Cleveland Clinic

# Cleveland Clinic Laboratories

## Molecular Pathology Tests

### Cytogenetics

#### Chromosome Studies

Postnatal:
- Peripheral blood
- Fibroblasts

Products of Conception:
- CVS (chorionic villi)
- Fetal tissue
- Placenta
- Skin
- Bone

Cancer:
- Bone Marrow
- Leukemic blood
- Lymph node
- Fatty tumors
- Renal tissue
- Solid tumors

Chromosomal Microarray
- Constitutional
- Bone marrow cancer

Constitutional *FISH*:
- X cen on PB
- Y cen on PB
- Yqh on PB
- *SRY* on PB
- *XIST* on PB

#### Reflex Tests on Bone Marrow Chromosome Studies

Bone marrow cancer chromosome microarray with normal, suboptimal, or cultures are no growth
MDS FISH with suboptimal or cultures are no growth
AML FISH with suboptimal or cultures are no growth

### Molecular Genetics and Genomics

Alpha-1-antitrypsin targeted genotyping
Cystic Fibrosis NGS
Factor V Leiden (PCR)
Fragile X syndrome (*FMR1*) DNA analysis (PCR)
*HFE* [Hereditary Hemochromatosis] (PCR)
*MTHFR* (PCR) (C677T,AIZ98C)
Progenitor cell engraftment monitoring (STR;PCR)
Prothrombin G20210A (PCR)
Spinal Muscular Atrophy (SMA)
TPMT Genotyping

### Molecular Hematopathology

Alpha thalassemia (*HBA1/2*) gene deletions
B-cell clonality (*IGH* + *IGK* BIOMED-2 PCR)
BCR-ABL Qualitative Multiplex RT-PCR
CALR (Calreticulin) Exon 9 Mutation Analysis
Tier 2 B-Cell Clonality (BIOMED-2 PCR)
*CEBPA* mutation analysis
T-cell clonality (TCRB + TCRG BIOMED-2 PCR)
*IGH* PCR (BIOMED-2 Primers)
*IGK* PCR (BIOMED-2 Primers)
*MPL* mutation analysis
*MYD88* L265P mutation analysis
*TCRB* PCR (BIOMED-2 Primers)
*TCRG* PCR (BIOMED-2 Primers)
p210 *BCR/ABL1*( RT-PCR, quantitative)
p190 *BCR/ABL1*( RT-PCR, quantitative)
Nucleophosmin gene (*NPM1*) mutation analysis
*FLT3* Gene Mutation
*JAK2* V617F mutation
*JAK2* exons 12-15 sequencing

#### Fluorescence in-situ hybridization

- 1p & 1q
- 5q
- 7q
- 20q/+8
- *ALK*
- *BCL2*
- *BCL6*
- *BCR/ABL1*
- *CBFB/MYH11* (inv 16)
- CEP 9/15
- CLL (13q,11q, 17p,+12)
- *ETV6/RUNX1 (TEL/AML1)*
- *FGFR1*
- *IGH*
- *IGH/BCL2*
- *IGH/CCND1*
- *IGH/MYC*
- *MALT1(18q21)*
- *MLL (KMT2A)*

*Continued on back*

*MYC*
Myelodysplasia (-5/5q, -7/7q,+8,-20q)
Plasma cell myeloma [13q, IGH, TP53, t(11,14), t(4;14), t(14;16)]
*PDGFRA*
*PDGFRB*
*PML/RARA*
*RARA*
*RUNX1/RUNX1T1 (AML1/ETO)*
Trisomy 4 and 10

## Molecular Oncology

*MGMT* promoter methylation
MLH-1 Promoter Hypermethylation
Microsatellite Instability (MSI)
Solid Tumor Cancer Hotspots (NGS)
- Lung Cancer Hotspot NGS (EGFR, KRAS, BRAF, MET)
- Melanoma Cancer Hotspot NGS (BRAF, KRAS, KIT)
- Colon Cancer Hotspot NGS (KRAS, NRAS, BRAF)
- IDH1&2 Gene Analysis
- BRAF Single Gene Analysis
- EGFR Single Gene Analysis
- IDH1 Single Gene Analysis
- IDH2 Single Gene Analysis
- KIT Single Gene Analysis
- KRAS Single Gene Analysis
- NRAS Single Gene Analysis

### Fluorescence in-situ hybridization

1p & 19q
*ALK* NSCLC FFPET
*ALK* NSCLC ThinPrep
*DDIT3 (CHOP)*
*EGFR (gliomas)*
*EWSR1*
*FISH* for bladder CA recurrence
*FISH* for cutaneous melanoma
*FISH* for MYC Angiosarcoma
*FOXO1A (FKHR)*
*FUS*
*HER2 (ERBB2) with CEP17*
*HER2* (*ERBB2*) with D17S122
*MDM2*
*RET*
*ROS1*
*SS18 (SYT)*
*WWTR1/CAMTA1*