IMCB Invited Speaker

Speaker : **Dr. Angela Wu**
Postdoctoral Scholar, Laboratory of Dr. Stephen R. Quake, Stanford University, USA

Date : 18 Sep 2013 (Wednesday)

Time : 11:00AM - 12:00PM

Venue : IMCB Seminar Room 3-46, Level 3, Proteos, Biopolis

Host : Dr. William Burkholder

Seminar :

Quantitative measurements of whole transcriptomes from single cells

Interest in single-cell whole transcriptome analysis is growing rapidly, especially in cases where one wants to profile rare or heterogeneous populations of cells. We compared the performance of various commercially available single-cell RNA amplification methods in both microliter and nanoliter volumes. We benchmarked each method to conventional RNA-seq of the same sample using bulk total RNA, as well as to multiplexed qPCR, which is the current gold standard for quantitative single-cell gene expression analysis. In doing so, we were able to systematically evaluate the sensitivity, precision, and accuracy of various approaches to single-cell RNA-seq. Our results show that it is possible to use single-cell RNA-seq to perform quantitative transcriptome measurements of single cells, that it is possible to obtain useful gene expression measurements with a relatively small number of sequencing reads, and that when such measurements are performed on large numbers of cells, one can recapitulate both the bulk transcriptome complexity as well as the distributions of gene expression levels found by single-cell qPCR. We subsequently used microfluidic-based RNA-seq to profile single cells of thedeveloping lung in embryonic mice, and identified novel transcriptional markers for a putative bipotent progenitor of alveolar cells. These results herald the future of single cell genomics as an indispensible tool in various biological and medical applications.

About the Speaker :

Angela Wu is currently a post-doctoral scholar at Stanford University in the Department of Bioengineering. She obtained her Ph.D. also from Stanford University in Bioengineering; her Ph.D. thesis started the field of microfluidic chromatin immunoprecipitation (ChIP). Her Ph.D. work focused on microfluidic designs to enable ultrasensitive profiling of protein-DNA binding via low cell number ChIP, and this technology is now being used in various other labs in biological applications. Angela Wu is a Siebel Scholar and was the recipient of a Bio-X interdisciplinary fellowship award. She is currently using single-cell genomics techniques to dissect the cellular heterogeneity of colorectal cancer in order to investigate cancer cell self-renewal and its associated transcriptional signatures.

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