Genomic Tests for Personalized Patient Care

Complementing our close partnership with Siteman Cancer Center, Genomics and Pathology Services (GPS) at Washington University offers an integrated approach to disease-specific genomic testing including the use of clinical next generation sequencing methodologies. Although our primary focus area is cancer, we also offer tests and expertise in other areas.

Comprehensive Cancer Gene Set

This tumor sequencing test offers a cost-effective and efficient analysis of clinically actionable genetic biomarkers spanning a wide range of cancers. It is widely used by oncologists at Siteman Cancer Center and is also available to any interested physician.

Below are examples of clinical cases that demonstrate the clinical utility of tumor sequencing.

Case 1: Make a Diagnosis

**Presentation** - 12-day-old infant presented with low platelet count (thrombocytopenia) and hepatosplenomegaly. Broad differential diagnosis was bone marrow failure, juvenile myelomonocytic leukemia (JMML), hemophagocytic lymphohistiocytosis and autoimmune lymphoproliferative syndrome.

**NGS Test Utility / Results** - Comprehensive cancer sequencing was performed to aid in diagnosis and a KRAS p.G13D alteration was detected.

**Actions / Outcomes** - Based on molecular findings the infant was diagnosed with JMML, an uncommon cancer type. Management included evaluation for hematopoietic stem cell transplant, splenectomy and chemotherapy, as well as parental counseling and follow-up.

Case 2: Refine a Prognosis

**Presentation** - 45-year-old female presented with cytogenetically normal acute myelogenous leukemia (AML). Routine molecular testing revealed NPM1 insertion and FLT3 internal tandem duplication by PCR. She was stared on chemotherapy.

**NGS Test Utility / Results** - Comprehensive cancer sequencing was performed to assess for mutational status of critical hematologic disease associated genes. A DNMT3A p.R882H mutation was identified, which is associated with poor prognosis in AML and myelodysplastic syndromes.

**Actions / Outcomes** - In concert with other cytogenetic and molecular findings the patient was determined to have an unfavorable prognosis with high risk of relapse. She was treated for aggressive disease with plans for allogeneic bone marrow transplantation.

Case 3: Identify a Targeted Treatment

**Presentation** - 58-year-old female presented with metastatic thymic carcinoma. Disease was rapidly growing in chest cavity and liver.

**NGS Test Utility / Results** - Comprehensive cancer sequencing detected a KIT p.D579del deletion, which is uncommon in this cancer type.

**Actions / Outcomes** - This mutation is predicted to respond to a drug in the expanding class of tyrosine kinase inhibitors (TKI), so a daily dose of the TKI imatinib was initiated. After one month of treatment, significant radiologic response was noted. Patient remains well with stable disease two years later.
CASE STUDIES
Comprehensive Cancer Gene Set

Case 4: Eliminate Unsuitable Treatment

Presentation - 67-year-old male presented with metastatic rectal adenocarcinoma. Routine molecular testing at diagnosis was negative for KRAS mutations in codons 12 and 13 by allele-specific PCR.

NGS Test Utility / Results - Comprehensive cancer sequencing detected KRAS p.Q61H alteration, which is uncommon and not tested in routine workup.

Actions / Outcomes - KRAS mutations confer resistance to anti-EGFR therapy, so patient therapy was adjusted to eliminate this treatment.

Case 5a: Identify a Clinical Trial

Presentation - 53-year-old female presented with metastatic colon adenocarcinoma. She was treated with standard of care including FOLFOX/Avasin and received a right hemicolectomy. However, disease recurrence was observed.

NGS Test Utility / Results - Comprehensive cancer sequencing detected PIK3CA p.H1047L alteration, which results in increased catalytic activity and enhanced signaling. Patient was wildtype for KRAS, BRAF and NRAS.

Actions / Outcomes - Due to this alteration in PIK3CA, the patient is being screened to determine eligibility for enrollment in PIK3CA colon cancer clinical trial.

Case 5b: Identify a Clinical Trial

Presentation - 71-year-old female presented with mucinous lung adenocarcinoma. Routine molecular testing was negative for ALK, EGFR, and KRAS. Patient was treated with multiple chemotherapy agents but she experienced disease recurrence and progression over a period of three years.

NGS Test Utility / Results - Comprehensive cancer sequencing detected a 12 base pair insertion in codon 20 of ERBB2 (HER2). ERBB2 mutations are not extensively reported in non-small cell lung cancer (2-4 percent).

Actions / Outcomes - ERBB2 exon 20 insertions have been shown to be sensitive to EGFR/ERBB2 TKIs and ERBB2 monoclonal antibody (mAb) therapy. The patient was enrolled in a phase I study of neratinib with temsirolimus to study the effect of a targeted treatment option. She responded favorably to treatment with a decrease in pulmonary mass and remains well with stable disease 10 months later.

Pre-treatment

Post-treatment (4 mo)

Contact us to order a test or for more info

Tel: (314) 747-7337
Toll Free: (866) 450-7697
Fax: (314) 747-7336
Email: gps@wustl.edu
gps.wustl.edu
Address: Cortex Building, Suite 302
4320 Forest Park Ave, St. Louis, MO 63108

Follow us:
www.facebook.com/GPS.WUSTL
www.twitter.com/GPSWUSTL