

**[f10.1]** This case of AML occurs in a 63-year-old male who presents with a 9-month history of myelodysplastic syndrome. At current presentation, his CBC data reveals a WBC count of  $3.8 \times 10^9/\text{mm}^3$  ( $3.8 \times 10^9/\text{L}$ ), a hemoglobin of 11.6 g/dL, and a platelet count of  $40 \times 10^3/\text{mm}^3$  ( $40 \times 10^3/\text{L}$ ). A bone marrow aspirate is performed to evaluate status of current disease and is characterized by small blasts, or “microblasts” **a**. Flow cytometric analysis of the bone marrow revealed a hemodiluted bone marrow with 14% of cells within the immature cell region. The immature cells expressed CD13, CD33, CD34 **b**, CD117 **c**, and HLA-DR without expression of any other markers analyzed. The bone marrow section **d** reveals lymphoid-appearing cells. CD34 **e** and CD117 IHC **f** were extremely helpful in confirming the greatly increased percentage of blasts in this case. The cytogenetic results demonstrated that 4 of 17 cells analyzed had chromosomal abnormalities; 3 of 17 had deleted chromosome 20q; 1 of 17: extra copy of chromosome 22; and the remaining 13 cells were normal (46, XY). Diagnosis of AML with multilineage dysplasia arising from a previous myelodysplastic syndrome in a hypocellular bone marrow is made.

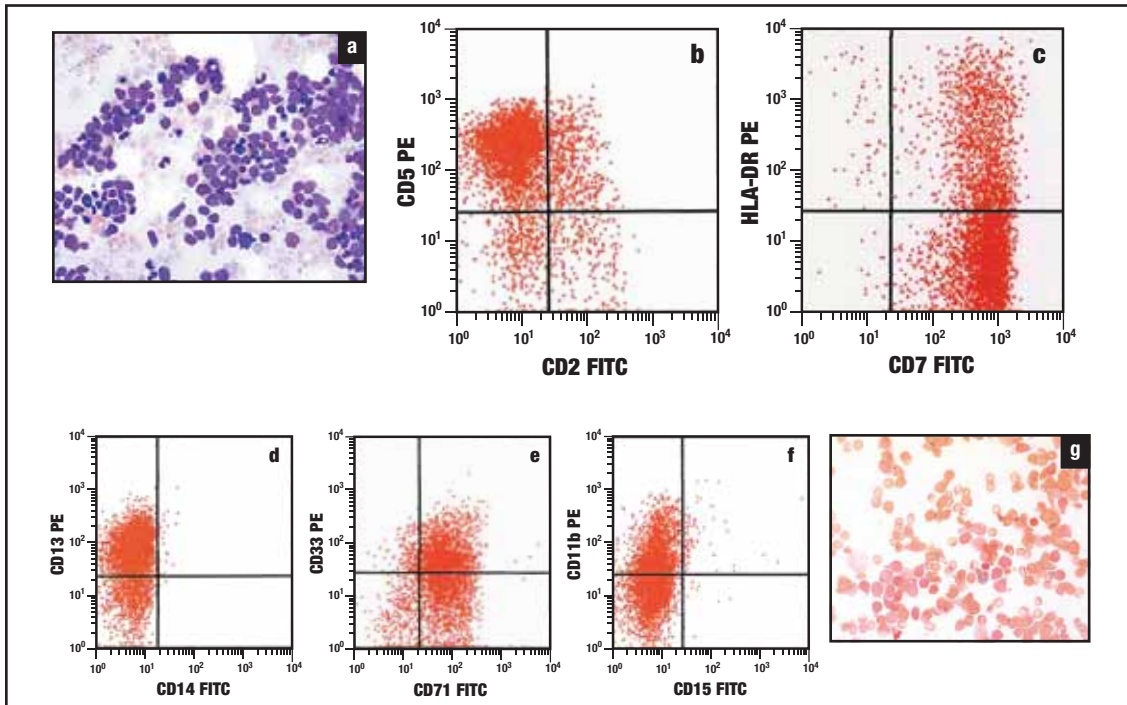
expression is often associated with CD56 and CD34 expressions, with AML, M2 morphology, and with a  $t(8;21)$ , discussed in the corresponding section below.

Likewise, the distinction between AML with aberrant T-cell antigen expression and precursor T-cell LL with aberrant myeloid antigen expression may again usually be made by the combination of markers expressed and review of the cytomorphology of the blasts in the peripheral blood and/or BM aspirate smear. AML with aberrant T-cell antigen expression (ie, CD2, CD7, or CD5 but not CD3) is HLA-DR+, whereas precursor T-cell LL is generally HLA-DR- [f10.2]. However, occasional cases of AML may also be HLA-DR- [f10.4] and [f10.5] and thus must be distinguished from precursor T-cell LL with aberrant myeloid antigen expression, which occasionally may also express HLA-DR [f10.5]. Among AMLs, CD2 co-expression is almost exclusively restricted to 2 AML subtypes: M3 variant (AML, M3v) and M4-eos and their related molecular aberrations. The most valuable markers to differentiate between myeloperoxidase (MPO)-negative AML (subtype M0) and precursor LLs

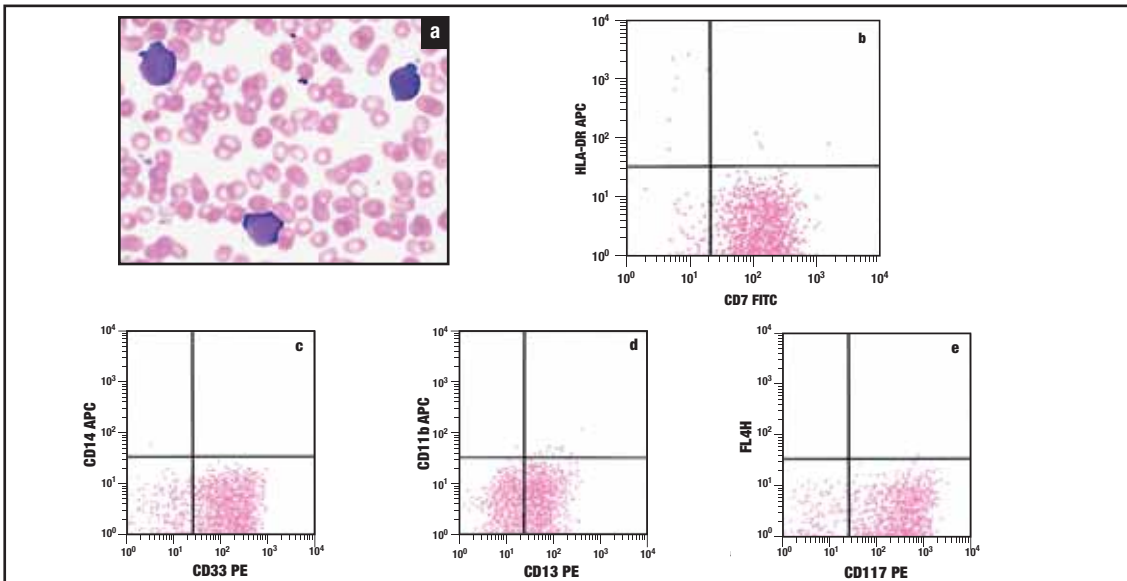
include CD13, CD33, and CD117, typical of M0, and intracytoplasmic CD79a (cCD79a), intracytoplasmic CD3 (cCD3), CD10, and CD2, typical of B-cell- or T-cell-lineage ALL [Thalhammer-Scherrer 2002]. Although cCD79a and CD10 are characteristically expressed in precursor B-cell LL, up to 60% of precursor T-cell LL may also express cCD79a and up to 47% of precursor T-cell LL, CD10 [f10.6] [Lewis 2006].

Note that, although CD117 has previously been considered an extremely useful marker of AML by FCA, subsequent reports have demonstrated CD117 expression in a small proportion of precursor T-cell LL (9%), mainly consisting of those of immature pro-T/pre-T-cell origin [f10.7]. CD117 expression is rare in precursor B-cell LL and occurs in <3%-5% of cases [Newell 2003, Suggs 2007, Sperling 1997].

In the study by Suggs [2007], of the 27% of precursor B-cell LLs expressing myeloid markers, 53% expressed CD13; 89%, CD33; and only 5%, CD117. Up to 42% of those expressing myeloid markers expressed both CD13 and CD33; and only 5%, all 3-CD13, CD33, and CD117 [f10.8]. Of the 29% of precursor T-cell LLs



**[f10.2]** This case of AML demonstrates aberrant expression of CD5 and CD7. The clinical history reveals a 47-year-old male with a history of cervical lymphadenopathy, night sweats, and weight loss for the past few months. The blasts are characterized by high nuclear:cytoplasmic ratios **a**. By flow cytometric analysis, they express CD5 **b**, CD7 **c**, CD13 **d**, CD33 **e**, CD11b **f**, CD34, and show heterogeneous expression of HLA-DR **c**. They are negative for CD2 **b**, CD14 **d**, CD15 **f**, as well as CD3, CD64, CD117, and B-cell antigens. MPO is staining >3% of blasts **g**. Conventional cytogenetic studies are normal. The diagnosis of AML with aberrant CD5 and CD7 expressions is made.



**[f10.3]** This case of AML demonstrates aberrant expression of CD7 and is HLA-DR-. The clinical history reveals a 1-year-old female with a history of trisomy 21 and pancytopenia. The blasts have markedly increased nuclear:cytoplasmic ratios **a**. The blasts variably express CD7 **b**, CD33 **c**, CD13 **d**, CD117 **e**, CD34, and CD56, and are negative for HLA-DR **b**, CD14 **c**, CD11b **d**, CD15, CD64, CD2, CD3, and CD5, as well as B-cell antigens. Conventional cytogenetic studies demonstrate a trisomy 21 and pericentric inversion of chromosome 3. The diagnosis of the peripheral blood specimen is AML with aberrant CD7 and HLA-DR-negativity. A subsequent bone marrow revealed >50% of cells staining with CD61, and was diagnosed as AML, M7.