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Clinical trials in a dish: A perspective on the coming revolution in drug development

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The emergence of various hiPSC-derived cell types (cardiac, neuronal, hepatic) allows, for the first time, to combine the strengths of human diversity with the in vitro assessment of susceptibility to drug-induced toxicity. Credit: Coyne Scientific

A new *SLAS Discovery* article available now for free ahead-of-print, offers perspective from researchers at Coyne Scientific (Atlanta, GA) about Clinical Trials in a Dish (CTiD), a novel strategy that bridges preclinical testing and clinical trials.

The pharmaceutical industry is facing unprecedented challenges as the cost of developing new drugs reaches unsustainable levels, fueled in large part by high attrition rates in clinical development. This new CTiD platform allows pharmaceutical companies to test, at the population level, novel drugs on patient cells before moving into actual clinical trials . Because current preclinical strategies don't follow this principle, CTiD offers the potential to significantly impact drug discovery and development.

Recent demonstrations show various human induced pluripotent stem cell-derived (hiPSCs) cell types (cardiac, neuronal, hepatic) recapitulate a specific individual's drug response (rather than that of a generic human being) and have opened up new avenues that support the concept of screening for cell-based safety and toxicity at the level of a population. The concept of CTiD is to satisfy, in an in vitro setting, the defining biological truth that establishes the need for a multi-patient clinical trial, which is that drug responses vary by human. CTiD studies are efficient, allow the study of a range of clinical doses, and can be executed at a fraction of the cost outside of the rigid and heavily regulated clinical testing environment.

CTiD studies are poised to revolutionize thinking about practical, immediate and near-term applications in the field of drug discovery and development. CTiD can lead to insights that cannot be obtained so early and economically in drug development by any other approach. Although still requiring improvements and enhancements, CTiD offers to refine the selection of drugs to move into clinical development, leading to reduced attrition and enabling safe drugs that address unmet medical needs to reach patients more quickly.

More information: Bernard Fermini et al, Clinical Trials in a Dish: A Perspective on the Coming Revolution in Drug Development, *SLAS DISCOVERY: Advancing Life Sciences R&D* (2018). DOI:

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