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Society for Immunotherapy of Cancer

SITC 2018 NOVEMBER 7–11 • WASHINGTON, D.C.

Development of a next-generation sequencing-based microsatellite instability assay (MSI-NGS) for solid tumor testing

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Presenter Disclosure Information

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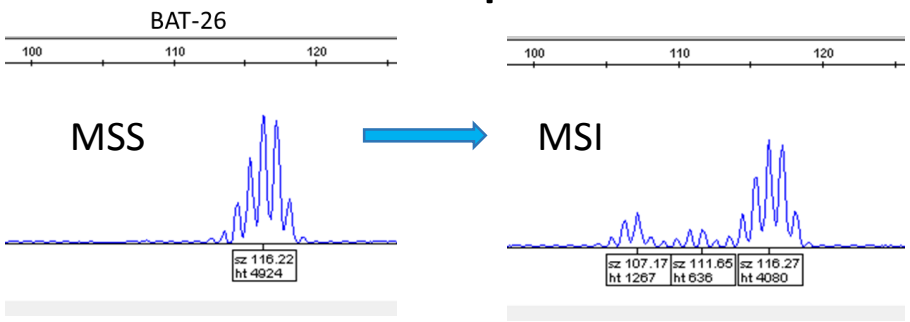
Financial Disclosures:

- *Salaried employee of OmniSeq, Inc. and Roswell Park Comprehensive Cancer Center*
- *Minority shareholder in OmniSeq, Inc., a subsidiary of Roswell Park Comprehensive Cancer Center*

Microsatellites

- Short, tandem repeated DNA sequences
- Distributed throughout the genome
- Vary in length between individuals
- Used to detect MSI, a change in microsatellite length
- Failure of DNA mismatch repair system



MSI Clinical Implications

- Screening test for Lynch Syndrome
- Identify appropriate patients for Immunotherapy
  - Keytruda® (pembrolizumab) approved for MSI-H patients
  - All solid tumors
  - Pediatric and adult patients

MSI-PCR testing - limitations

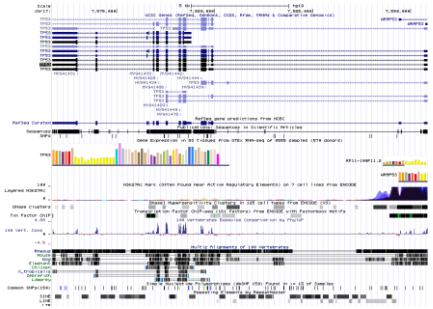
- Only 5-8 loci (Bethesda markers)
- CRC (Lynch Syndrome) focused
- Requires matched normal DNA
- Manual review of Chromatograms (inefficient)

MSI-NGS testing - Solution

- 29 target loci across 21 chromosomes
- Pan cancer
- Tumor only - no matched normal DNA
- Automated pipeline
- Scalable workflow

MSI-NGS Panel Development

Genomic Target Selection



Illumina Assay Design

Assay Optimization and Pre-Validation

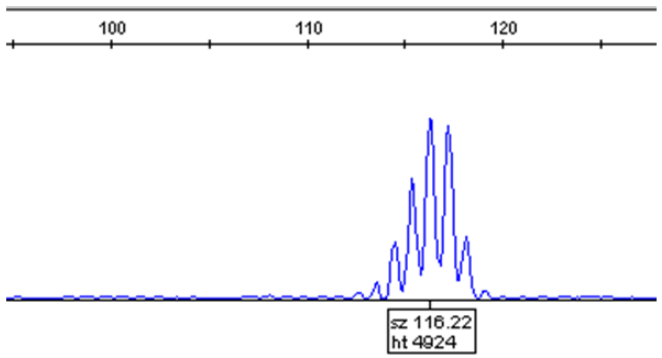
OmniSeq℠ MSI NGS

New York State CLEP Validation

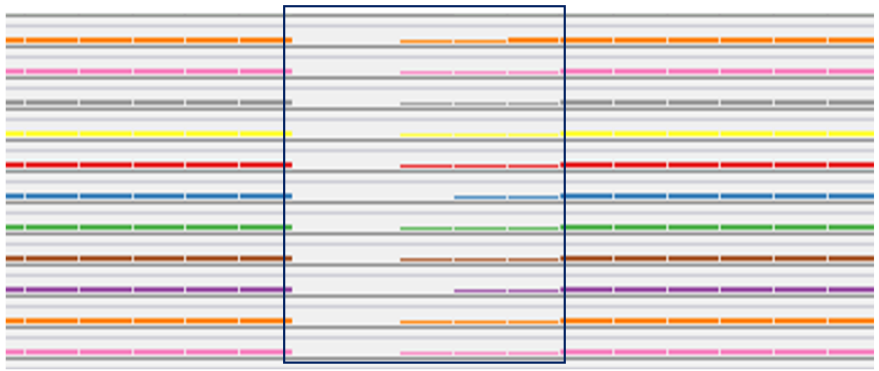
Proposed IVD

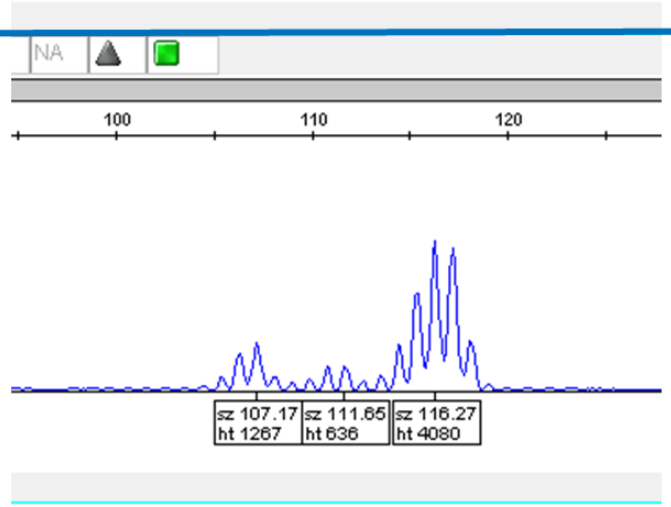
MSI-NGS Caller

Assigns MSI status by comparing target loci Indel lengths and frequency to normal reference population

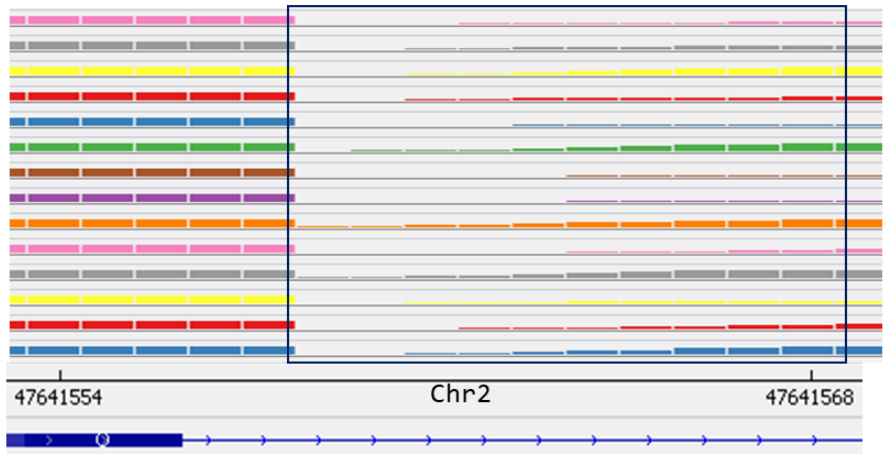


non-tumor



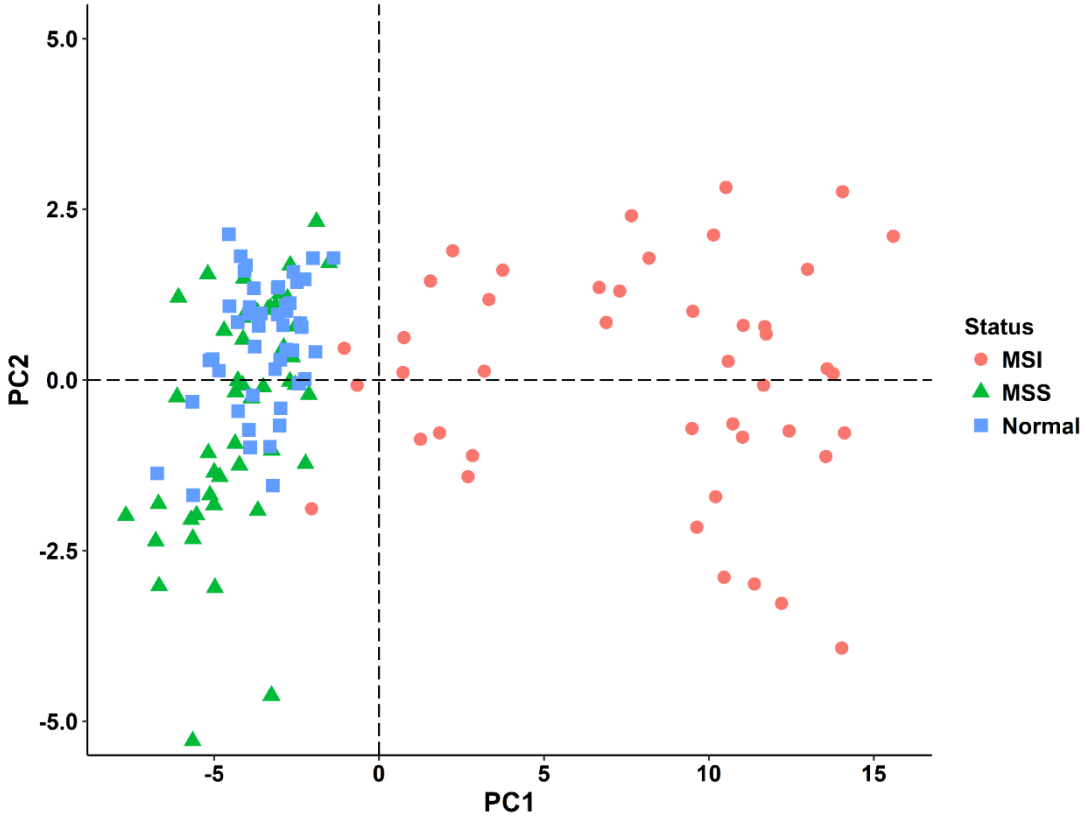


MSI-tumor



PCR **NGS**

Analytical Performance



Performance of MSI method on training cohort of 94 cases

TP	FP	TN	FN	Inconclusive	Total	Sensitivity	Specificity	PPV	NPV	Accuracy
18	0	68	0	8	94	91%	100%	100%	100%	100%

Performance of MSI method on a validation cohort of 47 cases

TP	FP	TN	FN	Inconclusive	Total	Sensitivity	Specificity	PPV	NPV	Accuracy
22	0	25	0	0	47	100%	100%	100%	100%	100%

NEW YORK STATE | Department of Health

NYS CLEP Approval May 2018

Powerful Advancement in MSI Testing

Delivers microsatellite instability results from tumor only FFPE samples:

- PCR requires normal tissue, NGS does not.
- Eliminate the hassle to acquire and track matched normal DNA from tissue or blood.
- 5 – 20ng input tumor DNA

Integrated ONCOLOGY
LabCorp Specialty Testing Group

Identify appropriate patients for Immunotherapy:

- Pan Cancer, not just CRC
- Cost equivalent to PCR, with similar turnaround times