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Biosketch

We have embraced the Quantitative Systems Biology approach that integrates experimental and computational methods in our drug discovery and development programs, especially in metastatic breast cancer, neurodegenerative diseases and liver diseases. Dr. Taylor began his academic career at Harvard University and remained at Harvard until 1982, developing and using novel fluorescence-based reagents and imaging technologies to investigate fundamental cellular processes in living cells. He then moved to Carnegie Mellon University (CMU) as a Professor of Biological Sciences and as Director of the Center for Fluorescence Research in the Biomedical Sciences continuing to develop and to apply novel fluorescence-based technologies in biology and medicine. Dr Taylor co-founded Biological Detection Systems with Alan Waggoner to commercialize research light microscope imaging systems and the multi-color cyanine dyes for fluorescence detection in the life sciences which is now part of General Electric Life Sciences. Dr. Taylor left CMU in 1996 to start and lead a series of companies: Cellomics-High Content Screening now part of ThermoFisher, Cellumen-early safety assessment and now part of Cyprotex and finally a private company, Cernostics-cancer diagnostics. Dr. Taylor returned to academia at the end of 2010 to continue his academic interests which now link large-scale cell and tissue profiling with computational and systems biology to optimize drug discovery and diagnostics. In addition, Dr. Taylor has developed human organs on chips starting with the liver in order to explore acute and chronic toxicity, as well as to create long-term human models of disease.

Abstract: Development and Application of a Human, 3D, 4 Cell Type, Microfluidic, Liver Model for Toxicity and Efficacy Testing

We have developed and continue to evolve a human liver-on-a-chip as part of the NCATS microphysiology systems (MPS) program. The goal is to reproduce major human liver acinus functions that will serve as a good in vitro model for both liver toxicity testing and efficacy testing for liver diseases. I will summarize the functionality of the generation 1 model and discuss the generation 2 model that is under development. Key advances in the generation 2 device include direct spatial measurement of oxygen, inclusion of improved NPC's and media, and early testing of human hepatocytes derived from iPSC's. We are further developing real-time biosensors of cell functions and a microphysiology database to manage data collection, analyses, management and modeling.