

Title:

Tumor organoid for molecular target discovery and personalized cancer therapy

Abstract:

Breast cancer is a heterogeneous disease, yet the functional role of cis-regulatory elements, including super-enhancers, in different breast cancer subtypes remains poorly characterized. Triple-negative breast cancer (TNBC) is a particularly aggressive subtype with a poor prognosis. Here we apply integrated epigenomic and transcriptomic profiling to reveal super-enhancer heterogeneity among breast cancer subtypes and provide clinically relevant biological insights towards TNBC. Using CRISPR/Cas9-mediated gene editing coupled with a tumor organoid platform, we have identified novel genes that are specifically regulated by TNBC-specific super-enhancers. Using patient-derived organoids (PDOs), 3D tumor spheroids and xenograft models, we further uncover genes and long non-coding RNAs (lncRNAs) that regulate cancer stemness and metastasis. In this presentation, I will discuss how we leverage the epigenetic landscape to identify multiple novel TNBC players and the potential of utilizing PDOs as a cancer precision medicine platform to discover molecular targets for therapeutic intervention.