27O-ISMS29 **A NGS-based Liquid Biopsy Gene Panel Assay with Molecular Barcode Technology**

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Recently, there is a growing demand for non-invasive liquid biopsy test in the field of cancer therapy. For example, genetic information from tumors can be obtained by liquid biopsy and assist to assess responses to certain treatments, such as epidermal growth factor receptor tyrosine kinase inhibitor (EGFR-TKI) in lung cancer. Deep sequencing analysis by Next Generation Sequencer (NGS) is a promising approach to detect rare mutation in circulating tumor DNA (ctDNA), namely cell-free DNA in plasma. The current technical obstacle of NGS is the high read error rate and PCR error introduced during library construction. Molecular barcoding technique (tagging of the individual DNA by the unique molecular identifier) has been developed as an effective solution to eliminate such PCR/sequencing errors by using consensus reads generated from multiple sequence reads of a single molecule. We have developed NGS-based gene panel assay system for liquid biopsy, named NOIR-SS (Non-overlapping Integrated Read Sequencing System). In this system, original DNA molecular barcoding technique is implemented to accurately detect the rare mutations. NOIR-SS offers the high sensitivity and precise estimation of the absolute molecular count of mutated ctDNA. NOIR-SS has high potential to offer the useful applications in the development of companion diagnostics, continual monitoring of tumor progression, and early diagnosis of cancer.