Analysis of Circulating Tumor DNA for Early Relapse Detection in Stage III Colorectal Cancer After Adjuvant Chemotherapy

Samuel A Jacobs1, Himanshu Sethi2, Tatjana Kolveska3, Thomas J George1,4, Svetlana Shchegrova5, Antony S. Tin6, James Lee7, Alexander Olson7, Derrick Renner8, Ekaterina Kalashnikova9, Greg Yothers10, Norman Wolmark11, Katherine L Pogue-Geile1, Ashok Srinivasan1, Jeremy Kortmansky1, Maggie Louie2, Rafaele Salarib, Bernhard Zimmermann1, Alexey Aleshin1, Carmen J Allegra1

1NSABP Foundation, Pittsburgh, PA; 2National Cancer Institute, San Carlos, CA; 3Kaiser Permanente Oncology Clinical Trials Program, Vallejo, CA; 4University of Florida Health Cancer Center, Gainesville, FL; 5University of Pittsburgh, Pittsburgh, PA; 6NIRS Oncology, Pittsburgh, PA; 7Yale, New Haven, CT

European Society of Medical Oncology | Barcelona, Spain | September 27 - October 1, 2019 #166P

Background
• Circulating tumor DNA (ctDNA) has emerged as a promising biomarker for early prediction of relapse across different tumor types.1,5
• In patients with colorectal cancer (CRC), multiple studies have analyzed ctDNA to monitor tumor burden using fixed gene panels and droplet digital PCR.1,5
• We use a highly sensitive and specific, bespoke, whole exome-based next generation sequencing (NGS) approach (Signatera10) for ctDNA monitoring.

Methods
• The study included a cohort of 33 patients (16 males and 17 females) with a median age of 56 (32-73) years stage III CRC who underwent surgery and were treated with at least 4 months of adjuvant chemotherapy.
• Plasma samples were collected during extended adjuvant therapy.
• Mutational profiles derived from primary tumor tissue and germline DNA whole plasma were analyzed using extended adjuvant treatment were analyzed for the presence of ctDNA.

Figure 1. Signatera Molecular Protocol

Figure 2. Study Design

Figure 3. Patient Overview and Patient-Specific Plots

Conclusions
• The study results indicate that ctDNA status is associated with high relapse risk in patients with CRC (positive predictive value = 100%) and can serve as a predictor of patient outcome.
• Molecular relapse through ctDNA analysis was detected up to 668 days ahead of radiological imaging with an average lead time of 305 days.
• Despite low plasma volumes (<4 mL) and lack of longitudinal samples for analysis, ctDNA was detected in 50% of relapse cases.

Figure 4. Association of ctDNA with Relapse Free Survival

References

Acknowledgments and Disclosures
Samuel A Jacobs, MD, NSABP Foundation, Two Alleghany Center - Suite 1200, Pittsburgh, PA 15212-5402.

*Corresponding Author Information
Samuel A Jacobs, MD, NSABP Foundation, Two Alleghany Center - Suite 1200, Pittsburgh, PA 15212-5402.

Email: samuel.jacobs@nsabp.org

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