

DNA barcode technologies to accelerate measurement of molecular and cellular dynamics

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Beyond its impact on (epi-)genome and transcriptome sequencing, next-generation sequencing has enabled many high-throughput experiments via the idea of DNA barcode. In this presentation, I will first summarize high-throughput biotechnologies enabled by DNA barcodes and introduce Barcode Fusion Genetics technology that we developed for *en masse* phenotyping of hyper-heterogeneous cell pools where each cell has a different combination of two or more genetic modifications. We applied this technology to a Yeast Two-Hybrid (Y2H) protein interaction assay system and enabled one-shot protein interaction screening at least from 2.5 million protein pairs in 2-3 weeks just by one researcher. I will also talk about our challenges of developing new DNA barcode technologies to trace dynamics of heterogeneous cell populations in a large scale at the nearly single cell resolution and their potential applications to study cell evolution, differentiation and whole-body development.