

The Peripheral Blood Smear and Differential Diagnosis of Leukemia

As house staff officers and future clinicians you will encounter high white counts. Your personal review of the Wright's stained peripheral blood film with a hematologist or hematopathologist is an important step in diagnosis. The key points for differentiating the leukemias are summarized below.

- Blasts are very large cells (3-4 red blood cell diameters) with large irregularly shaped nuclei demonstrating open chromatin and nucleoli.
- The cytoplasm in myeloblasts may show granules or Auer rods. Bundles of Auer rods or very dense purple or azure granules (along with laboratory evidence for DIC) should make you think of acute promyelocytic leukemia which is managed differently.
- Lymphoblasts are also large cells, but the chromatin of their nuclei may be less open and the nucleoli are fewer in number and less distinct.
- In CML you will see cells with large nuclei and some nucleoli, but only a few of these cells are blasts and promyelocytes. The great majority of the cells are myelocytes (which may retain a single nucleolus) and metamyelocytes demonstrating the presence of neutrophilic, eosinophilic or basophilic maturation. The first impression may be acute leukemia, but a close examination shows the complete maturation of myeloid cells from a few blasts to bands and segmented white cells accompanied by basophilia and eosinophilia that is characteristic of CML.
- The leukemic cells in CLL are small lymphocytes—their nucleus is about the size of a red blood cell. The nucleus is round with dense, clumped chromatin. Although smudge cells are seen in all leukemias, they are so characteristic of CLL that they are included in the differential count.