

## Foreword to Special Issue on Neuropharmacology and Neurotoxicity

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Harm inflicted upon the nervous system from thousands of synthetic substances and natural products is well documented, yet far from being understood. As such, assessment and characterization of issues extending to neuropharmacology and neurotoxicity is deemed timely. The current issue is multidisciplinary in nature, addressing a plethora of topics, ranging from basic biology to biotechnology.

The last decade has ushered rapid advances in modeling, toxicogenomics, bioinformatics, epigenetics, imaging as well as computational pharmacology and toxicology, to name a few. Great emphasis has also been placed on addressing the utility of *in vitro* methods and complimentary *in vivo* animal models to advance the understanding of neuropharmacology and neurotoxicity, while concomitantly reducing the need for mammals in experimentation. Emphasis has also been placed on genetics/transgenic models with inherent high throughput capacity to accelerate the identification of candidate genes that modulate toxic outcomes and pharmacokinetics. Altogether, the issue provides state-of-the-art account on emerging methods and mechanisms by which pharmacological and environmental compounds mitigate or trigger neurological disorders, respectively.

Several articles address neuropharmacologic and toxicological mechanisms associated with neurodegenerative diseases. Better understanding of the pathophysiology of such disorders and the search for efficacious neuroprotective measures and therapeutics to combat the increasing prevalence of Parkinson's disease and Alzheimer's disease (and others) highlight pertinent issues facing public health fora and industry around the globe. Violence and crime, and their potential relationship to heavy metals are also addressed, underpinning neurotransmitter disturbances that may trigger such behaviors. Human

studies also highlight the characteristics potential remedies for the visual disturbances associated with alcoholic ketoacidosis. Efficacious therapy is also discussed within the context of multidrug resistance and Acquired Immunodeficiency Syndrome (AIDS).

Other articles highlight advances in brain imaging and its application to cognitive experimental and brain sciences, addressing connectivity between the memory and craving systems in brains of chronic cocaine users. The utility of tissue culture methodology in deciphering basic molecular toxicity (demyelination) is also demonstrated, modeling inflammatory responses in aggregating brain cell cultures. The Tissue Repair and Angiogenesis (TRAG) network highlights advances in computational toxicology as means of quantifying the biological impact of exposure to environmental toxicants via the use of computable network models and network scoring methods. Several case reports highlight the toxicity of natural compounds (e.g. ibogaine), suggesting the need for additional studies on their mechanisms of toxicity and raising questions about their usage in clinical settings. Other studies, demonstrate the utility of naturally derived compounds (e.g. Spinosad) as means for controlling mosquito larviciding.

In assembling a cadre of excellent articles the editors highlight the rigor and excellence inherent to the Journal of Clinical Toxicology. The carefully selected topics exude high quality and bring needed attention to a compendium of timely and wide range of neuropharmacology and toxicology topics. Cellular and molecular biology themes are well illustrated, and cell-specific toxic effects are mechanistically exemplified. Overall, this volume provides an excellent reference with in-depth analysis and provocative discussions, and it should speak to neuropharmacologists and toxicologists in all employment domains (government, industry, academia and consulting).

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