4.6: Takeaways Summary

The tremendous advancement at the technological level has made it possible to generate data at "high-throughput" levels. It has also enabled scientists to study toxicological processes from a more holistic approach. Instead of answering single questions at a time, a more comprehensive approach is now being applied to understand toxicological responses. "Systems" approach is being effectively used in industry, government and clinical settings.

In biopharmaceutical/chemical industries, thousands of molecules are screened in the early discovery phase to select target compounds with efficacy. Similarly, compounds can also be screened based on their toxicity fingerprints. Molecular fingerprints generated for each class of compounds/ specific chemistries can be used to screen compounds for different indications for future uses. This has also significantly reduced the time and increased efficiency in discovery programs in industry settings.

The government has also been using "the systems" approach successfully for safety assessment programs. Efforts such as the ToxCast and Tox 21 are examples where "systems" toxicology is being efficiently used to prioritize animal testing towards chemicals that pose the greatest risk to human health and safety.

In the clinical setting more and more information is becoming available via the "systems" approach for specific disease states that enable physicians and researchers to develop personalized medicines based on specific needs of patients.

While, all these efforts mark the beginning of a very promising future, there is still a lot of research necessary to utilize these tools and technologies to their full potential.

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