

Morphology	Cause	Disorder
Acanthocytes	Abnormal ratio of membrane lipids (e.g., cholesterol)	Severe liver disease (spur cell anemias) Abetalipoproteinemia (metabolic disease)
Agglutinated cells	Ig-M	Cold agglutinin disease
Basophilic stippling (Wright's stain)	Defective heme synthesis (remnant ribosomal material)	Lead poisoning Thalassemia MDS (not necessarily microcytic) Sideroblastic anemia
Heinz bodies	Precipitated Hg (causing bite cells)	G6PD deficiency Alpha-thal
Howell-jolly bodies	Splenic hypofunction or absence	Sickle cell (functional asplenia) Post-splenectomy (warm antibody hemolytic anemia, ITP)
Hypochromia	Hemoglobin synthesis deficiency	<i>Iron deficiency</i> Thalassemia Sideroblastic anemia
Schistocytes	Traumatic disruption of membrane	MAHA (DIC, TTP, HUS, metastatic cancer) Intravascular prostheses Calcific aortic heart valve Embolized tumors in high flow vessels Trauma to extremities
Sickled cells	Polymerization of hbS	Sickle cell
Spherocytes	Loss of membrane	Hereditary spherocytosis Autoimmune hemolytic anemia (microspherocytes)
Stacking of RBC (rouleau)	Excess IgG in circulation	Multiple myeloma
Target cells	Increased ratio of RBC surface to volume	Thalassemia Sickle cell, HbC Liver disease (lipid disorder) Abetalipoproteinemia Post-splenectomy
Teardrop cells	Bone marrow infiltration or fibrosis (leukoerythroblastosis)	MMM

Anemia	MCV	Cause	Retic count	Disorders
Microcytic	< 80	Hb synthesis deficiency (chain or heme)	Elevated (hemolysis)	Alpha-thal (hbH) Sickle-beta-thal (high RDW) Treated iron deficiency
			Low or normal	<i>Iron deficiency (high RDW)</i> Thal trait (not a hemolytic anemia) Beta-thal (low production of RBC) Chronic disease Lead poisoning Sideroblastic anemia (defective heme synthesis)
Normocytic	80-100	Underlying systemic illness or complex presentation of hematologic disorder (combined iron, B-12 deficiency)	Elevated	Bleeding Hemolysis
			Low or normal	Bone marrow disorder Early B-12, folate, iron deficiency Kidney disease Acute blood loss Chronic disease Medications Mixed disorders
Macrocytic	> 100	Megaloblastic (impaired DNA synthesis)		<i>B-12 deficiency</i> <i>Folate deficiency</i> Medications Inherited metabolic disease
			Non-megaloblastic	Elevated
			Low or normal	Liver disease Myelodysplasia Alcoholism Hypothyroidism

