

Using Multiomic Plasma Profiling From Liquid Biopsies to Identify Potential Signatures for Disease Diagnostics in Late-Stage Non-small Cell Lung Cancer (NSCLC) in Trinidad and Tobago

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Abstract : Lung cancer is the leading cause of cancer-associated deaths in North America, with the vast majority being non-small cell lung cancer (NSCLC), with a five-year survival rate of only 24%. Non-invasive discovery of biomarkers associated with early-diagnosis of NSCLC can enable precision oncology efforts using liquid biopsy-based multiomics profiling of plasma. Although tissue biopsies are currently the gold standard for tumor profiling, this method presents many limitations since these are invasive, risky, and sometimes hard to obtain as well as only giving a limited tumor profile. Blood-based tests provides a less-invasive, more robust approach to interrogate both tumor- and non-tumor-derived signals. We intend to examine 30 stage III-IV NSCLC patients pre-surgery and collect plasma samples. Cell-free DNA (cfDNA) will be extracted from plasma, and next-generation sequencing (NGS) performed. Through the analysis of tumor-specific alterations, including single nucleotide variants (SNVs), insertions, deletions, copy number variations (CNVs), and methylation alterations, we intend to identify tumor-derived DNA—ctDNA among the total pool of cfDNA. This would generate data to be used as an accurate form of cancer genotyping for diagnostic purposes. Using liquid biopsies offer opportunities to improve the surveillance of cancer patients during treatment and would supplement current diagnosis and tumor profiling strategies previously not readily available in Trinidad and Tobago. It would be useful and advantageous to use this in diagnosis and tumour profiling as well as to monitor cancer patients, providing early information regarding disease evolution and treatment efficacy, and reorient treatment strategies in, timethereby improving clinical oncology outcomes.

Keywords : genomics, multiomics, clinical genetics, genotyping, oncology, diagnostics

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