

# Chemical Engineering Seminars – TT 2009

*Week 8, Wednesday June 17<sup>th</sup> 2009, 4:00PM-5:00PM  
Lecture Room 2, Thom Building, Engineering Science*

## **Engineering *in vitro* cell-based drug testing platforms**

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### ***Abstract***

With the cost of bringing a drug into the market rising to US\$ 400 million, there is a greater need to eliminate false lead candidates by performing pre-clinical drug screening using *in vitro* models with enhanced degree of predictability. Currently available models are mostly for non-cell based *in vitro* drug screening, involving molecular assays, such as affinity binding assays. However, it is important that such drug testing models incorporate cells, in particular primary hepatocytes as they contain a broad range of metabolizing enzyme activities, hepatic transporters, and other differentiated functions. Maintaining high level functions *in vitro* has been challenging. Over the years, we have systematically investigated and engineered extra-cellular microenvironments; and developed innovative 3D hepatocyte-culture models for drug testing applications. Here I would describe our recent efforts to develop a 3D HepaTox Chip based on a microfluidic platform; and explore a few other models based on microfabricated membranes or polymer hydrogel or inter-cellular linkers. A highly interdisciplinary approach will be elaborated to illustrate the process of developing a useful real-world application solution from conception, to basic studies, to engineering parts, and finally to integration into a useful device/platform.

### ***Biography***

Dr. Henry Yu is a Professor in the Department of Physiology, Yong Loo Lin School of Medicine, National University Health System. He concurrently holds the positions of Group Leader at the Institute of Bioengineering and Nanotechnology, A\*STAR, principal investigator in the newly established Research Centre of Excellence in Mechanobiology, and Visiting Professor at the Department of Mechanical Engineering in MIT. Professor Yu graduated with a PhD in Cell Biology from Duke University followed with further training at the European Molecular Biology Laboratory (EMBL). Since joining the National University of Singapore in 1997, he has established and managed major cross-disciplinary graduate education and research programs at university- and institute-levels in Singapore. He published extensively in multidisciplinary areas such as Biomaterials, Tissue Engineering, Cell Biology and Imaging. He takes pride in the many PhD students and postdocs trained in his laboratory who then went onto outstanding careers in academia and industry.