Radiation-assisted Amplification Sequencing (RAMP-Seq): Evaluating the use of Stereotactic Body Radiation Therapy (SBRT) for Enriching Circulating Tumor DNA in Liquid Biopsies

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Background

Administration of stereotactic body radiation therapy (SBRT) to known or suspected tumor masses with a coverage will also identify an optimal period of peak ctDNA enrichment for liquid biopsy (kinetics cohort).

Methods and Cohort

DIDA-Seq custom-capture sequencing was carried out using a 150bp panel on cell-free DNA (cfDNA) of individuals undergoing SBRT as standard-of-care to an average depth of 50x-20x X coverage.

Experimental Workflow

CfDNA Monitoring in Metastatic Disease Shows

Radiation induces a 25-fold average ctDNA enrichment

but varies between patients in Stage I NSCLC cohort

Conclusions

• RAMP-Seq utilizes highly-conformational radiation to induce ctDNA enrichment.

• On average, VAF increased 25-fold from baseline to treatment.

• Kinetic curves of identified variants demonstrate that ctDNA abundance peaks after a minimum of 96 hours from initial treatments in our current cohort of 8 patients.

• Biochemical evaluation underway for clinical use to validate de novo calls made with cfDNA DIDA-Seq.

• Study continues to enroll patients and should exceed initial target of 20 participants.

Our approach has possible applications such as diagnosis of early-stage cancer and genotyping lesions normally inaccessible by a traditional biopsy.

References


