

Abstract

At present, several animal-based assays are used to assess immunotoxic effects such as immunosuppression and sensitization. Growing societal and ethical concerns, European legislation and current research demands by industry are driving animal-based toxicity testing towards new animal-free testing strategies. There is a growing belief that non-animal approaches can assure human safety, provided that biological markers are available to identify the immunotoxic potentials of new chemicals to which humans are exposed.

The understanding that the immune system can be the target of many chemicals, resulting in a range of adverse effects on the host's health, has raised serious concerns from the public and within the regulatory agencies. Hypersensitivity and immunosuppression are considered the primary focus for developing *in vitro* methods in immunotoxicology. However, *in vitro* assays to detect immunostimulation and autoimmunity are also needed. Reviews of the state-of-the-art in the field of *in vitro* immunotoxicity reveal a limited number of cell-based immunotoxicity assays for predicting the toxicity of xenobiotics toward the immune system.

The objective of this chapter is to review the progress made in understanding mechanisms and key adverse outcome pathways and their components that are involved in responses to toxicant exposure, and application of this understanding to test development and hazard prediction of xenobiotics.

Key words:

allergy, autoimmunity, cell lines, human, immunosuppression, *in vitro* immunotoxicology.

Introduction