CERTARA

Understanding the Impact of FDA Modernization Act 2.0 on Drug Development

By Dr. Jim Herman and Dr. Hannah Jones

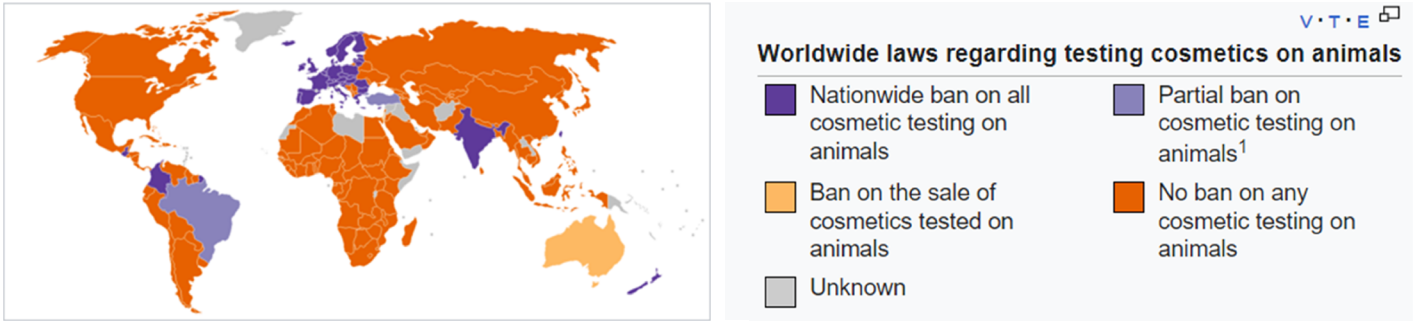
In December 2022, President Biden signed the FDA Modernization Act 2.0 that eliminated the 80-year-old mandate in the United States requiring drug developers to conduct animal tests before human trials. Features of this legislation include:

- The potential for less reliance on animal testing.
- Drug developers can now choose the most appropriate method for their application much earlier during drug discovery.
- The use of computer modeling and micro-physiological systems (MPS) is now allowed.

Precedents for Minimizing Animal Testing

- The EU has banned animal testing in the cosmetic industry since 1993, and a marketing ban prohibits animal testing on finished cosmetic products.
- The US FDA doesn't prohibit animal testing in the cosmetic industry but encourages alternative approaches.
- The US EPA announced reducing and eventually eliminating animal testing for performing safety assessment of chemicals in 2019.
- The EMA announced a similar approach to the FDA's Modernization Act, investing in and encouraging alternative methods in the pharma industry in Europe.

Figure 1

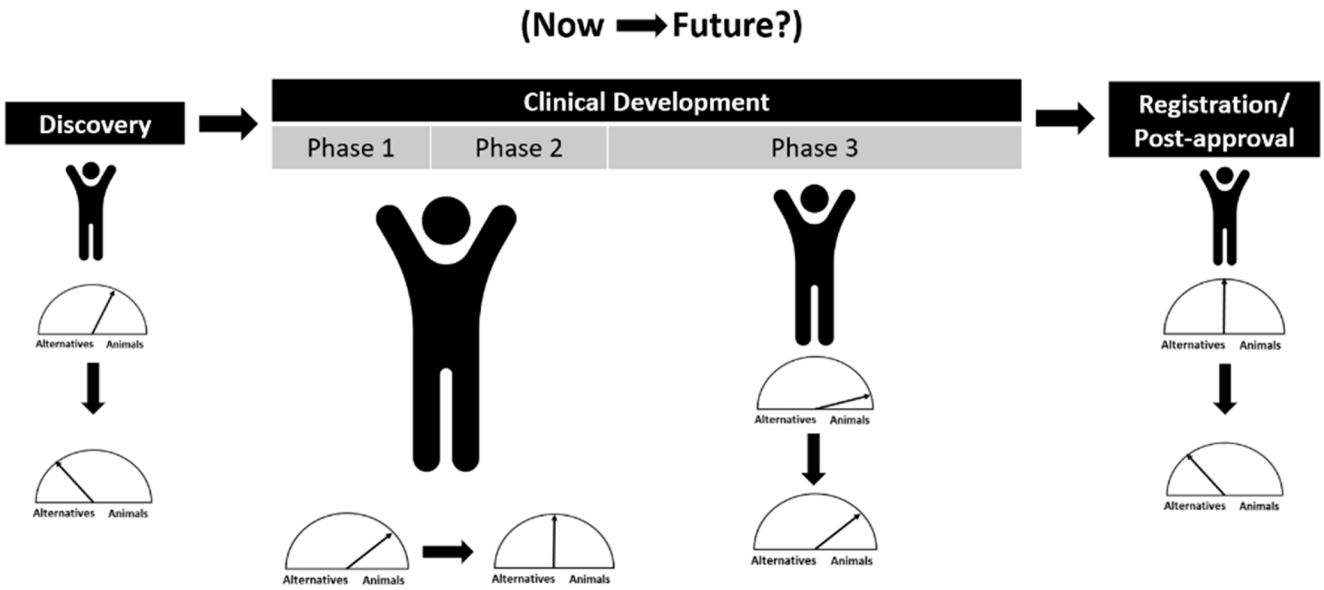


There has a been a global push to reduce animal testing in the cosmetics industry.

Current State of Animal Usage in Drug Development

The COVID-19 pandemic has led to shortages in the animal supply chain, especially for primates. The availability of other large animal species has also been impacted. Thus, sponsors are seeking to reduce the number of animals they use by turning to alternative methods.

Figure 2



Non-clinical toxicology support in drug development. The use of alternatives to animal testing is likely to increase at all stages of drug development.

- Discovery Phase: While alternatives are available, animal usage is still high.
- Phase One, Two, and Three Clinical Development: Heavy reliance on animal testing, with limited available alternatives.
- Registration and Post-approval: Current usage is split around 50-50 between animal and non-animal methods.
- In the future, we expect to see a shift extensive use of animal models to greater use of alternative methods.

Innovative Alternatives to Reduce, Refine, and Replace Animal Testing

The goal of the 3 R's (Replacement, Reduction, and Refinement) is to optimize the information gained about an investigational drug while using fewer animals:

- Replace animal testing by promoting alternative methods.
- Reduce the number of animals used in experiments.
- Refine procedures to minimize potential animal discomfort.

The pharmaceutical industry now has more flexibility to consider alternative approaches.

In Silico

Replaces pharmacokinetic (PK) experiments by using computer models to predict substance behavior. It can predict drug safety, efficacy, and side effects to optimize drug design.

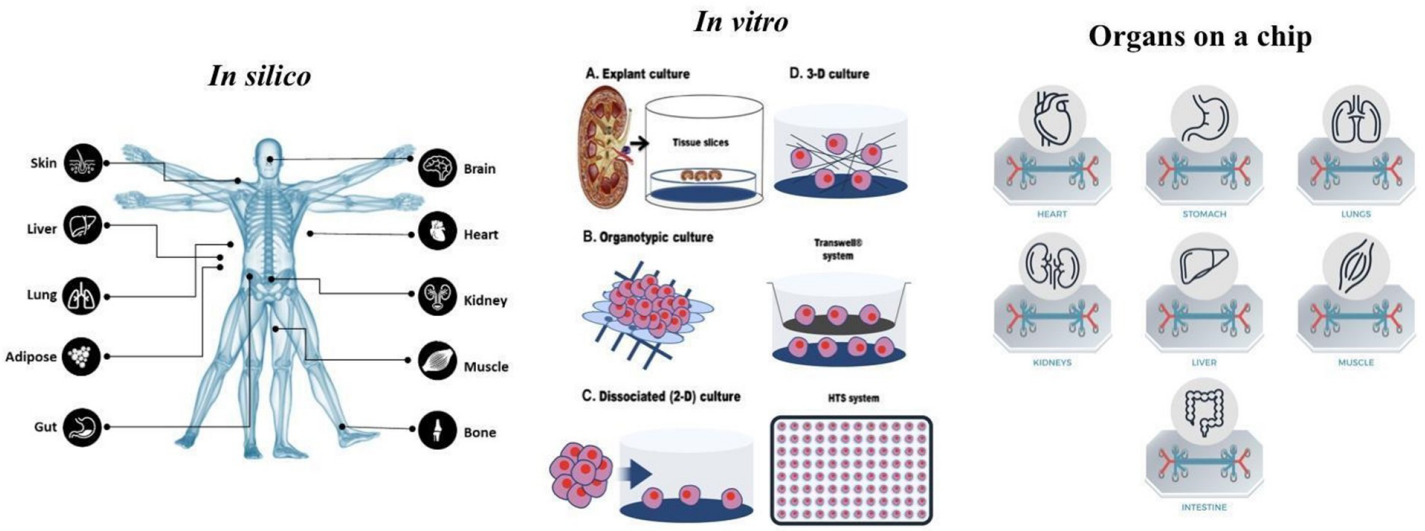
In Vitro

Predicts the drug absorption, distribution, and metabolism, as well as understanding drug potency and early toxicity screening.

Organ on a Chip

Simulates the physiological and mechanical aspects of human organs, such as blood flow and breathing motions, and can be used for drug discovery, pharmacokinetic, and toxicology testing.

Figure 3



In silico **and** ***in vitro*** **techniques established in some areas: ADME > PD/efficacy > toxicity**
Organ on a chip technology is emerging

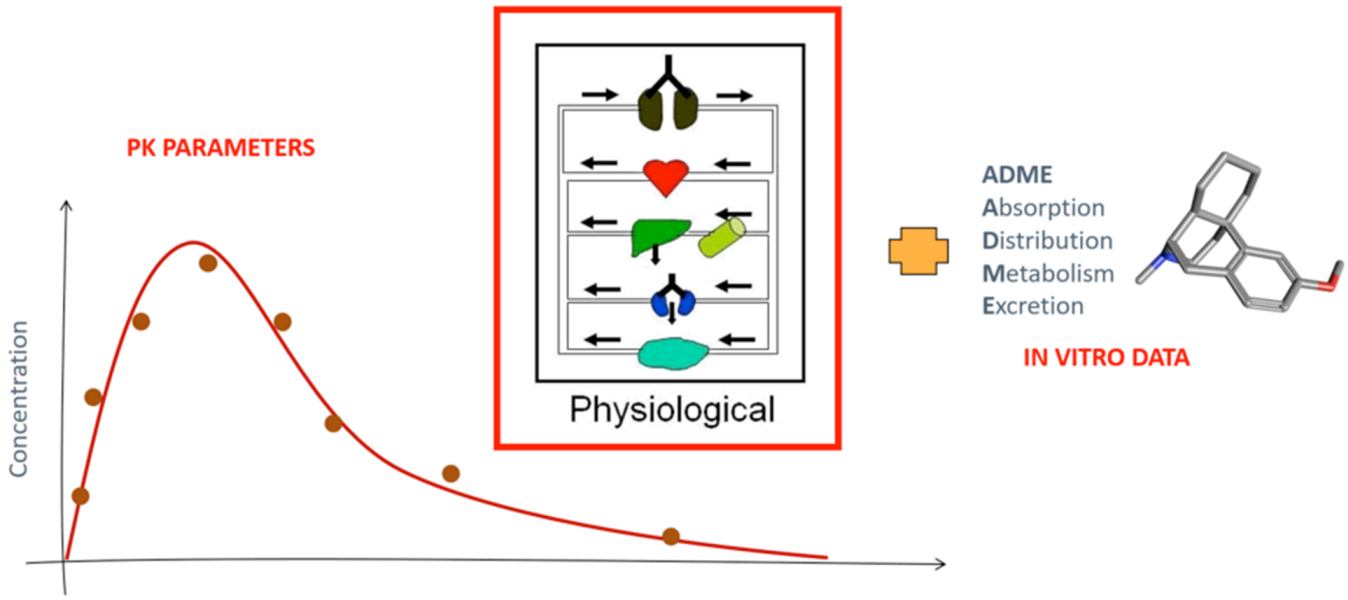
Alternatives to help reduce, refine, or replace animal testing.

How Can Biosimulation Support the 3 R's?

Biosimulation (modeling and simulation) offers a way to promote the 3 R's by:

- Reducing animal testing by predicting drug exposure in humans using data from animal studies and in vitro experiments.
- Refining animal testing methods by providing a way to optimize study design and dose selection, reducing variability, and improving the accuracy of results.
- Replacing animal testing by simulating drug exposure in the body based on human physiology, reducing ethical concerns, and providing a cost-effective and efficient way to develop new drugs.

Figure 4



Physiologically-based pharmacokinetic modeling combines physiological data with in vitro drug data to simulate and predict virtual PK parameters.

Preparing for the FDAs Modernization Act 2

To stay ahead of the curve, it's crucial to start integrating alternative approaches to animal testing into your workflow:

- Familiarize yourself with available alternatives to animal testing, discuss the use of alternatives for your programs with regulators, and use when appropriate.
- Invest in cutting-edge technologies and equipment such as in vitro testing and computer modeling and/or utilize commercial service providers.
- Partner with experts in the field to help develop, validate, and implement alternative methods and navigate the regulatory landscape.

Certara Can Help You Maximize Efficiency and Minimize Animal Testing

By utilizing best practices in drug development, you can streamline the non-clinical development process and improve drug safety assessment, saving time, money, and, most importantly, countless animals.

Experience the power of innovation and join us in paving the way toward a more ethical and efficient future in drug development.

Looking for more information on what to expect with FDA Modernization Act? Watch this related on-demand webinar:

https://www.certara.com/on-demand-webinar/fda-modernization-act-2-0-what-does-it-mean-for-drug-developers/

Schedule a free consultation: iDDconsulting@certara.com

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