Multi-Analyte Profiling Reveals Relationships Among Circulating Biomarkers in Colorectal Cancer

Daniel Deluca, Eric Ariazi, Jonathan Berliner, Adam Drake, John Dulin, Riley Ennis, Erik Gafni, Kate Niehaus, Gabriel Otte, Jennifer Pecson, Girish Putcha, Corey Schaninger, Arushi Sharma, Mike Singer, Abraham Tzou, Jill Waters, David Weinberg, Brandon White, Imran S. Haque

Overview of Multi-Analyte Approach for ‘Liquid Biopsy’

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CONCLUSIONS

• These data suggest that TF is correlated with cancer stage, but has a large potential range, even in early stage disease.

• TF has the potential for multiple prognostic, diagnostic, and screening applications. These findings lend further support to ongoing efforts to develop methods that can detect TF in blood, which might permit real-time, dynamic monitoring of colorectal disease progression.

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References


INTRODUCTION

• Blood-based tests hold great promise as cancer diagnostics, but most current tests are restricted to the analysis of a single class of molecules (e.g., circulating tumor DNA, circulating RNA, circulating protein).

• The ability to analyze multiple analytes simultaneously from the same biological sample may increase the sensitivity and specificity of such testing by exploiting independent information among different analytes.

OBJECTIVE

• Develop and implement an experimental and analytical system for the integrated analysis of multiple analytes from a single biological sample.

METHODS

MULTI-ANALYTE APPROACH (Figure 1)

• De novo blood samples were collected from healthy individuals and individuals with non-advanced histology (non-AA) colorectal cancer (CRC).

• After plasma separation, multiple analytes were measured as follows:
  - Cell-free DNA (cfDNA): long-read whole-genome sequencing (lcWGS), and whole-genome bisulfite sequencing (WGBS)
  - Cell-free microRNA (cf-miRNA): small-RNA sequencing
  - Protein levels: enzyme-linked immunosorbent assay (ELISA)

• Levels of circulating miRNAs were measured by quantitative reverse transcription-polymerase chain reaction (qRT-PCR).

Figure 3. Overview of Multi-Analyte Approach for ‘Liquid Biopsy’

Molecular Genotype Screening

Whole-genome bisulfite sequencing (WGBS) of cfDNA

Cell-free microRNA (cf-miRNA)

Circulating protein biomarker measurement

Multi-analyte biomarker measurement

- Multi-analyte WGBS
- cf-miRNA sequencing
- Proteomics

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REFERENCES