EVALUATION OF KRAS MUTATION IN COLORECTAL CANCER: A PROSPECTIVE STUDY WITH COMPARISON TO NEXT-GENERATION SEQUENCING

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BACKGROUND
• Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the United States among both men and women.
• The management of CRC has been aided by the advancement and increased usage of molecular testing.
• Mutational analysis of KRAS and NRAS is warranted for CRC patients considered for anti-EGFR therapy. BRAF codon 600 testing is also recommended in CRC for prognostic stratification.
• The American Society of Clinical Oncology (ASCO) recently expanded their recommendations on molecular testing for CRC patients considered for anti-epidermal growth factor receptor (anti-EGFR) therapy to include KRAS and NRAS codons 12 and 13 of exon 2, codons 59 and 61 of exon 3, and codons 117 and 146 of exon 4 (so-called “expanded” or “extended” RAS testing).
• The Idylla™ system (Biocartis, Mechelen, Belgium) is a fully automated platform that utilizes a single-use cartridge containing all necessary reagents and steps for sample processing and real-time PCR-based mutation amplification and detection.
• In this prospective study, we evaluated the Idylla™ system against next generation sequencing using colorectal cancer tissue specimens.

DESIGN & METHODS
• Seventy-five CRC tissue specimens which were ordered for next-generation sequencing (NGS) between January 2018 and December 2018 were also prospectively tested on the Idylla™ system using the KRAS and NRAS-BRAF-EGFR S492R cartridges (Research Use Only), which test for actionable mutations in KRAS, NRAS and BRAF.
• Two 10 µm formalin-fixed paraffin-embedded (FFPE) tissue sections (one for each cartridge) were used for each run on the Idylla™ and all cases met the system’s minimum tumor requirement of 10%.
• NGS testing was performed using the Ion AmpliSeq 50-gene Cancer Hotspot Panel v2 (Thermo Fisher Scientific). NGS results and turnaround time of the testing process were compared to those obtained by the Idylla™ system.

RESULTS

Table 1 & 2. Mutations detectable by the Idylla™ KRAS and NRAS-BRAF-EGFR S492R Mutation Assays

Table 3. Idylla™ results compared with NGS

*Mutations not included in the list of mutations detectable by the Idylla™ but not by NGS

CONCLUSIONS
• The Idylla™ system offers rapid and reliable testing of clinically actionable mutations in colorectal cancer specimens directly from FFPE tissue sections.
• This prospective study demonstrates high concordance between the Idylla™ system and NGS.
• The Idylla™ system is ideal for centers that lack highly trained molecular staff or infrastructure and can complement NGS in larger centers by providing rapid turnaround time.