
Poster: current activities regarding the EU-chemicals policy (REACH)

Bringing toxicology into the 21st century: a global call to action

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Conventional toxicological testing methods are often decades old, costly and low-throughput, with questionable relevance to the human condition. Several of these factors have contributed to a daunting backlog of tens of thousands of chemicals and mixtures that have been inadequately assessed for their effects on human health. Some authorities have responded to this challenge by implementing complex and burdensome data collection and testing programmes, such as the Registration, Evaluation and Authorisation of Chemicals (REACH) regulation in the European Union. Others have concluded that nothing less than a fundamental paradigm shift in regulatory toxicology is warranted, given the tremendous advances that have taken place in biology, technology, and bioinformatics in recent decades. One such call came in 2007 from the United States National Research Council, which articulated a landmark vision of “twenty-first century toxicology” based predominantly on cutting-edge, non-animal techniques. The cornerstone of the NRC vision is a systems biology approach, integrating high-throughput, human cell-based *in vitro*, ‘omic and computational models to develop a robust understanding of xenobiotic effects on fundamental biological pathways. Potential advantages of such an approach include the capacity to examine a far greater number of chemicals, mixtures and biological outcomes at more relevant exposure levels; a substantial reduction in testing costs, time and animal use; and the grounding of regulatory decisions on human rather than rodent biology. In order for the NRC’s and similar calls to action to make a significant impact on regulatory toxicology in the foreseeable future, they must be translated into sustained multidisciplinary research programmes that are well co-ordinated and funded on an international level. The Humane Society is calling for a “big biology” project to meet this challenge, akin to the Human Genome Project of the 1990s. We are in the process of forging a multi-stakeholder consortium dedicated to implementing the NRC vision. Discussion will include implementation activities to date by government agencies in the US and elsewhere, as well as projected funding and infrastructure needs for the research effort that will be critical to the realisation of the NRC vision.

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