Toxicodynamics: Mechanistic Insights into Cellular and Molecular Responses to Toxicants

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Abstract

Toxicodynamics explores the mechanisms through which toxic substances cause adverse effects at the cellular and molecular levels. Understanding these mechanisms is crucial for assessing the impact of toxicants on biological systems and for developing strategies to mitigate their harmful effects. This article provides a comprehensive review of the mechanistic insights into cellular and molecular responses to toxicants, focusing on key processes such as cellular signaling disruptions, oxidative stress, and alterations in gene expression. The review also discusses the role of specific biomolecules and pathways in mediating toxicity and how these insights can inform risk assessment and therapeutic interventions. By elucidating the molecular basis of toxic responses, this article aims to advance our understanding of toxicodynamics and its implications for public health and environmental safety.

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