TOXICOLOGY IN THE 21ST CENTURY
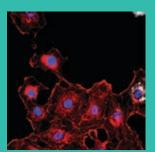
Interested in Advancing Science and Saving Animals?

Toxicology is the study of the adverse effects of substances on living organisms and the environment, and toxicity testing for medicines, pesticides, cosmetics, personal-care products, and cleaning products has historically been conducted using animals.

Every year, millions of animals are poisoned and killed in toxicity tests because of old habits and regulations. In these tests, rats, mice, guinea pigs, rabbits, dogs, nonhuman primates, and other animals are used—they may be forced to swallow or inhale massive quantities of a test substance, or experimenters may smear a chemical into their eyes or onto their skin.

However, animal tests can be replaced with human-relevant, animal-free methods, such as the following:
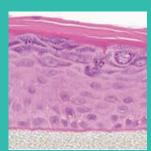
CELL CULTURES

Cell cultures can be used to assess the effects that chemicals will have on human cells. Researchers may use cell lines, primary cells, or induced pluripotent stem cells.

3D TISSUE MODELS

3D tissue models composed of human cells mimic the architecture of human tissues and their responses to chemicals. As one example, MatTek's EpiDerm™ is a human cell-derived skin model that replicates key traits of human skin and can detect corrosion, irritation, or an allergic response caused by a test substance.
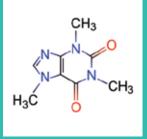

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ORGANS-ON-CHIPS

Organs-on-chips containing human cells mimic the structure and function of human organs and can be linked by channels that contain a flowing blood-like liquid to create a "human-on-a-chip." The Wyss Institute at Harvard University is one of several groups that have developed this method for assessing toxicity.

© Conceptual Schematic of a Human-on-a-Chip
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COMPUTER MODELS

Sophisticated computer models can be used to predict the effects of chemicals on people. The OECD QSAR Toolbox is one example of a computer software application that uses the structural characteristics and behavior of tested chemicals to predict the toxicity of similar, untested chemicals.

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You can help advance human-relevant, animal-free toxicity testing by learning about and sharing these techniques. Find out more about animal-free methods for evaluating the safety of chemicals and consumer products at **PETAIndia.com/animal-free-testing** and **PISCLtd.org.uk**.

PeTA INDIA

"The reason we use animal tests is because we have a comfort level with the process … not because it is the correct process, not because it gives us any real new information we need to make decisions. Animal tests are no longer the gold standard. It is a marvelously new world."
—Melvin E. Andersen, Ph.D., former director, Division of Computational Systems Biology, The Hamner Institutes for Health Sciences