## Sample Case 3: AML MRD confirmed by Molecular Genetics

## “Difference from Normal” Multidimensional Cytometry Results

**Specimen Type:** Bone Marrow Aspirate

**Clinical History/Indications:** A xy-year-old patient with a clinical history of FLT3-positive AML. A previous bone marrow specimen showed no evidence of abnormal myeloid progenitor cells.

**Analysis/Conclusions:** **The flow cytometric findings reveal a suspicious myeloblast population at 0.03% of non-erythroid cells, see comment.** Histopathologic, cytogenetic, and clinical data are required for complete interpretation.

**Comment: The suspicious cell population lacks expression of CD13, a characteristic not identified in the previous specimen. Without a diagnostic phenotype to compare, it is difficult to interpret the significance of this small population. Cell sorting and molecular studies suggested.**

**Flow Cytometric SSC/CD45 Differential:** 29% lymphocytes, 3.7% monocytes, 61% myeloid forms (of all stages of development), 0% lymphoblasts, and 0.1% myeloblasts (CD117) including 0.03% suspicious myeloid progenitor cells.

**Immunophenotypic Findings:** Independent immunophenotypic analysis of the myeloblast population reveals abnormal surface antigen expression consisting of HLA-DR, CD34, CD33, CD123, and CD117, without expression of CD11b, CD13, CD14, CD16, CD64 and all lymphoid antigens tested. Analysis of the maturing myeloid populations shows normal antigenic relationships. Total non-erythroid cells expressing CD34 are present at 0.2%.

## Molecular Genetic Confirmation on Flow Cytometric Sorted Cells

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**Specimen Type:** Flow cytometry sorted CD34+CD13+ sorted cell fraction from Bone Marrow Aspirate (36345312). Inadequate DNA yield for NGS analysis.

**Clinical History/Indications:** A xy-year-old patient with a clinical history of FLT3-positive AML. Current flow cytometric findings are suspicious for the presence of an aberrant myeloblast population at 0.03%.

**FMS-like tyrosine kinase 3 mutation detection: POSITIVE (ITD)**

**Analysis/Conclusions:**

* These findings are *positive* for the presence of an internal tandem duplication (ITD) (~42 bp) of the juxtamembrane domain of the **F**ms-**L**ke **T**yrosine kinase **3** receptor **in the CD34-positive, CD13-positive cell fraction of this specimen.**
* Clinical and histological correlation required for definitive diagnosis.

Activating mutations of the fms-like tyrosine kinase 3 receptor have been described to be an important prognostic factor in AML [Thiede et al. Blood 2002, 99:4326-4335] [Kottaridis et al. Blood 2001, 98:1752-1759].