

Monocyte, Immature (Promonocyte, Monoblast)

Here's a look inside the new Color Atlas of Hematology: An Illustrated Field Guide Based on Proficiency Testing, from the section on granulocytic and monocytic cells.

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 lobu-

lated 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, CD45 positive; variable CD14, CD15

OTHER FEATURES

May appear as undefined "blast cell"
 Vacuoles may be seen in cytoplasm

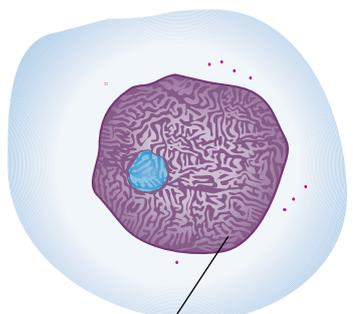
POTENTIAL LOOK-ALIKES

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 polymorphocyte
 Carcinoma

ASSOCIATED DISEASE STATES AND CONDITIONS

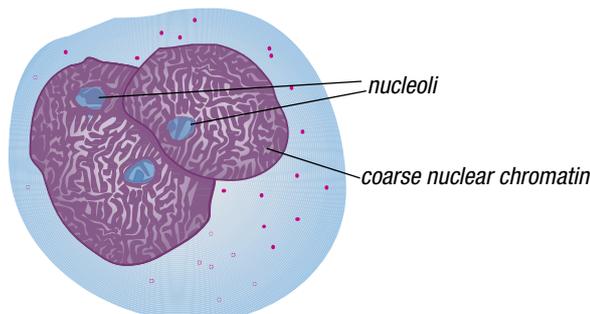
Acute monocytic/monoblastic leukemia
 Acute myelomonocytic leukemia
 Chronic myelomonocytic leukemia
 Myelodysplastic/myeloproliferative neoplasm

Monoblast

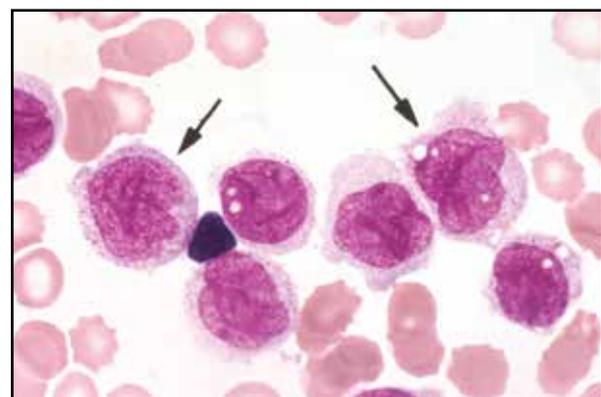
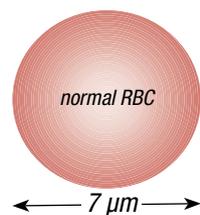


lacy chromatin and prominent nucleolus

Promonocyte



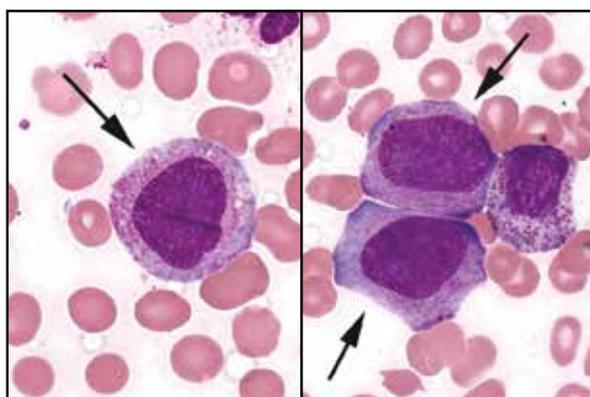
gray-blue cytoplasm containing a few red granules



BCK/BCP-17, 2002 (Blood, WG, X400)

Identification	Referee %	Participant %
Monocyte, immature	80.0	71.1
Monocyte	10.0	14.8

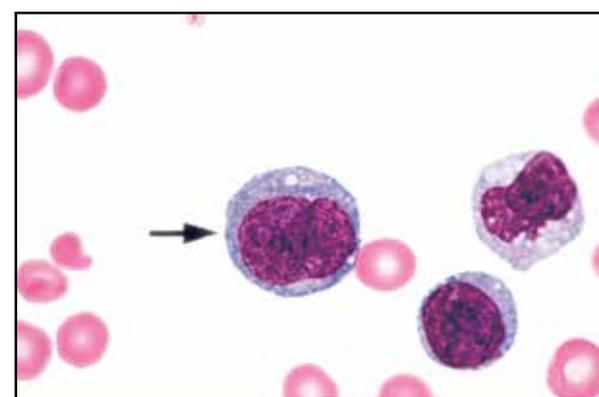
A promonocyte is typically large like a monoblast with a moderate amount of cytoplasm. The chromatin contains a similar fine pattern; however, the nucleus demonstrates a delicate folded or grooved appearance. The nucleolus is faint to indistinct. The cytoplasmic granulation is also apparent. Occasional 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.



EHE1-09, 2013 (Blood, WG, X400)

Identification	Referee %	Participant %
Monocyte, immature	-	47.0
Neutrophil, promyelocyte	-	13.7
Neutrophil, myelocyte	-	13.1
Nucleated red cell, normal or abn.	-	10.7

The arrowed cells are immature monocytes, which include monoblasts and promonocytes. These cells may have overlapping morphologic features. The arrowed cells in this image have round to oval nuclear contours with fine, lacy chromatin and distinct nucleoli, best resembling monoblasts. Monoblasts are usually large and may appear as a typical myeloblast or may have increased basophilic cytoplasm and lower N:C ratios, as seen in this image.



BCK/BCP-14/XHP-20, 2009 (Blood, WG, X360)

Identification	Referee %	Participant %
Immature monocyte	66.7	59.7
Monoblast	28.2	17.5

The cell indicated by the arrow is an immature monocyte. These cells differ from mature monocytes in that their chromatin pattern is finer than the clumped pattern of a mature monocyte. Also the nucleus lacks the more prominent indentation of a mature monocyte and nucleoli are present. There is a high N:C ratio and the cytoplasm is gray-blue. The other nucleated cells in the field have similar nuclear and cytoplasmic characteristics and are also examples of immature monocytes.



Virtual Peripheral Blood Smear
http://capatholgy/H16_151-09-1

