

Drug Development Pipeline Running Low, What's Data Got to Do with It?

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Abstract:

The per capita cost of health care in the US, by far the highest in the world, is driven in part by the high cost of pharmaceuticals. The low conversion rate of promising agents into successful clinical therapeutics is an important contributor to the high cost of pharmaceuticals. For example, all of the ~150 drugs developed in the last 15 years in mouse models to treat sepsis have failed in clinical trials. Several NIH institutes and other funding agencies have recently eliminated or significantly curtailed their funding for animal-based studies. A number of *in vitro* models of living tissues, especially organoids and microphysiological systems, are playing an increasingly significant role in prescreening of promising therapeutics for safety, efficacy and toxicity prior to expensive animal and human trials, thus offering the promise of accelerated drug development. However, a data-based understanding of how and the degree to which these assays reproduce the biological signals of interest, as well as drug-cell interactions, is critical to their successful deployment in the field of drug discovery. It is therefore critical to decipher omic and other changes to map known response pathways/networks so that *in silico* models can be used to determine which components of the biological signaling in human cells is preserved in mouse cells to guide further optimization of *in vitro* assays. Development of appropriate analytical tools will be critical to the success of this hybrid approach to drug development.

Biography:

Dr. Mohammad F. Kiani is a professor of mechanical engineering, bioengineering and radiation oncology at Temple University. He served as the chair of Department of Mechanical Engineering at Temple University (2004-2014) and Department of Biomedical Engineering at the University of Tennessee Health Science Center (2003-2004). He received a B.S. in electrical engineering from the University of Oklahoma and M.S. and Ph.D. in biomedical engineering from Louisiana Tech University. He was an NIH postdoctoral fellow at the University of Rochester from 1990 to 1993. The current focus of his research is the development of organoids and microphysiological systems for rapid drug development and screening and targeted drug delivery. Dr. Kiani has received a number of scholarly research and teaching awards including the prestigious Established Investigator Award from the American Heart Association. His research has been funded by a number of government agencies and private foundations. He has published more than 80 peer reviewed scientific articles and has made more than 250 presentations at scientific meetings. Dr. Kiani is a fellow of the American Heart Association, a senior member of IEEE and several other scientific and engineering organizations and serves as a reviewer for several funding agencies and a number of scientific and engineering journals. He is also the co-founder and past president of Engineering World Health which is a major nonprofit organization delivering healthcare infrastructure and engineering support to a number of hospitals in Africa, Central America and Asia.