

Tentative Outline
Special Issue for Current Drug Metabolism (CDM)

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TITLE: In Vitro Human-mimicry Systems for Drug Discovery and Assessment

Aims & Scope:

Prior to testing a new drug in a clinical trial, principle phase analysis on pharmacodynamics and pharmacokinetics take place using animal models and/or two-dimensional (2D) in vitro models. Despite technological advancements, development and application of new therapeutic products face multiple barriers prior to the clinical trials. While various animal models are genetically altered to mimic the human body for drug testing and screening, lack of replicating key facets of human body makes such trails limited for drug efficacy and safety assessment. In-vitro studies, on the other hand, allow a certain degree of progress yet cannot replace clinical trials on humans. In particular, traditional in-vitro analysis is incapable of mimicking the human body due to the lack of surrounding stimulations each organ undergoes in a living body. In the past few decades, more complexed in-vitro humanized systems have replaced animal study and 2D in-vitro analysis as they closely mimic not only the organ of interest but also incorporate necessary stimulations (physical, electrical, chemical, mechanical) that an organ experiences. In vitro modeling including three-dimensional (3D) organoids, 3D microfabrication, and 3D bio-printed platforms for several organs were reposted. Such platforms fabricate human-mimicry systems including heart, kidney, lung, intestinal tract, liver, retina, bone, and brain among other. Organ-on-chip devices facilitate drug testing on different cell lines while multiple-organ-chip platforms study pathways of different drugs and their efficacy on one organ in correlation with others. Human-on-chip devices provide a deeper understanding of drugs metabolism, pharmacokinetics, and toxicity on human body as a united physiological entity. Nonetheless, organ-on-chip and human-on-chip platforms also suffer from certain shortcomings including complexity of operation due to the device size and inconsistency of the results from one laboratory to another. This thematic issue will concentrate on latest updates of in-vitro human-mimicry systems for drug discovery and assessment. The issue also welcomes discussions on progress and advancement of such systems as well as shortcomings and challenges faced by the researchers. Moreover, contributions are encouraged to include future directions that may pave the path for further evolution of in-vitro human-mimicry systems.

Keywords: Drug metabolism; Drug discovery; Drug safety; Drug screening; Organ-on-chip devices; Human-on-chip; 3D in-vitro; Bioprinting.

Subtopics: (Paper titles along with the Contributors complete name, affiliation and emails)

1. 3D in-vitro analysis of the interfaces between natural and synthetic drugs. Samira Hosseini (Tecnologico de Monterrey, Monterrey, Mexico. Email: samira.hosseini@tec.mx), Aida Rodriguez (Universidad Autónoma de Nuevo León, Monterrey, Mexico. Email: aida.rodriguezgrc@uanl.edu.mx)
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Schedule:

Manuscript submission deadline: 30 August 2019

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