UNC *Molecular Pathology and Genetics Laboratory* Test Menu

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Molecular Oncology Tests

***ABL1* mutation** – Sequence the kinase domain of the *BCR-ABL1* fusion gene transcript to predict response to tyrosine kinase inhibitors in patients with leukemia

***BCR-ABL1* translocation** - Quantify p210 or p190 transcripts for diagnosis, monitoring and therapy selection in chronic myeloid leukemia and acute lymphoblastic leukemia

***BRAF* mutation –** detect *BRAF* V600 codon activating mutation in carcinoma or melanoma tissue, or suspected hairy cell leukemia blood or marrow

FLT3 - In acute myeloid leukemia, detect *FLT3* internal tandem duplication (ITD) or tyrosine kinase domain (TKD) mutation, impacting prognosis and response to targeted therapy

Glioma panel – In tumor tissue, test *TERT* promoter and *IDH1* and *IDH2* mutation to classify glioma

***JAK2* –** quantify *JAK2* 1849G>T [V617F] in blood to detect or monitor myeloproliferative neoplasia

***IDH* mutation –** Classify glioma by detecting *IDH1* R132 or *IDH2* R172 mutation

Immunoglobulin and T cell receptor genes - Detect rearrangement of the *IGH, IGK* and *TRG* genes to assess clonality and lineage of B and T cell lesions

***MGMT* methylation –** Detect promoter methylation associated with sensitivity to alkylating agents in *IDH* wild type glioma tissue

Microsatellite Instability – In cancer tissue, assess defective mismatch repair, and inform response to immunotherapy and/or likelihood of Lynch syndrome.

***MLH1* methylation –** Test promoter methylation in the workup of possible Lynch syndrome and/or to inform response to immunotherapy

Myeloid Mutation Panel – In blood, marrow or tissue, detect hotspot mutations in multiple genes for diagnosis, prognosis and/or therapy selection in patients with acute myeloid leukemia, myelodysplastic syndrome, or myeloproliferative neoplasia

Myeloproliferative Neoplasm Hotspot Panel – In blood or marrow suspected of myeloproliferative neoplasia, detect mutation in ***JAK2, CALR,*** or ***MPL*** genes

***NPM1* –** quantify *NPM1* type A mutation in blood to monitor leukemia burden

Prosigna Breast Cancer Risk of Recurrence Score – Assess prognosis in early-stage ER or PR positive, Her2 negative breast cancer with up to 3 involved nodes.

T-cell Large Granular Lymphocytic Leukemia - Testing for the presence of somatic mutations may assist in the diagnosis of T-cell large granular lymphocytic leukemia (T-LGLL). Mutations of *STAT3* and *STAT5B* can aid in distinction of reactive and neoplastic proliferations of T-cell large granular lymphocytes

Heritable and Congenital Disease Tests

Alpha-1-antitrypsin - Detect *SERPINA1* mutation at E342K (Z allele) and E264V (S allele) associated with deficiency of the enzyme alpha-1-antitrypsin

Apolipoprotein E *(APOE)* – Detect *APOE* e2, e3, and e4 alleles for patients with Alzheimer disease being considered for treatment with monoclonal antibodies against aggregated beta amyloid such as Leqembi® (lecanemab-irmb) and to predict risk of late-onset Alzheimer.

APOL1 - Detect *APOL1* G1 or G2 alleles associated with risk of kidney disease

Connexin 26 and 30 – In blood or stored newborn blood card, detect *GJB2* (exon 2) mutation and *GJB6* deletions associated with altered connexin 26 and 30 proteins and congenital hearing loss

CYP2C19 - Detect *CYP2C19* gene variants associated with drug efficacy or resistance to clopidogrel (Plavix) therapy

Cystic fibrosis - test for common mutations in the *CFTR* gene, offered to women of childbearing age and to patients with signs or symptoms of cystic fibrosis

Factor V & Factor II - Detect Factor V Leiden (*F5* c.1601G>A, p.R534Q) and prothrombin (*F2* 20210G>A) mutations associated with inherited predisposition to venous thrombosis

Fragile X genotype - Detect altered *FMR1* gene associated with Fragile X syndrome, premature ovarian failure, and tremor/ataxia syndrome

Hemochromatosis - Detect *HFE* mutation (63H>D & 282C>Y) associated with heritable predisposition to iron overload

Kidney Genetics Mutation Panel – Detect mutation in 17 genes associated with heritable forms of kidney disease, including nephrotic syndrome, focal segmental glomerulosclerosis (FSGS), and Alport syndrome

Prader-Willi & Angelman Syndromes - Detect methylated (maternal) and unmethylated (paternal) alleles of the *SNRPN* gene

Primary Ciliary Dyskinesia - Detect mutation in multiple genes associated with ciliary dysfunction in respiratory tracts or sperm motility (required history and consent forms)

SMN1, SMN2 – Screen for potential carriers of spinal muscular atrophy or support diagnosis in an affected patient

UGT1A1 – Assess promoter of the *UGT1A1* gene to predict toxicity to irinotecan or to confirm a diagnosis of Gilbert's syndrome

Additional Test Services

DNA Fingerprinting - In allogeneic transplant patients, quantify proportions of recipient and donor cells in blood or marrow. In products of conception or prenatal specimens, estimate maternal and fetal fractions.

Custom DNA sequencing – Detect selected gene variants.

DNA or RNA extract and hold - extract DNA or RNA from specimen and hold for ≥ 1 year

Validation of assays for use in clinical trials – Genomic sequencing, PCR, expression profiles, & related technologies are developed to suit a given clinical investigation

UNC *Molecular Pathology and Genetics Laboratory* Website has a one-page information sheet about each test:
https://www.uncmedicalcenter.org/mclendon-clinical-laboratories/directory/molecular-pathology-and-genetics/