NC SOT Spring Meeting Agenda
26 February 2009
US EPA Main Campus, RTP, NC

12:00-2:00  Poster session; Student poster competition (refreshments provided) B Atrium
2:00-4:15  Plenary talks  Auditorium C111

Dr. Victoria Ballard, GlaxoSmithKline
“Cardiovascular Stem and Progenitor Cells as Biomarkers and Tools for Drug Screening” - In recent years, a number of adult cardiac stem and progenitor cells have been identified both in the heart itself as well as other organs, most notably the bone marrow. These cells have the capacity to differentiate into cardiomyocytes and vascular cell types and therefore provide a novel target for the development of therapies to treat heart disease. Furthermore, subpopulations of circulating progenitor cells may themselves act as biomarkers of vascular health and thus prove useful in pre-clinical and clinical determination of drug efficacy. In the lab, the lack of homogeneous, expandable sources of rodent and human cardiomyocytes for drug screening and toxicological analyses has hampered research efforts in the cardiovascular field. Besides therapeutic applications, both adult stem cells, as well as embryonic stem cells, may therefore also provide sources of differentiated cardiomyocytes for such in vitro assays. These various aspects of cardiac stem cell biology will be discussed with an emphasis on the potential application of stem cells to drug discovery and safety assessment.

Dr. Aaron Chuang, GlaxoSmithKline/Sirtris
“Driving The Realization Of Stem Cell Technology In Drug Discovery” - Advancement in stem cell research is moving the therapeutic promises of stem cells from mere fantasy towards the realm of reality. The pace of this exciting progress is further fuelled by investments from key organisations hoping to accelerate the deployment of stem cell technology for the benefit of patients. One of the areas that could be revolutionized by stem cell technology is preclinical toxicology assessment, where the creation of human cells could narrow the gap in translating chemical molecules into safe and efficacious drugs for the human. This presentation aims to highlight some key examples of such efforts on both sides of the Atlantic.

Dr. Salman Khetani, Hepregen Corporation
“Engineering Microscale Models of Rodent and Human Liver Tissue for Drug Development” - Tissue function depends on hierarchical structures that extend from single cells to functional subunits that in turn coordinate organ functions. Conventional cell culture disperses tissues into single cells while neglecting higher-order processes. The convergence of semiconductor-driven microtechnology with the biomedical arena now allows fabrication of microscale tissue subunits towards functionally improving in vitro models. Furthermore, as with DNA microarrays, microtechnology may revolutionize biological assays simply through the benefits of miniaturization. Here, we present miniaturized, multi-well human and rodent liver tissue models with optimized microscale architecture that maintain phenotypic functions for up to 12 weeks in vitro. Our system is comprised of primary hepatocytes organized in micropatterned colonies of empirically optimized dimensions and subsequently surrounded by supportive stromal cells, also optimized to provide robust induction of hepatic functions. We demonstrate model utility via characterization of global gene expression profiles (Affymetrix GeneChips), phase I-II metabolism (i.e. CYP450 enzyme activities), bile canalicular transport, secretion of liver-specific products (albumin and urea secretion), drug-drug interactions (i.e. induction/inhibition of CYP450 activities), species-specific drug metabolism, and susceptibility to a panel of hepatotoxins. In the future, the combination of microtechnology and tissue engineering may spur development of other tissue models and their integration towards the so-called ‘human-on-a-chip’.

4:15-4:30  Business meeting; Student awards presentation  Auditorium C111
4:30-5:00  Reception; additional poster viewing (refreshments provided)  B Atrium