PREFERRED SUBMISSION, SPECIMEN STORAGE AND TRANSPORT REQUIREMENTS

MOLECULAR GENETICS

Collected Monday through Friday, to be received in the Laboratory by 1500.

Interpretive report availability: 3 to 5 business days

Specimen Type	FISH	PCR
Peripheral blood	Green top 5 mL minimum, 10-20 mL preferred	Lavender preferred, 10-20 mL
Bone Marrow Aspirate	Green top 2-3 mL	Lavender preferred, 2-3 mL
Fresh Tissue (lymph node, solid tissue, fine needle aspirate, skin)	RPMI Four or more pieces preferred. Minimum one piece, 0.5 x 0.5 x 0.2 cm.	
Body Fluids	50-200 mL fluid, total volume, in RPMI (1:1 dilution).	
Fine Needle Aspirate	RPMI	RPMI
Cerebral Spinal Fluid	Sterile glass tube 2 mL	
Formalin Fixed Biopsy (Bone marrow core and/or clot)	1-2 cm in length	
Fresh Bone Marrow Core Biopsy	RPMI	

Storage and Shipping:

Use a refrigerated cold pack when ambient temperature is >75º F.
Be sure cold pack is not in direct contact with specimens during transport.

Collection Tubes:

Green Top – Sodium Heparin – Maintains viability for up to 48 hours
Lavender Top – EDTA – Maintains viability up to 24 hours

Molecular Genetics (FISH/PCR)
Molecular genetics testing can provide sensitive detection of neoplastic changes associated with malignancies such as APL, CML, FL and lymphoid neoplasms. Reports are issued upon completion. FISH is the application of fluorescently labeled DNA molecules to metaphase chromosomes and interphase nuclei for the detection of chromosome abnormalities and alterations. It is a rapid, reliable and direct approach for diagnosis, Prognosis and management of hematologic malignancies.

Lab Mnemonic	OE Order Name	Specimen Type
GPF 5427-0	Acute Myelomonocytic Leukemia (AML-4) and Acute Monocytic Leukemia (AML-M5) **MLL, t(11q23) by FISH** Diagnosis under consideration: ALL, AML diagnosis There are numerous variant translocations of 11q23, the more common of which are associated with therapy-related AML, AML-M4 and M5, and have an intermediate prognosis. Detected in 50-80% of infant leukemia; 15% of adult Acute Lymphocytic Leukemia. Usually associated with a poor prognosis, regardless of age. See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: 88368 (1)	BONE MARROW : 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5037 7	Acute Myeloid Leukemia/Acute Lymphocytic Leukemia **MLL, AF4, t(4;11) by PCR** Diagnosis under consideration: AML, ALL See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: 83902, 83898 (3), 83894 (3) 83912 (1), 83892 (2), 83894 (1), 83897 (1), 83896 (1), 83912 (1)	BONE MARROW: EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL Blood (L)
GPF 5024 5	Acute Myelogenous Leukemia with maturation (AML-M2) **AML-M2 by FISH** Diagnosis under consideration: AML FAB M2 Probe: AML1/ETO Location: t(8;21) Diagnostic for Acute Myelogenous Leukemia (AML-M2). Found in about 5-12% of AML patients. Usually associated with a favorable response to chemotherapy. Occurs predominantly in young adults. See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: 88368	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN Non-decalcified Paraffin Embedded Tissue (block)
GPP 5034 4	Acute Myelogenous Leukemia **AML-M2 by PCR** Probe: AML1/ETO Location: t(8;21) Diagnosis under consideration: Acute Myelogenous Leukemia (AML-M2) See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: 83890 (1), 83902 (1), 83901 (2), 83896 (2), 83912 (1)	BONE MARROW : EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL Blood (L)

Lab Mnemonic	OE Order Name	Specimen Type
GP 5988 1	Acute Myelogenous Leukemia Prognosis using NPM1 FLT3 and Mutation Analysis **AML Prognostic by PCR** Also known as: FLT3, NPM1, Nucleophosmin Diagnosis under consideration: AML Helps understand the prognosis in AML patients. Patients with FLT3 mutations have a poor prognosis whereas those with NPM1 mutations have a good prognosis in the absence of FLT3 mutations. See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: 83891(1), 83894(1), 83898(1), 83900(1), 83901(3), 83904(2), 83912(2)	BONE MARROW : EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD : EDTA only, 5 mL Blood (L)
GP 8860 9	CEBPA mutations in AML **CEBPA by PCR 19q13.1** CEBPA mutations are relevant in the assessment of prognosis of cytogenetically normal acute myeloid leukemia (CN-AML). Studies have indicated that patients with CEBPA-positive mutations have a longer remission period and overall survival compared to patients with unmutated CEBPA. CEBPA mutations, in combination with FLT3 and NPM1 mutational status, are important prognostic factors for AML patients with a normal cytogenetic karyotype. CEBPA is an important prognostic factor independent of FLT3 and NPM1 results. See page 1 for specimen collection, storage, transport requirements and TAT. CPT Codes: Contact GenPath	BONE MARROW : EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD : EDTA only, 5 mL Blood (L)
GPF 5260 5	Acute Promyelocytic Leukemia **AML-M3 (APL) by FISH** Probe: PML/RARA Location: t(15;17) Diagnostic for AML-M3. Detected in about 5-8% of AML patients. Treatment with All-trans retinoic acid (ATRA) and other chemotherapy agents can induce maturation. Usually associated with a favorable response to chemotherapy. See page 1 for specimen collection, storage, and transport requirements. TAT: 1 day (This is a STAT request) CPT Codes: 88368(1)	BONE MARROW : 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD : 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE : Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5261 3	Acute Promyelocytic Leukemia **AML-M3 (APL) by PCR** Probe: PML/RARA Location: t(15;17) Dx under consideration: AML-M3 (APL) See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83890(1), 83902(1), 83901(4), 83896(4), 83912(1)	BONE MARROW: EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL whole blood (L)

Lab Mnemonic	OE Order Name	Specimen Type
GPP 5025 2	Acute Myelomonocytic Leukemia with Eosinophilia **AML-M4Eo by FISH** Probe: CBFB/MYH11 Location: inv(16) Diagnosis under consideration: AML FAB M4Eo Diagnostic for AML-M4Eo. Detected in about 10-12% of AML patients. Usually associated with a favorable response to chemotherapy. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5035 1	Acute Myelomonocytic Leukemia with Eosinophilia **AML-M4Eo by PCR** Probe: CBFB/MYH11 Location: inv(16) Dx under consideration: AML-M4Eo See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83890(1), 83902(1), 83901(2), 83896(2), 83912(1)	BONE MARROW: EDTA only 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only 5 mL whole blood (L)
GPF 5265 4	Chronic Myelogenous Leukemkia (CML) **CML, B-ALL by FISH** Probe: BRC/ABL Location: t(9;22) Diagnosis under consideration: Chronic Myelogenous Leukemia (CML) BCR/ABL, t(9;22) is diagnostic for CML and is also seen in a subset of ALL and AML. In adult ALL and AML, usually associated with an unfavorable response to chemotherapy. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5858 3	Chronic Myelogenous Leukemkia (CML) **CML, B-ALL by PCR** Also known as: Quantitative BCR/ABL, t(9;22) Diagnosis under consideration: Chronic Myelogenous Leukemia (CML) See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83891(1), 83898(3), 83896(6), 83902(1), 83912(1)	BONE MARROW: EDTA only 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only 5 mL whole blood (L)

Lab Mnemonic	OE Order Name	Specimen Type
GP 5182 1	Chronic Eosinophilic Leukemia **FIP1L1-PDGFRA** Also Known As: CHIC2, 4q12 See page 1 for specimen collection, storage, and transport requirements. CPT Codes 88365*1	Preferred Specimen and Volume: Bone Marrow or Blood in green top tube (Sodium Heparin) Alternate Specimen and Volume: Bone Marrow or Blood in lavender top tube (EDTA)
GPF 5281 1	Myelodysplastic Syndrome (MDS) Panel **MDS Panel by FISH** Diagnosis under consideration: MDS Location: +8,-5/5q-, -7/7q-, 20q- Trisomy 8 (+8) is diagnostic for MDS in the appropriate clinical context and is usually associated with an intermediate prognosis. -5/5q- (5q33-q34 5q-) is found in 10-15% of MDS and, is associated with a favorable response to chemotherapy is it is the sole abnormality. The "5q- syndrome" also has a favorable prognosis. A complete deletion of chromosome 5 (-5) is usually associated with an unfavorable prognosis. Lenalidomide (RevlimidA®) may reduce transfusion requirements and reverse cytologic and cytogenetic abnormalities in these patients. -7/7q- 7q31 is the most common abnormality in pediatric MDS and is usually associated with an unfavorable response to chemotherapy. 20q12 20q- is a chromosomal 20q deletion, is associated with about 5% of primary MDS and confers a relatively favorable prognosis. See page 1 for specimen collection, storage, and transport requirements. CPT codes: 88368(4)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5157 3	Myeloproliferative Neoplasm (PV,ET,CIMF) **JAK-2 V617F Mutation Analysis in MPNs by PCR** Related tests: Myeloproliferative Neoplasm (PV) by PCR [JAK-2 Exon12 in Myeloproliferative Neoplasms (MPN)] JAK2 V617F mutation is seen in a variety of BRC/ABL-negative chronic myeloproliferative neoplasms (MPNs), and appears to be mutually exclusive of BRC/ABL. Diagnosis under consideration: Non-CML Chronic Myeloproliferative Disorders See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83896(2), 83898(4), 83891(1), 83904(2), 83912(1)	BONE MARROW : EDTA only, 3 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL whole blood (L)
GPP 5307 4	Myeloproliferative Neoplasm (PV) by PCR **JAK-2 Exon12 in Myeloproliferative Neoplasms (MPN) (PV) by PCR** Diagnosis under consideration: Polycythemia vera Related tests: JAK-2 V617F Mutation Analysis in MPNs by PCR JAK2 Exon 12 mutations help confirm polycythemia vera in MPN patients that are JAK2 V617F negative. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: Contact GenPath	PERIPHERAL BLOOD: EDTA 5 mL whole blood (L)

Lab Mnemonic	OE Order Name	Specimen Type
GPP 5272 0	MPL515 for JAK2 Negative Myeloproliferative Disorder Patients **Myeloproliferative Neoplasm (ET,CIMF) by PCR** Also known as: MPL515 Mutation Analysis Diagnosis under consideration: Myeloproliferative disorders See page 1 for specimen collection, storage, and transport requirements. CPT codes: 83891(1), 83900(1), 83901(2), 83904(4), 83912(1)	BONE MARROW – EDTA only 2 mL marrow (L) PERIPHERAL BLOOD – EDTA only 5 mL whole blood (L)
GPF 5280 3	Chronic Lymphocytic Leukemia (CLL) Panel **CLL Prognostic Panel by FISH** Also known as: CLL Panel (+12,p53,D13s319,ATM) Diagnosis under consideration: CLL Prognosis Trisomy 12 (+12) is found in about 20% of CLL/SLL cases and usually associated with an unfavorable response to chemotherapy and a predominantly unmutated IgVH gene status. D13s319- deletions involving 13q14.3 are detectable by FISH in approximately 50% of persons with CLL. This deletion is associated with a favorable clinical outcome. ATM (11q22.3) mutations of the ataxia-telangiectasia gene are seen in 10-20% of B-cell CLL and are associated with a relatively aggressive disease course and poorer prognosis. P53 (17p13) monosomy is usually associated with an unfavorable response to chemotherapy. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368(4)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE : Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5223 3	IgVH Mutation Analysis for CLL/SLL **CLL Prognosis IgVH by PCR** Also known as: Chronic Lymphocytic Leukemia, IgVH Mutation Status Dx under consideration: CLL prognosis The sensitivity of this assay is 10%; sequencing may not be possible for peripheral blood or bone marrow specimens with 10% clonal B-CLL cells. B-cell CLL patients can be stratified into prognostically indolent and more aggressive disease types by assessment of the presence or absence of somatic mutations in the variable region of the immunoglobulin heavy chain gene locus (IgVH). Those patients showing more than 98% homology to the germline sequence (i.e., unmutated) have a relatively aggressive disease course with an average survival of 79-119 months. Those patients with 98% homology to the germline sequence (e.g., mutated) have a longer survival of 124-293 months. Other adverse independent prognostic factors, according to multivariate analysis, include clinical stage, loss or mutation of p53 (17p deletion), and loss of ATM (11q deletion). Patients with a normal karyotype or deletion of 13q14 (RB1) have a better prognosis than those with a complex karyotype. CD38 and ZAP-70, commonly assessed by flow cytometry, correlate with IgVH mutational status, in that, high CD38 and/or ZAP-70 expression is overrepresented in the unmutated (germline or naïve) group of patients. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83909(1), 83891(1), 83894(1), 83902(1), 83904(2), 83900(1), 83912(1)	BONE MARROW: EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL whole blood (L)

Lab Mnemonic	OE Order Name	Specimen Type
GPP 5031 0	T-Cell Lymphoma (TCR) **T-Cell Lymphoma by PCR** Also known as: TCR-Gamma, T-Cell Gene rearrangement, Clonal T-Cell, T-Cell Receptor Dx under consideration: T-Cell Lymphoma See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83891(1), 83900(1), 83901(1), 83909(3), 83912(1)	BONE MARROW: EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL Blood (L) ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPP 5278 7	IGH (B-Cell Gene Rearrangement) **B-Cell Lymphoma by PCR** Also known as: Clonal B-Cell, B-Cell Receptor, B-Cell Lymphoma Diagnosis under consideration: B-Cell Lymphoma See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83898(2), 83909(2), 83912, 83891(1).	BONE MARROW: EDTA only, 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only, 5 mL Blood (L) ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPF 5028 6	BCL6 **Diffuse Large B-Cell Lymphoma by FISH** Also known as: BCL6 3q27 BCL6 3q27 is found in up to 35% of DLBCL and 6-14% of Follicular lymphoma. FL with BCL6 translocation suggests a subgroup prone to early transformation to a more aggressive lymphoma (DLBCL). Diagnosis under consideration: NHL (Diffuse Large B-Cell Lymphoma, FL) See page 1 for specimen collection, storage, and transport requirements. CPT Codes 88368 (1)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPF 5027 8	Burkitt Lymphoma **Burkitt Lymphoma by FISH** Probe: MYC/IGH Location: t(8;14) Diagnosis under consideration: Burkitt Lymphoma MYC/IGH t(8;14) is found in most, if not all, of Burkitt lymphomas/leukemias See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)

Lab Mnemonic	OE Order Name	Specimen Type
GPF 5026 0	BCL1, t(11;14) **Mantle Cell Lymphoma (MCL) by FISH** IGH/CCND1 t(11;14) is diagnostic for MCL. Diagnosis under consideration: Plasma Cell Myeloma or Mantle Cell Lymphoma See page 1 for specimen collection, storage, and transport requirements. CPT Code: 88368(1)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPF 5270 4	Follicular Lymphoma (FL) **Follicular Lymphoma by FISH** Probe: IGH/BCL2 Location: t(14;18) Diagnosis under consideration: Follicular Lymphoma (FL). IGH/BCL2 t(14;18) is found in 85-90% of FL. Diagnostic for B-Cell lymphoma of follicle center cell origin. See page 1 for specimen collection, storage, and transport requirements. CPT Code: 88368(1)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPF 5273 8	Non-Hodgkins Lymphoma Panel **Non-Hodgkin's Lymphoma by FISH** Also known as: BCL1, BCL2, and BCL6 Diagnosis under consideration: Non-Hodgkin's Lymphoma (NHL) This panel consists of BCL1, BCL2, and BCL6 FISH probes that are used to identify Non-Hodgkin's Lymphoma. See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368 x 3	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GPF 5282 9	Plasma Cell Dyscrasia (PCD) Panel **Plasma Cell Dyscrasia Panel by FISH** Also known as: PCD Panel [RB1, BCL1, p53, t(4;14)] Diagnosis under consideration: Plasma Cell Dyscrasia (PCD) Prognosis. RB1 (13q14 del) is found in about 50% of CLL/SLL cases and is usually associated with a predominantly mutated IgVH gene status and a favorable response to chemotherapy. IGH/CCND1 t(11;14) stratifies patients as likely mantle cell lymphoma (MCL) and is usually associated with an unfavorable response to chemotherapy. p53 (17p13) monosomy is usually associated with an unfavorable response to chemotherapy. The FGFR3 probe is intended to detect the t(4;14)(p16;q32) reciprocal translocation involving the FGFR and IGH gene regions. The t(4;14) translocation is an independent poor prognostic factor for progression free survival (PFS) and overall survival (OS). This translocation can be found in up to 15% of multiple myeloma patients and in up to 2% of patients with monoclonal gammopathy of undetermined significance (MGUS). See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 88368(3).	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)

Lab Mnemonic	OE Order Name	Specimen Type
GPP 3420 7	HFE Gene, HLA-H Gene, C282Y/H63D/S65C **Hereditary Hemochromatosis (HHC) by PCR** Tests for inherited genetic disorders or predisposition require a separate consent form signed by the patient before results may be released. Dx under consideration: Hereditary Hemochromatosis See page 1 for specimen collection, storage, and transport requirements. CPT Codes: 83896(2), 83898(2), 83891(1), 83904(3), 83912(1)	BONE MARROW: EDTA only 2 mL marrow (L) PERIPHERAL BLOOD: EDTA only 5 mL Blood (L)
GPF 5066 6	X/Y **Bone Marrow Transplant Monitoring by FISH** Used to monitor bone marrow transplants See page 1 for specimen collection, storage, and transport requirements. CPT Code: 88368(1)	BONE MARROW: 2 mL Heparinized Marrow (Gn) PERIPHERAL BLOOD: 5 mL Heparinized Blood (Gn) LYMPH NODE OR FRESH TISSUE: Submit in RPMI Sorted cells in sterile tube ALTERNATE SPECIMEN: Non-decalcified Paraffin Embedded Tissue (block)
GP CTC	**Cell Search Circulating Tumor** Also known as: CTC or Circulating Tumor Cell CPT Codes 88346*3, 88313*1, 88361*2	PERIPHERAL BLOOD: 7.5 mL whole blood in CellSave tube Room Temperature Contact Laboratory for collection kit.