Biocartis Idylla Microsatellite Instability Assay Shows High Concordance with PCR and IHC for Microsatellite Instability Status in Colorectal Cancer

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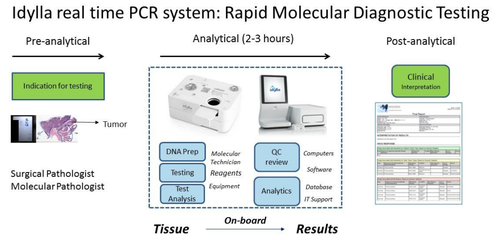
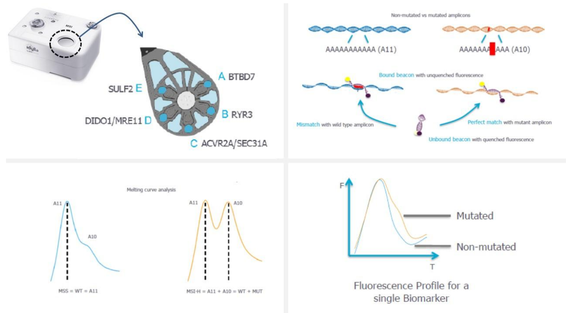
Introduction

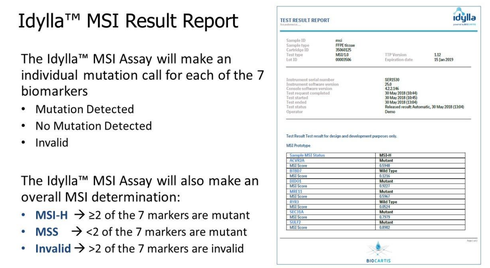
Determination of mismatch repair (MMR) and/or microsatellite instability (MSI) status in colorectal cancer (CRC) is recommended to aid in the identification of patients with Lynch syndrome or as a prognostic indicator. In addition, it is becoming increasingly important as predictive biomarker for cancer immunotherapy. Current molecular testing methods for MSI are often labor intensive and require comparison to normal tissue. In this retrospective study, we examine the fully automated Biocartis MSI Assay (research use only), capable of MSI determination without the need to analyze normal tissue.

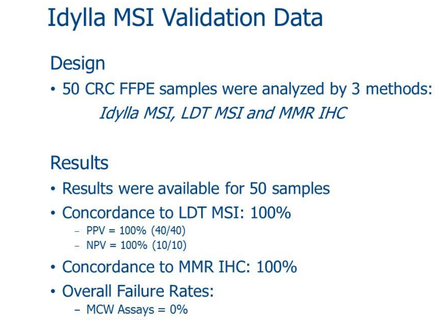
Materials and Methods

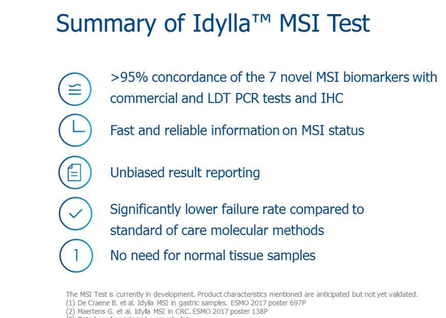
50 archived formalin fixed, paraffin embedded (FFPE) CRC specimens with known MSI status were selected for analysis on the Biocartis Idylla system. Both MMR IHC (MLH1, MSH2, MSH6 and PMS2) and a lab-developed (LDT) PCR assay (BAT-25, BAT-26, NR-21, NR-24 and NR-27) were used as reference methods for determination of MSI status on all 50 samples. The Idylla MSI cartridge assesses microsatellite instability at 7 novel loci in the ACVR2A, BTBD7, DID01, MRE11, RYR3, SEC31A and SULF2 genes by PCR amplification followed by high-resolution melting curve analysis. For each sample, MSI-High (MSI-H) is called if 2 or more biomarkers demonstrate instability; microsatellite stable (MSS) call is made if 0 or 1 biomarkers are instable. For the two PCR MSI methods (Idylla and the PCR-based assay), analysis was performed from a single 10µm FFPE section. In both cases, a macrodissection was performed. For the LDT PCR method, DNA was extracted and then analyzed; for Idylla, FFPE was inserted directly into the MSI assay cartridge.











Results

40 samples were characterized as defective MMR (dMMR) by IHC and MSI-H by the PCR-based reference method. The remaining 10 samples were characterized as proficient MMR (pMMR) by IHC and MSS by PCR. When the same set of 50 samples was analyzed by the Idylla MSI Assay, concordant results were obtained for 40/40 MSI-H/dMMR samples and 10/10 of the MSS/pMMR samples for an overall concordance of 100% (50/50). Additionally, the Idylla system was easy to use, required only 2 minutes of hands on time and produced results in as few as 150 minutes.

Conclusions

The Idylla platform offers a simple and fully automated solution for MSI status determination. The Idylla MSI Assay produces rapid results that are highly concordant with standard MSI/MMR testing methods.