Immature monocytes are usually not seen in any significant number except in malignancies involving the monocytic cell line. The monoblast is a large cell with relatively more cytoplasm than a myeloblast. The monoblast nucleus is round or oval and has finely dispersed chromatin with distinct nucleoli. The cytoplasm is blue to gray-blue and may contain small, scattered azurophilic granules, but Auer rods are rare. Monoblasts differentiate into promonocytes (see A Closer Look At… Life Cycle of Monocytes); promonocytes are considered to be monoblast equivalents for classification determination. Promonocytes have nuclear and cytoplasmic characteristics that are between those of monoblasts and mature monocytes. The nucleus is more irregular than that of a monoblast and is often indented or lobulated or has delicate folding or creasing of the nuclear membrane. Nucleoli are present but often not as distinct as in a monoblast. Nuclear chromatin is more immature and delicate than that of a mature monocyte. The cytoplasm contains uniformly distributed, fine, azurophilic granules with generally few cytoplasmic vacuoles.

Some monoblasts cannot be distinguished morphologically from other blast forms, hence the need for using other means (e.g., cytochemistry and flow cytometry) before assigning a particular lineage to a blast cell. For purposes of proficiency testing, selection of the response “monocyte, immature (promonocyte, monoblast)” should be reserved for malignant cells in myeloid neoplasms (see A Closer Look At… Acute Myeloid Leukemia and Related Neoplasms). A spectrum of immature, non-neoplastic monocytes may circulate in small numbers in reactive conditions, including cells with enlarged nuclei and small nucleoli.

**SYNONYMS**
- Monoblast, promonocyte

**VITAL STATISTICS**
- Size: 15-25 µm
- N:C ratio: 7:1 to 3:1
- Cell shape: Round to oval
- Nuclear shape: Round or indented
- Chromatin: Reticular, lacy
- Nucleoli: One to two present
- Cytoplasm: Gray to cloudy blue, few red granules

**KEY DIFFERENTIATING FEATURES**
- High N:C ratio, nucleoli, indented nucleus
- Enzyme cytochemical stain: Nonspecific esterase positive
- Immunophenotype: CD4, HLA-DR, CD13, CD33, CD36, CD38, CD64, CD11b, CD145 positive; variable CD14, CD15

**OTHER FEATURES**
- May appear as undefined “blast cell”
- Vacuoles may be seen in cytoplasm

**POTENTIAL LOOK-ALIKES**
- Other blasts (myeloblast, lymphoblast, megakaryoblast)
- Blastic plasmacytoid dendritic cell neoplasm
- Natural killer cell
- Mature monocyte
- Dysplastic myeloid or erythroid precursors
- Atypical lymphocyte (i.e., Epstein-Barr virus infection, rarely)
- Lymphoma cell or prolymphocyte
- Carcinoma

**ASSOCIATED DISEASE STATES AND CONDITIONS**
- Acute monocytic/monoblastic leukemia
- Acute myelomonocytic leukemia
- Chronic myelomonocytic leukemia
- Myelodysplastic/myeloproliferative neoplasm

**CELLULAR CHARACTERISTICS**

Monocyte, Immature (Promonocyte, Monoblast)

<table>
<thead>
<tr>
<th>Identification</th>
<th>Referee %</th>
<th>Participant %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monocyte, immature</td>
<td>80.0</td>
<td>71.1</td>
</tr>
<tr>
<td>Monocyte</td>
<td>10.0</td>
<td>14.8</td>
</tr>
</tbody>
</table>

A promonocyte is typically large like a monoblast with a moderate amount of cytoplasm. The chromatin contains a similar fine pattern; however, the nucleus demonstrates a delicate folded or grooved appearance. The nucleolus is faint to indistinct. The cytoplasmic granulation is also apparent. Occasional vacuoles may be present, but this is not a typical feature. These cells are part of a leukemic population and therefore should not be classified as benign monocytes. It can sometimes be difficult to distinguish benign from leukemic monocytes in peripheral blood. In this instance, the leukemic monocytes have morphologically distinctive immature features.