医工薬理融合 GPLLI Seminar Series

Graduate Program for
Leaders in Life Innovation
The University of Tokyo

Developmental analysis and human disease modeling for the human kidney

Dr. Andy McMahon, FRS,
Keck Provost Professor,
Director, Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research
Chair, Department of Stem Cell Biology and Regenerative Medicine
Keck School of Medicine, University of Southern California

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Time: 11 am- 12 pm
Venue: Molecular & Life Innovation Bldg, Academic Hall (Hongo Campus)

For over 60 years, the mammalian kidney has been a central model system for exploring the mechanisms by which distinct stem/progenitor populations generate a complex 3D functional organ architecture. Given the power of mouse genetics, the mouse has been the predominant experimental model and a reasonable molecular and cellular framework has been generated for the developing mouse kidney. Recently, several groups have reported approaches to generate human kidney-like structures through the directed differentiation of pluripotent stem cells in culture. This raises the question of how closely these *in vitro* processes model human kidney development and whether the cell types generated reflect normal kidney cell types. Answering these questions requires an understanding of normal development of the human kidney. I will discuss our progress in what is an ongoing effort to characterize human kidney development *in vivo* and the use of new approaches such as pseudotime analysis to predict cell fate relationships and potential cell fate generating processes. Through relational modeling, we have been able to demonstrate that mouse and human nephron patterning follows a predictable 3D organization and I will present evidence that suggests the timing of recruitment of progenitor cells into the nephron anlagen determines the subsequent fate of those cells in the nephron forming process. Insights from normal human kidney development will facilitate kidney organoid-directed efforts to generate human kidney structures, and model and treat kidney disease.

Organizer: Graduate Program for Leaders in Life Innovation, The University of Tokyo
Cooperation: International Core Research Center for Phototheranostics

For Further Information Contact: Kiyoko Jarnes at GPLLI Office
Phone: 03-5841-1509 / Fax: 03-5841-1510
E-mail: jarnes@cnbi.t.u-tokyo.ac.jp

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