Insecticide Mode of Action: From Insect to Mammalian Toxicity

Aims & Scope:

Pesticides have been used for many years for preventing, destroying or repelling pest insects. Insecticides and bio-insecticides often directly target the insect central nervous system by affecting major targets such as the neuronal receptors including nicotinic acetylcholine ACh receptors, and γ-aminobutyric acid (GABA) receptors but also ion channels like voltage-gated sodium channels. Additional targets also include, for instance, acetylcholinesterase (AChE). However, because insects are more similar in physiology to mammals than plants or fungi, most pesticides are not completely specific for pest insect and can also induce damage to the mammalian nervous system. Insecticide neurotoxicity in mammals and particularly in humans may produce directly and/or indirectly adverse neurological effects by disrupting the general cellular and molecular mechanisms that support the activity of the central or peripheral nervous system or both. Moreover, neurotoxicity for behavioral and higher-brain functions still remains unresolved and represents a challenging problem. The present special issue is concerned with the relationship between insecticide and bio-insecticides mode of action, cellular and molecular mechanisms involved in the modulation of insect target site sensitivity to insecticides, chemical structure and mammalian toxicity. In addition, this special issue will not only explore the potential collateral effects of the insecticide active ingredient used but also the involvement of their major metabolites, coming from specific metabolic pathways, which can themselves be toxic.

Keywords: Mammalian toxicity, Pesticides, Insecticides and bio-insecticides, Insecticide neurotoxicity

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