Plenary Lectures

PLEN-390

The changing role of the 3Rs in the pharmaceutical industry

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The 3Rs is well established as an iconic paradigm for review and debate of studies requiring animals. In the pharmaceutical industry animal studies are divided into those looking for targets and leads for efficacy (pharmacology) and those designed for toxicity and safety (drug testing). In addition animals are still required for quality control and batch release for vaccines and biological products. Recently studies using animals in pharmaceutical companies has expanded to device work; such as in bioelectrical modulation for disease treatment and/or prevention. This plenary presentation will review not only present work in the 3Rs, but also future opportunities through both inspirational and realistic lenses.

PLEN-624

Predictive evaluation of environmental impact driving sustainable innovation in the cosmetic industry

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Nowadays, cosmetics and personal care products (CPCP) are most frequently used in the bathroom. Used rinsed off products flow down the drain where they mix with wastewaters. In industrialized countries they are directed to sewage treatment plants, but in many developing countries wastewaters may directly be discharged into rivers or the sea shore. In addition, certain products such as sunscreens may be directly released by swimmers in lakes, rivers or the ocean. Assessing their potential environmental impact faces significant methodology challenges because of their extremely diverse composition, from single ingredients to heterogeneous complex mixtures. Predicting and anticipating the impact of CPCP on the environment, at the end of life or for their production, early in the research process is a key element to innovate sustainably. The purpose of this presentation will be to present the challenges, trends and advances in these fields but also contributions to the innovation process.

PLEN-733

Using 21st century science for risk-related evaluations: An overview of the report

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The report Using 21st Century Science for Risk-Related Evaluations, released by the National Academies of Sciences, Engineering, and Medicine in January 2017 and was a follow-on to the 2007 report Toxicity Testing in the 21st Century: A Vision and a Strategy and the 2012 report Exposure Science in the 21st Century: A Vision and a Strategy. The 2017 report describes advances in toxicology, exposure science and epidemiology since publication of the earlier reports and focused on practical applications of the data being generated using 21st century science and approaches. Case studies are provided in several appendixes, but the report emphasizes that the ability to generate the data has outpaced the ability to use the data for risk assessment and decision making and greater attention needs to be paid to data interpretation and integration. This presentation introduces the 21st Century Science report and its principal findings. While the report indicates ways to immediately apply 21st Century methods to risk evaluation issues, it also describes a path forward on some of the remaining and unsolved challenges in doing so.

Reference
Rat helping behavior: Implications for husbandry

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United States Enrichment programs aim to provide rodents with a complex physical environment and access to an exercise wheel. Social enrichment has received far less attention. Yet, rats are motivated by other rats to take actions that do not occur in response to physical objects. Using a paradigm in which rats are given the opportunity to release a cagemate trapped within a restrainer, we have learned a great deal about rats’ attitudes toward other rats in distress. The motivation to help is independent of immediate social reward as rats release trapped rats into spaces that they (the helper) cannot access. Rats treated with an anxiolytic do not help a trapped cagemate, suggesting that it is affect that motivates the helper to actively help. Yet, to our surprise, unpublished results suggest that rats help even when the trapped rat shows no distress, suggesting that cognitive empathy can motivate a rat to help. Cognitive empathy refers to the communication and understanding of another’s experience through modes that do not involve affect. In sum, rats show behaviors that resemble not only emotional empathy but also cognitive empathy, heretofore thought to be the exclusive domain of primates, particularly humans.