugs and some chemicals must be tested on animals before humans, but no one is certain how well such tests predict the toxic affects on people. The Johns Hopkins team hopes to find out by comparing standard animal tests with more modern scientific methods that use [human cells](#) or computer models.

"It's a pivotal time to provide this evidence," said Katya Tsaïoun, who is leading the study as director of the Evidence-based Toxicology Collaboration in the Johns Hopkins Bloomberg School of Public Health. "No one hopefully will be able to dispute the findings."

Some studies have found animal studies are not good at predicting how drugs and chemicals affect humans, and Tsaïoun said her review using the latest toxicology science could provide definitive evidence.

Many researchers and regulators at the U.S. Food and Drug Administration, which oversees drug approvals, and the Environmental Protection Agency, which oversees chemicals, still argue that animal

testing is necessary. But the agencies have explored ways to support new nonanimal tests to speed up the development and approval process.

Many hope to decrease the number of drugs that show promise in animal testing but fail to prove safe and effective in human trials, failures that are costly and disappointing to pharmaceutical companies and researchers as well as to patients hoping for better therapies and cures. A drug trial for a promising Alzheimer's drug failed in a large trials last year, for example.

"We won't necessary jump completely away from animals to completely nonanimals," said Kristie Sullivan, vice president of research policy for the Physicians Committee for Responsible Medicine, a medical ethics group that opposes animal testing. "It will be staged."

Data from a U.S. Department of Agriculture website that has recently been taken down showed that more than 767,600 animals were used in research in 2015. The number included dogs, cats, guinea pigs, hamsters, rabbits, primates and some farm animals.

The data did not include dogs and other animals held in labs but not experimented on. It also didn't count rats, mice or birds, which are the most common test subjects.

A 2015 Pew Research Center survey shows a slight majority of Americans disapprove of animal testing. A growing number of manufacturers of home and beauty products that are not required to test on animals have abandoned the practice, Sullivan said. Medical schools, including those at the University of Maryland and at Johns Hopkins have stopped practicing surgical techniques on animals in favor of computer models.

But basic research and drug and chemical tests still rely heavily on

animals, Sullivan said. In some cases animals just can't carry the load. There are more than 100,000 chemicals in consumer products but few have been subjected to significant testing because existing labs don't have the capacity to test them all, she said.

One promising replacement for animal testing is "tissue on a chip," Sullivan said. It's a small plastic stick with internal channels containing lung, gut or other human cells. By running a drug or chemical through the stick, the cells can show if they may be toxic to human organs.

"We're seeing more and more researchers trying to incorporate human-based methods into research, using human cells, stem cells or tissue on a chip," she said. "The more of those methods used, the better for human health and for animals."

For now, however, researchers must be allowed to continue research on animals, said Matt Bailey, president of the Foundation for Biomedical Research, which advocates on behalf of the scientific community for animal testing.

His group supports efforts to reduce the use of animals and for ethical treatment of animals in labs, but he said animals remain crucial to medical advances.

"Right now, there is no comprehensive substitute for animal testing and research," Bailey said.

"Certainly, computer models and cell cultures, as well as other adjunct research methods, reduce the number of animals used," he said. "But there is no way to completely replace animal research because the pathway to fully replicating a complete living system does not yet exist."

Meanwhile, animal advocacy groups plan to continue efforts to reduce

animal testing and find homes for surviving animals.

The Beagle Freedom Project contacts more than 470 research labs a year and offers to take their dogs once studies are completed. Its officials won't disclose where the animals come from but say a few dozen labs have taken them up on the offer.

"Our mission is to see an end to animals used in experiments," said Jeremy Beckham, a research specialist for the group. "We make our case to the public on two grounds, and one is an ethical argument. These animals feel pain and suffer and experience the world much like we do. ... But we also have to make the case on scientific grounds."

That's why the group is sponsoring several research projects, including grants to study tissue on a chip and an "artificial nose" that can detect toxicity in inhaled particulate matter. It also gave \$50,000 for Tsaion's toxicity study.

While the Beagle Freedom Project hopes Tsaion will prove that animals are bad stand-ins for people, it has agreed to allow publication of her results no matter the findings.

Tsaion will look at data on 10 approved drugs, including some that later were found to have toxic effects on the human liver. She will compare the animal tests on those drugs with the nonanimal tests to see which more accurately predicted the drugs' potential toxicity.

Tsaion said [animal testing](#) eventually will become "redundant" no matter her results, as more personalized tests are developed that could, for example, predict something as specific as who will have an allergic reaction to a drug or chemical or will have heart or kidney troubles.

In the meantime, animal rights groups and lawmakers are pushing a bill

this year in the Maryland General Assembly to require public and private research institutions to seek homes for adoptable dogs and cats once studies conclude.

A sponsor, Del. Ben Kramer, a Montgomery County Democrat, said at least three other states have such laws, but major research universities here oppose the measure and it isn't expected to pass. Kramer intends to continue introducing the measure to draw attention to the [animals](#).

"The bill would allow them to live out what time they have left after experimentation in a home and experience a little bit of kindness and love," he said. "They deserve that."

Audrey Huang, a spokeswoman for Johns Hopkins Medicine, said Hopkins labs comply with federal laws and ethical standards and said a state law would pose a regulatory burden that could hinder [research](#).

A statement from the University of Maryland School of Medicine said the measure would inappropriately put adoption decisions in nonveterinary hands.

Huang said Hopkins' use of dogs also is on the decline. Researchers there used 493 in 2005 and 31 in 2016, largely because they've been replaced with mice and rabbits. And Hopkins, as well as Maryland, already have adoption programs. Maryland didn't report a number, but Hopkins has found homes for 240 since records were first kept in 1998.

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Citation: Research will examine whether other methods can replace animal testing (2017, March 14) retrieved 17 April 2024 from <https://phys.org/news/2017-03-methods-animal.html>

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