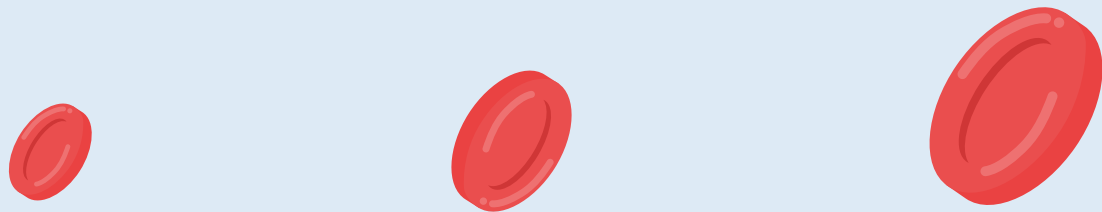




MACROCYTOSIS

TERM DEFINITION

Macrocytosis refers to red blood cells (RBCs) that are larger than normal.



MICROCYTE

NORMOCYTE

MACROCYTE

<90

MEAN CELL VOLUME (MCV) IN fL UNITS

>90

CAUSES

**Megaloblastosis* refers to characteristic pathological changes in the bone marrow.

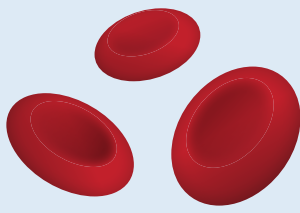
MEGALOBLASTIC*

- 🩸 Vitamin B12 deficiency
- 🩸 Folate deficiency
- 🩸 Drugs

NON- MEGALOBLASTIC

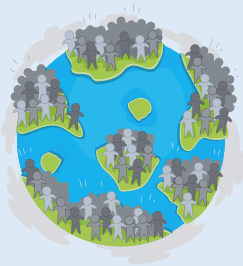
- 🩸 Reticulocytosis
- 🩸 Liver disease
- 🩸 Alcohol
- 🩸 Hypothyroidism
- 🩸 Drugs
- 🩸 Myelodysplasia

CLINICAL PEARLS



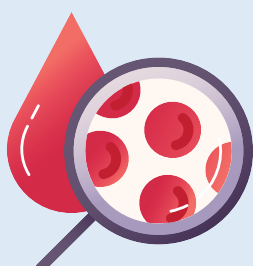
5-7 μ M

is the diameter/size of a normal RBC



3%

prevalence of macrocytosis in the general adult population



40%

prevalence of macrocytosis occurring without anemia



20%

the % of macrocytosis cases that remain unexplained after an exhaustive workup



MCV > 130 fL

almost always explained by B12/folate deficiency or drugs (e.g. hydroxyurea)

PROXIMATE MECHANISMS

B12 and folate deficiency cause nuclear-cytoplasmic asynchrony with loss of cell division. Liver disease leads to increased incorporation of lipids in the red cell membrane.

Mechanisms of other causes are poorly understood.

EVOLUTIONARY MECHANISMS



Evolution has selected for an optimal **hematocrit** (Hct).

$$\text{Hct} = \text{MCV} \times \text{RBC count}$$

Some animals meet their target Hct with many small RBCs, whereas others have fewer numbers of large cells. In mammals, Hct is typically 40-45%.

DID YOU KNOW?

HISTORY OF MEDICINE

In the late 1800s, macrocytosis was considered synonymous with vitamin B12 or folate deficiency. Only later were other causes identified.

NOTES

ATTRIBUTIONS

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The **Blood** Project
ENCYCLOPEDIA OF BLOOD