



## Molecular Mechanism of Action of Neonicotinoid Insecticides

Guest Editor:

**Prof. Dr. Steeve Hervé Thany**

Laboratoire de Biologie des  
Ligneux et des Grandes Cultures  
(LBLGC), Université d'Orléans,  
UPRES EA 1207-USC INRA, Rue  
de Chartres, BP 6759, 45067  
Orléans, France

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### Message from the Guest Editor

Neonicotinoid insecticides are used worldwide and have been demonstrated as toxic to beneficial insects such as honeybees. Their effectiveness is predominantly attributed to their high affinity for insect neuronal nicotinic acetylcholine receptors (nAChRs). Mammalian neuronal nAChRs are of major importance because cholinergic synaptic transmission plays a key role in rapid neurotransmission, learning and memory processes, and neurodegenerative diseases. Several lines of evidence have demonstrated that neonicotinoid insecticides can modulate cholinergic functions through neuronal nAChRs. It has been found that the neonicotinoids thiamethoxam and clothianidin can activate the release of dopamine in rat striatum. In some contexts, such as neurodegenerative diseases, they can disturb the neuronal distribution or induce oxidative stress, leading to neurotoxicity.

In this special issue, we aim to explore the molecular mechanism of action of neonicotinoid insecticides from chemical analyses, toxicology, to molecular and cellular levels.





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### Prof. Dr. Maurizio Battino

Department of  
Odontostomatologic and  
Specialized Clinical Sciences,  
Sez-Biochimica, Faculty of  
Medicine, Università Politecnica  
delle Marche, Via Ranieri 65,  
60100 Ancona, Italy

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MDPI, Grosspeteranlage 5  
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