

World Journal of Pharmacology & Toxicology

## Editorial

## **Biomedical Toxicology**

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Toxicology is an interdisciplinary field of biomedical sciences that includes the study of molecular and cellular mechanisms of action of synthetic and natural chemicals with an aim to evaluating their potential harmful effects. Examine toxicological testing required to assure the safety of new drugs, consumer products, pesticides and industrial chemicals before they go to market. Develop a strong foundation in science disciplines related to toxicology and forge a related career. There have been continuing researches on stem cells and stem cell-derived tissue-specific cells to develop alternative methods/biomarkers for animal toxicity testing including developmental toxicity, genotoxicity, and tissue-specific toxicity. Along with unique abilities of stem cells including self-renewal, infinite proliferation, and differentiation into multiple lineages, human stem cell-based in vitro systems have been proven valuable to increase predictive power of toxicology through providing with better scientific information related to toxic risks in humans without inter-species variability. In particular, stem cells including induced pluripotent stem cell-based system for personalized toxicological assessment could be a better option as an in vitro model system in comparison with immortalized cells with abnormal phenotype or primary cells with small quantity and batch-to-batch variation. Emerging studies have implicated exosomes as mediators of neurodegeneration by shuttling pollutant-induced pathogenic proteins and miRNAs from afflicted neurons to neighboring cells. Exosomes also provide a mechanistic link between inhalation exposures and airway

inflammation, remodeling, and systemic effects. Exosomes provide the means for toxic agents to initiate oncogenic transformation and create favorable tumor microenvironments. These same features have led to an increasing use of C. elegans in toxicology, both for mechanistic studies and high-throughput screening approaches. We describe some of the research that has been carried out in the areas of neurotoxicology, genetic toxicology, and environmental toxicology, as well as high-throughput experiments with C. elegans including genome-wide screening for molecular targets of toxicity and rapid toxicity assessment for new chemicals. We argue for an increased role for C. elegans in complementing other model systems in toxicological research.

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