



21st Century Validation Strategies—One Size No Longer Fits All

Introduction

Recent advances in systems biology, testing in cells and tissues, and related scientific fields offer the potential to fundamentally change the way that chemicals and drugs are tested for their risk to humans. These advances in toxicology testing may also replace, reduce, or refine animal testing, but roadblocks exist to incorporating these new methods into regulatory assessment. To overcome these roadblocks will require an active dialogue and early collaboration among all stakeholders, including federal regulatory agencies, other regulators, NGOs, academia, and industry scientists.

Issues

In 2007, a National Academy of Sciences (NAS) report, *Toxicity Testing in the 21st Century: A Vision on Strategy*, described a new vision and strategy for toxicity testing in the 21st century based on human rather than animal biology. This vision could be less expensive and time-consuming and would have a strong commitment to replacement, reduction, and/or refinement of animal use in testing. The publication of the NAS report might be the “tipping point” for a change, but validation of these methods for regulatory use will be a critical component in ensuring the vision’s success. Using a one-size-fits-all approach to validation will deter the rapid incorporation of this emerging science into the regulatory framework. As toxicology evolves, our approach to assessing these methods should also evolve.

Many of the methods used today in the traditional approach to toxicology testing originated over half a century ago and rely on high-dose animal studies that are time-consuming, low throughput, costly on both the economic level and in requiring animal use and often offer limited information about how the tested chemical or product will act in the human body. New science-based approaches to validation of new toxicological methods for regulatory use are needed. Current formal approaches to validation involve lengthy and expensive processes that require validating *in vitro* data against *in vivo* data. This approach is not relevant for all new pathways and endpoints being measured. “Fit for purpose” qualification or validation would ensure these new technologies become integrated into the regulatory review process quicker, but differing points of view exist on what these validation strategies would look like.

Additional Sources of Information:

National Academy of Sciences. *Toxicity Testing in the 21st Century: A Vision and Strategy*, Report in Brief. http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/Toxicity_Testing_final.pdf

EPA Science Matters newsletter. The Future of Toxicity Testing is Here. August, 2011. <http://www.epa.gov/sciencematters/august2011/toxicity.htm>