



Title
Presenter
Supervisor(s)
Time & Venue

An Integrative Platform for Single-Cell Analysis of Circulating Tumor Cells

Lim Su Bin

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Wednesday, 1 November 2017, 2pm – 3pm
NGS Multi-Purpose Room (MPR)
Centre for Life Sciences (CeLS), Level 1



Abstract

The prognosis and prediction of adjuvant chemotherapy (ACT) response in early-stage non-small cell lung cancer (NSCLC) still remain poor in this era of personalized medicine. We aim to address this critical aspect using an integrative approach combining bioinformatics, microfluidics and cancer genomics principles. Relying on conventional blood draws, liquid biopsy provides cancer patients with a less painful clinical test compared to the traditional tissue biopsy. Particularly, single-cell profiling of circulating tumor cells (CTCs) holds great promise in clinical oncology. While bulk-CTC analysis complicates downstream genomic analysis with the inevitable leukocyte contamination, single-CTC profiling reveals cell-to-cell heterogeneity, which is responsible for selective drug resistance and thus failure of cancer treatment. Importantly, it allows real-time monitoring of therapy response with sequential sampling of blood samples – which is a significantly unmet need in the current clinical practice.

We have previously developed a label-free, fully automated cell retrieval system that can enrich wholly intact and viable CTCs from small amounts of blood with fast processing time (ClearCell FX system, Clearbridge Biomedics). Using our developed bioinformatics pipeline, we have further identified novel cancer-associated biomarkers that holds prognostic and predictive potential. Together with our microfluidic device that is able to isolate single cells with 100% purity, an integrative platform for single-cell genomic characterization of CTCs is established in this preclinical study. We foresee that our developed workflow for single-CTC transcriptomic profiling will open up new avenues in uncovering novel biomarkers for detection and diagnosis of cancer, prognostic evaluation of disease progression, and predictive evaluation of therapeutic efficacy.