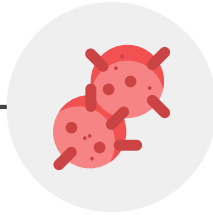


# **RBC Morphology**

# ABOUT RED BLOOD CELLS

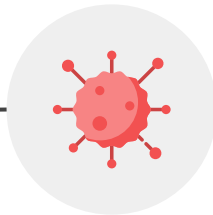
Round with  
Flattish Indented  
Centers



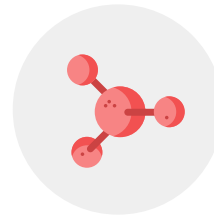
They are made  
in the bone  
marrow



Hemoglobin is  
the protein  
inside that  
carries oxygen &  
CO<sub>2</sub>



Live for about  
120 days and  
then they die



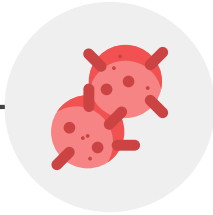
# NORMAL RED BLOOD CELLS



- Minimal variation in size and shape
- Central Pallor is  $\frac{1}{3}$  of the RBC
- They are a pink color
- Most of the membranes are smooth and circular

# ABNORMALITIES WITH RBCs

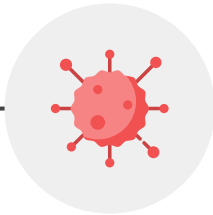
SIZE



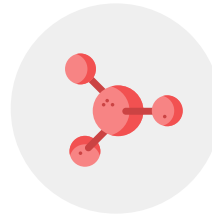
COLOR



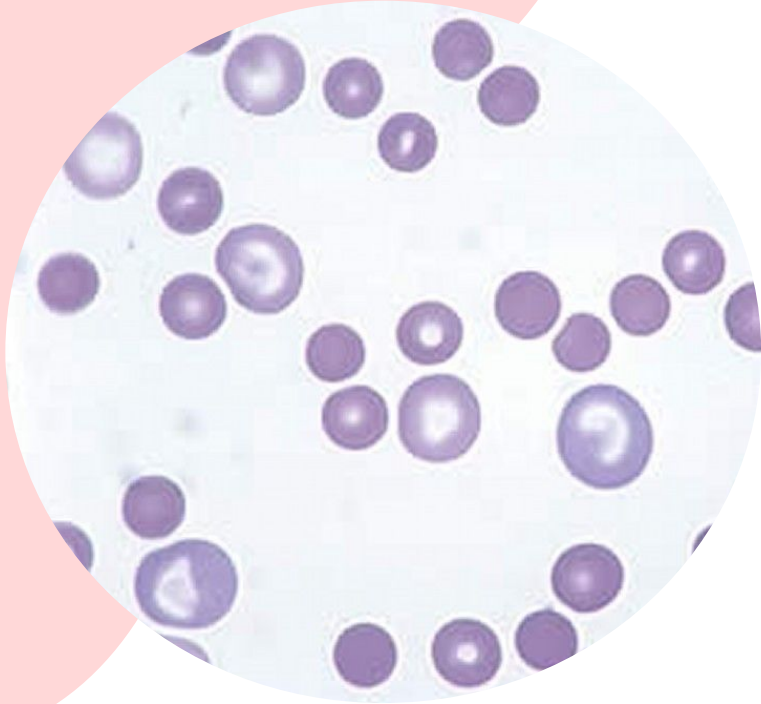
SHAPE



NUCLEUS



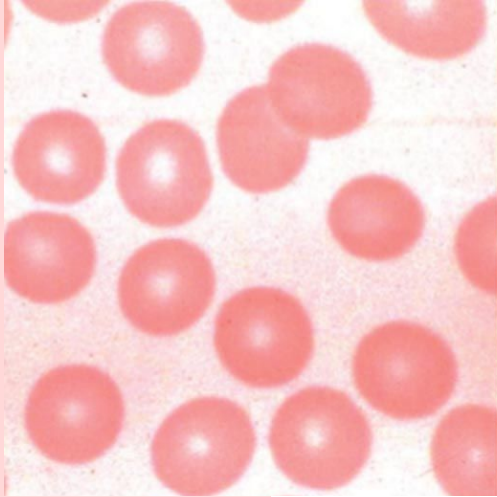
# Size : ANISOCYTOSIS



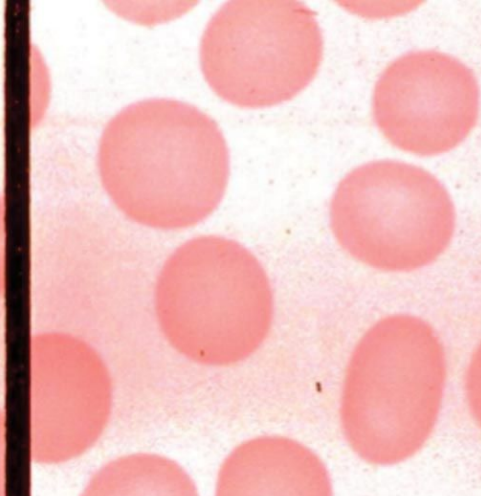
- Variation in Sizes Throughout Slide
- Due to Anemia

# Size: Macrocytosis

NORMAL RBCS

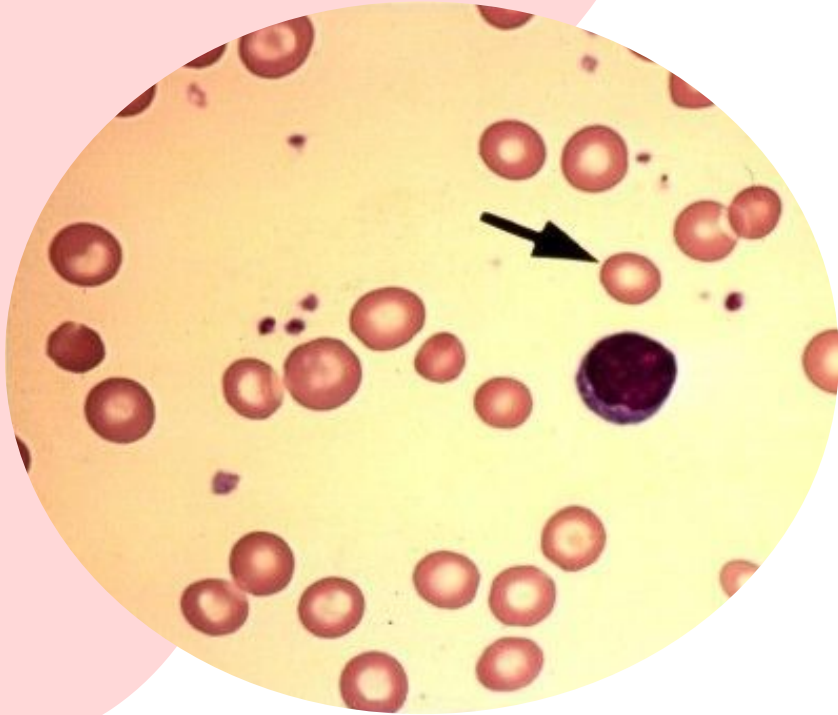


Macrocytic



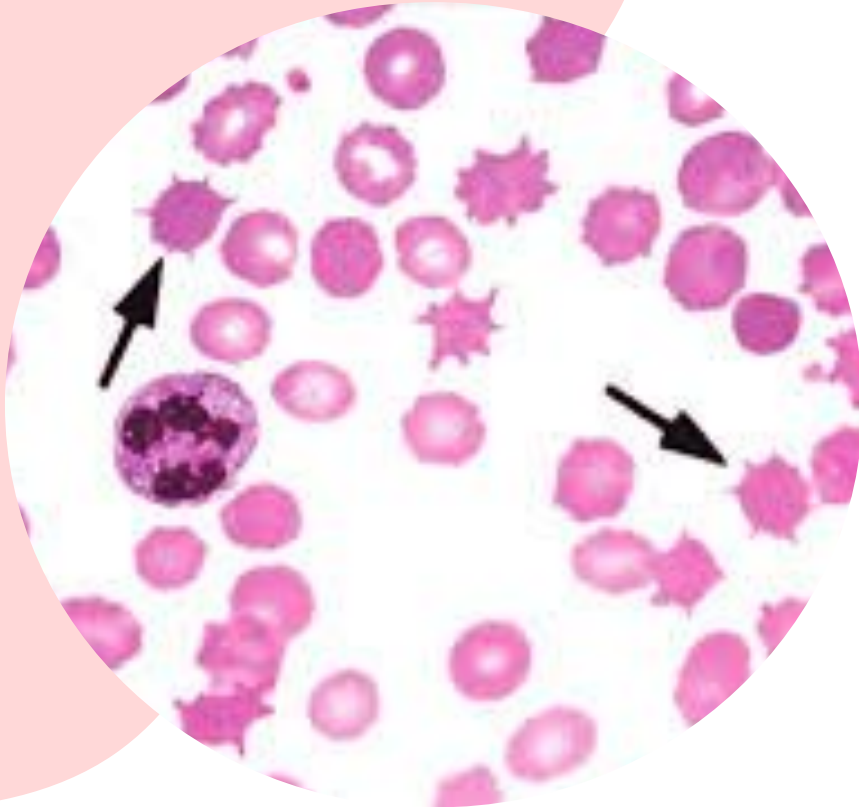
- Large in Size
- Difficult to See Central Pallor
- Due to Vitamin B12 Deficiency, Liver Disease, or Thyroid Disease

# Size: Microcytosis



- Small in Size
- Larger Central Pallor
- Due to Iron Deficiency from external blood loss or Anemia

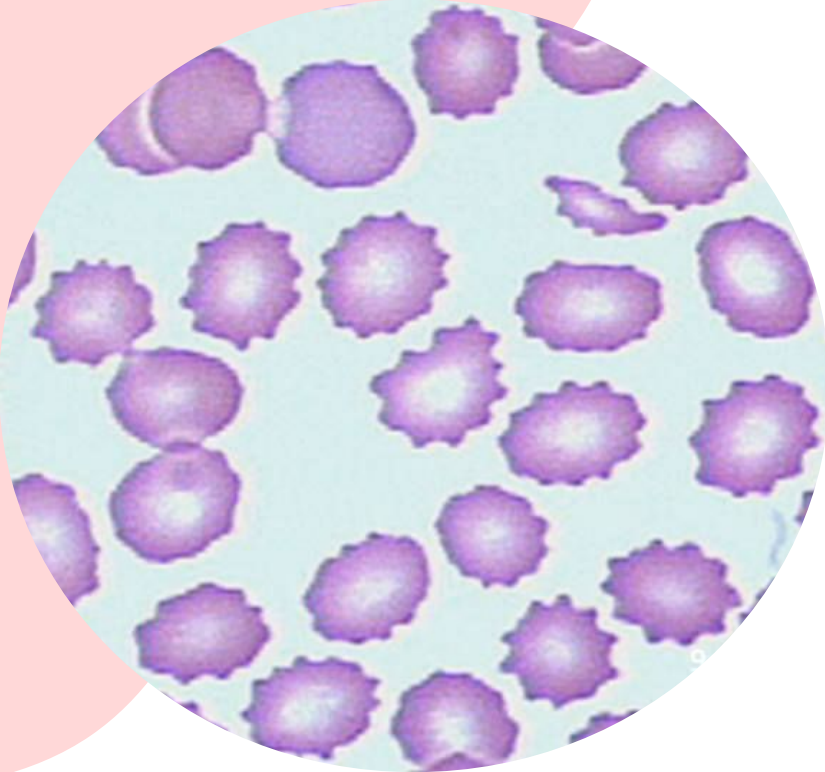
# Shape: Acanthocytes



- Spur Cells
- Irregular Shape with 5-10 club shaped spicules (points/tips)
- Seen after splenectomies or with liver disease, also during fragmentation (DIC) or Iron Deficiency Anemia

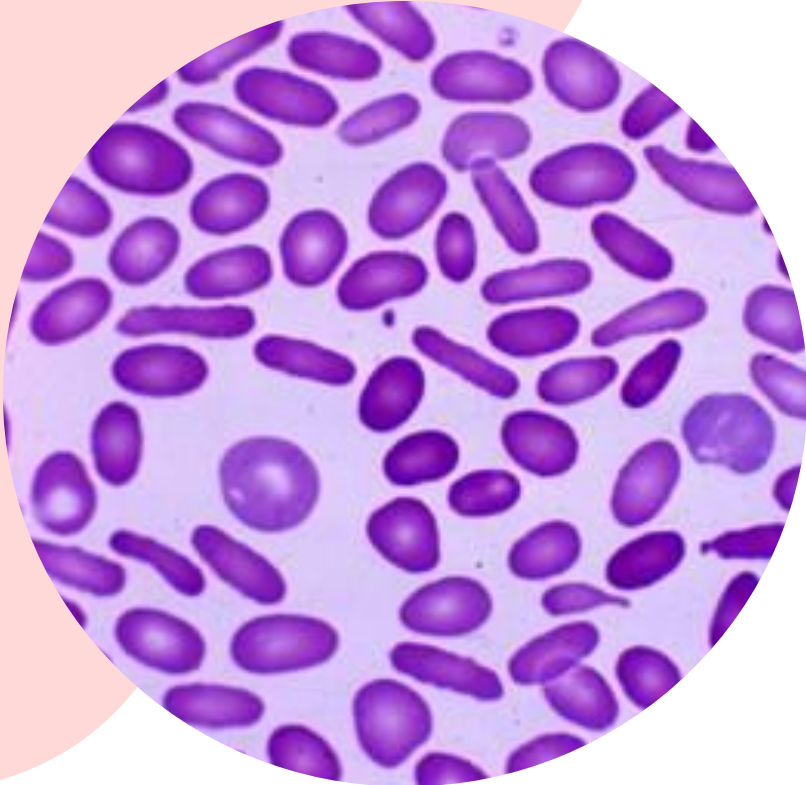


# Shape: Echinocytes



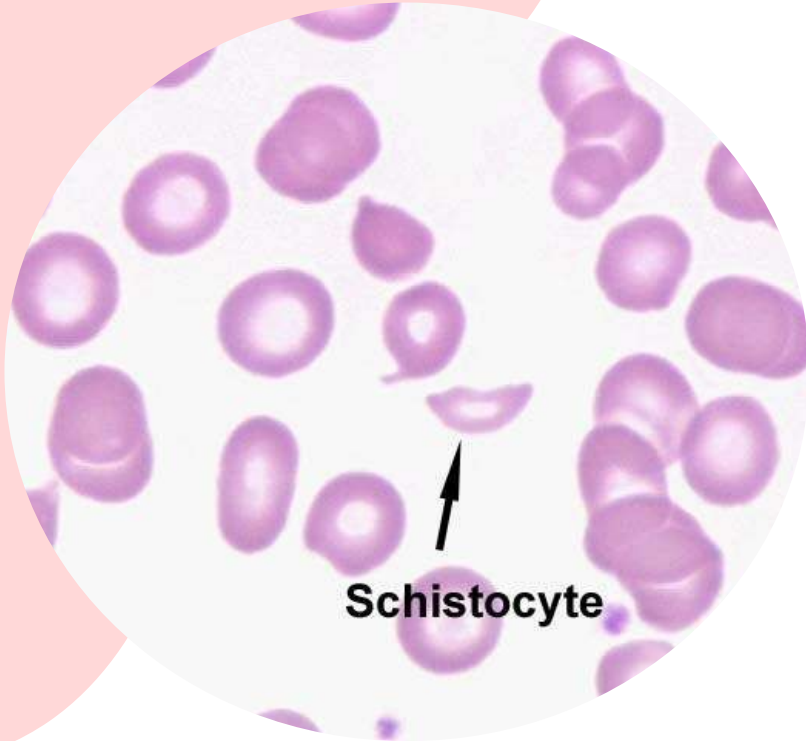
- Burr or Crenated Cells
- 10-30 Blunt Projections
- Can be seen with Renal Failure, or RBC that do not have the ability to produce ATP (energy carrying molecule)

# Shape: Elliptocytes



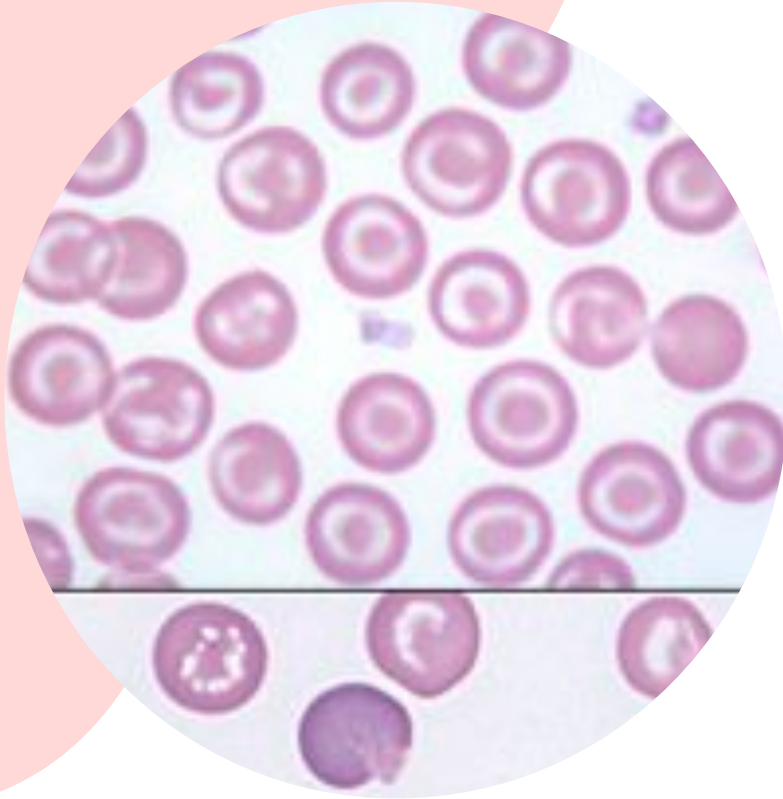
- Oval Elliptical Shaped
- Due to various Anemias
- Myelofibrosis  
(Uncommon Bone Marrow Cancer)

# Shape: Fragmented Cells



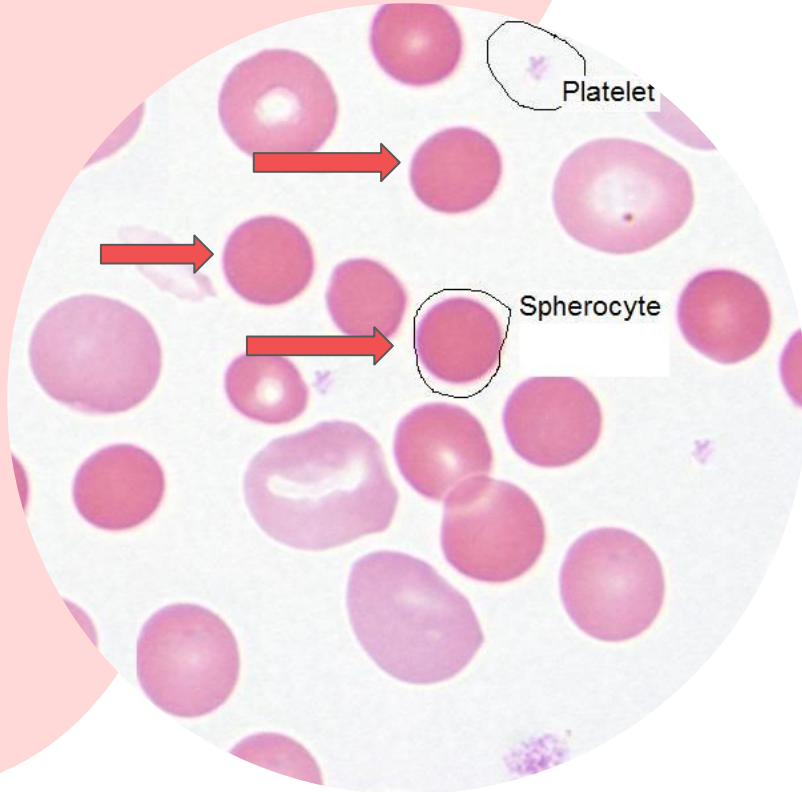
- Schistocytes or Helmet Cells
- Due to DIC when they pass through fibrin clots
- or due to Thrombocytopenia

# Shape: Codocytes



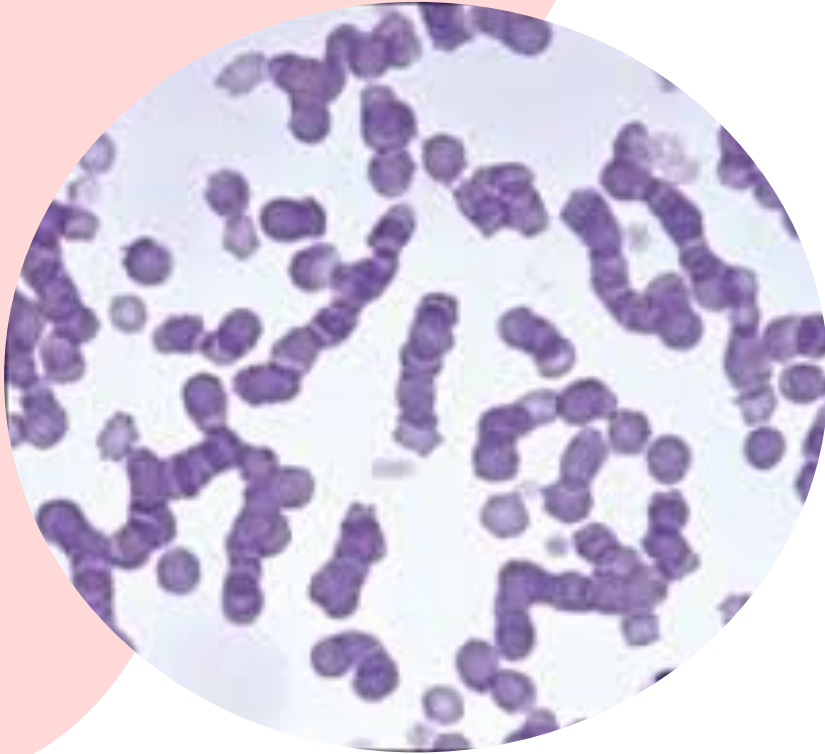
- Target Cells or Bull's Eye
- Due to Liver Disease or regenerative anemia

# Shape: Spherocytes



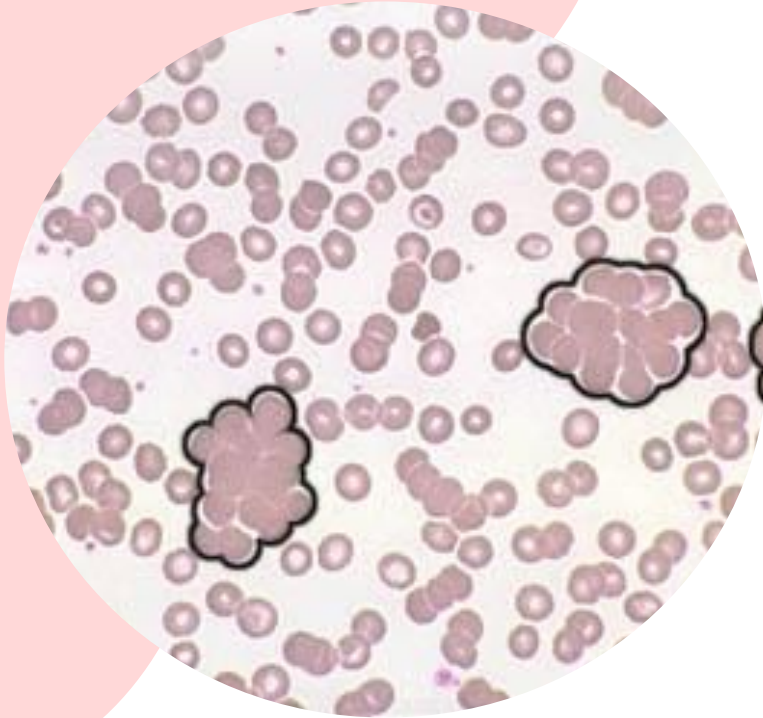
- Smaller Sphere Shaped (Baseballs)
- No obvious Central Pallor & Darker Pink Color
- Due to IMHA, coral snake envenomation, and bee stings

# PATTERN : Rouleaux



- Coin Stacking Formation or like the Rolo Candy
- Indicates hyperglobulinemia
- Can be seen with inflammations or cancer

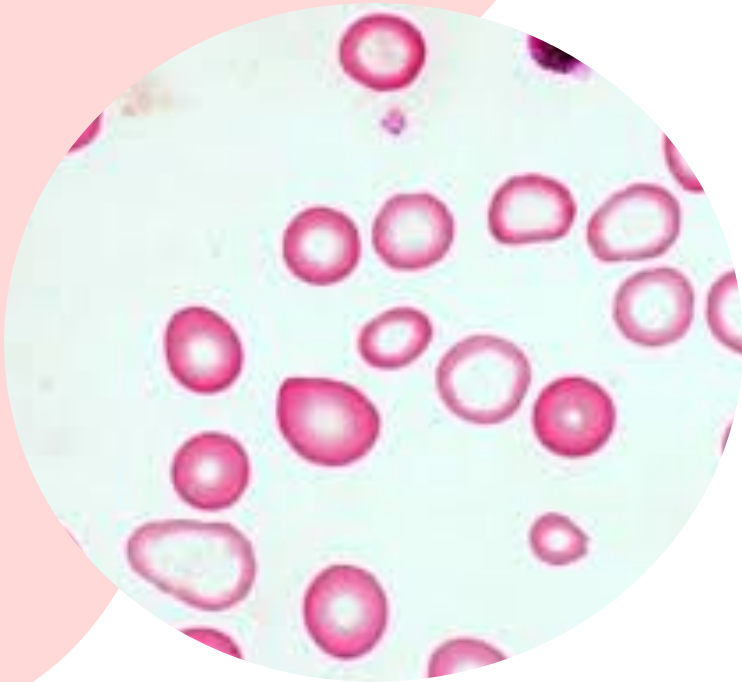
# PATTERN : Agglutination



- Clumping Formation
- Can be seen in IMHA or patients with a reaction to a blood transfusion.



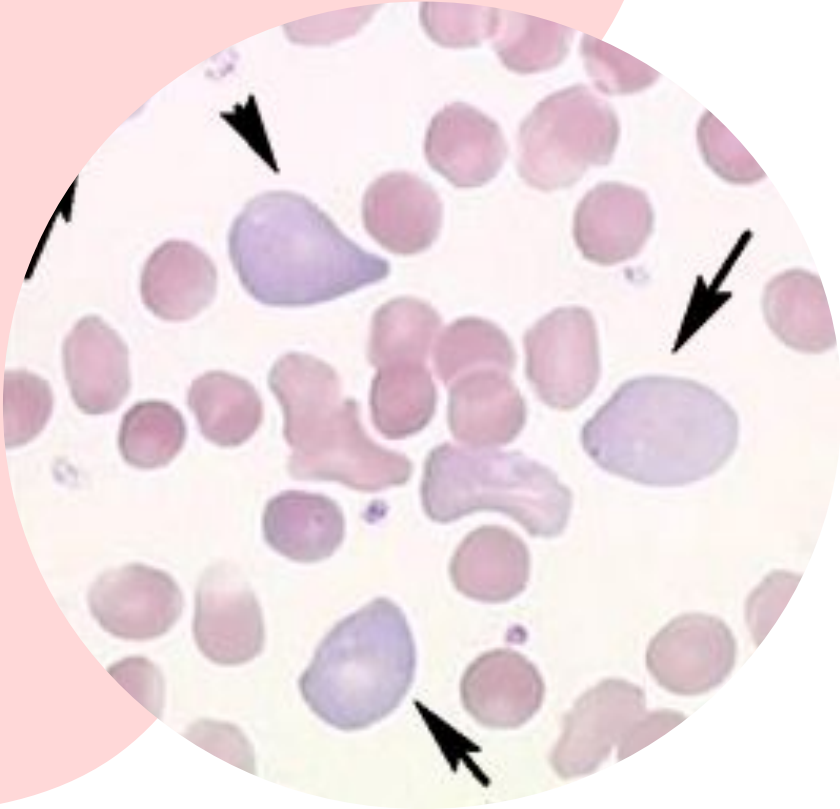
# Color: Hypochromasia



- Pale Color
- Large Hollow Middle of the Cell
- Insufficient Hemoglobin

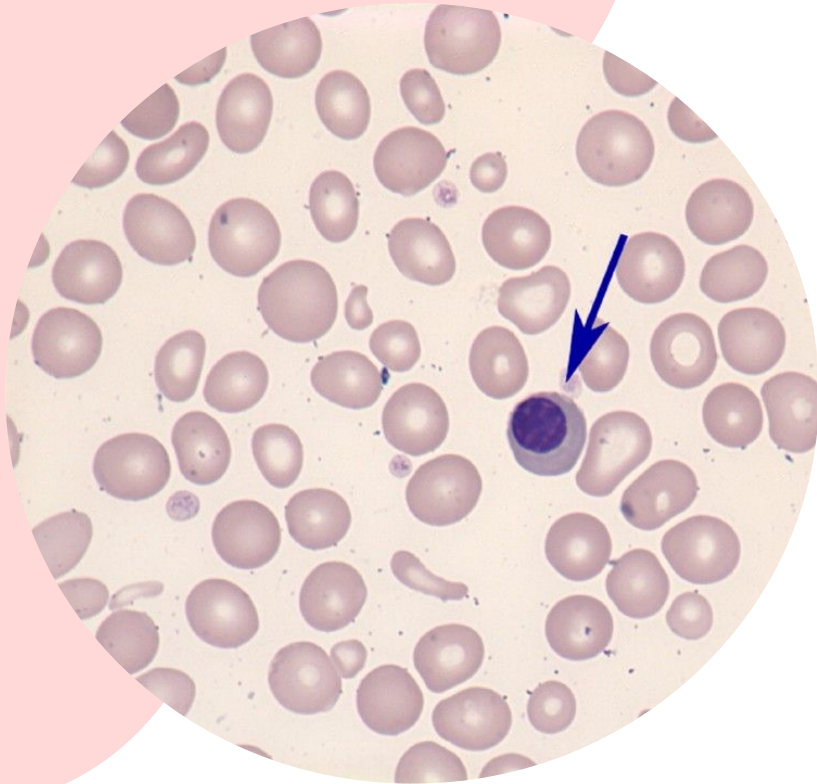


# Color: Polychromasia



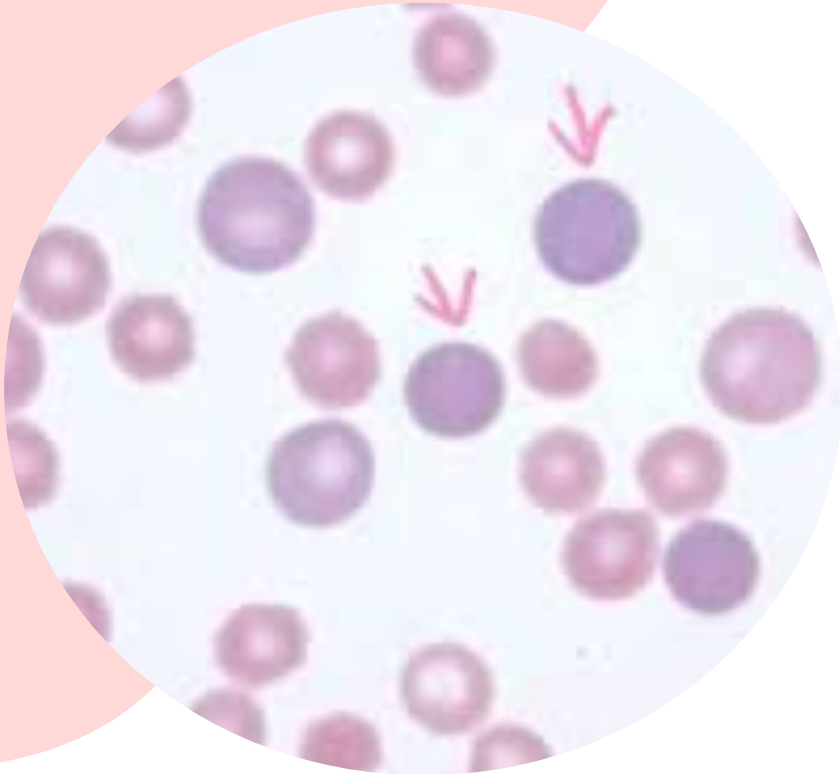
- Blue Staining
- Increase in RNA content
- Immature due to early release from bone marrow

# Color: Nucleated RBCs



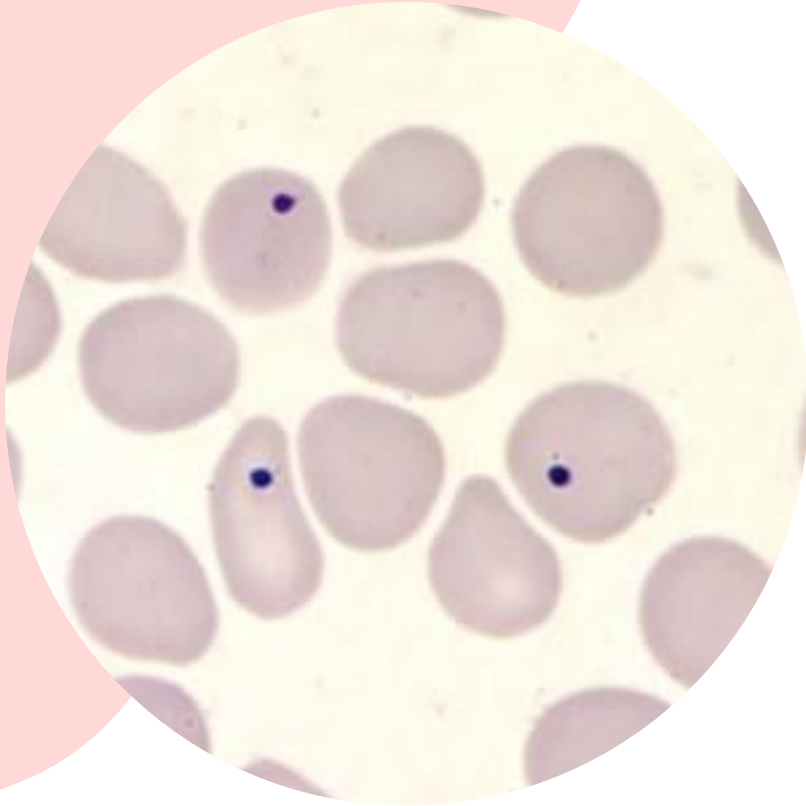
- Due to severe anemia, tumors/cancers, or chronic low levels of oxygen
- Dark Sphere Nucleus inside of a RBC

# Color: Reticulocytes



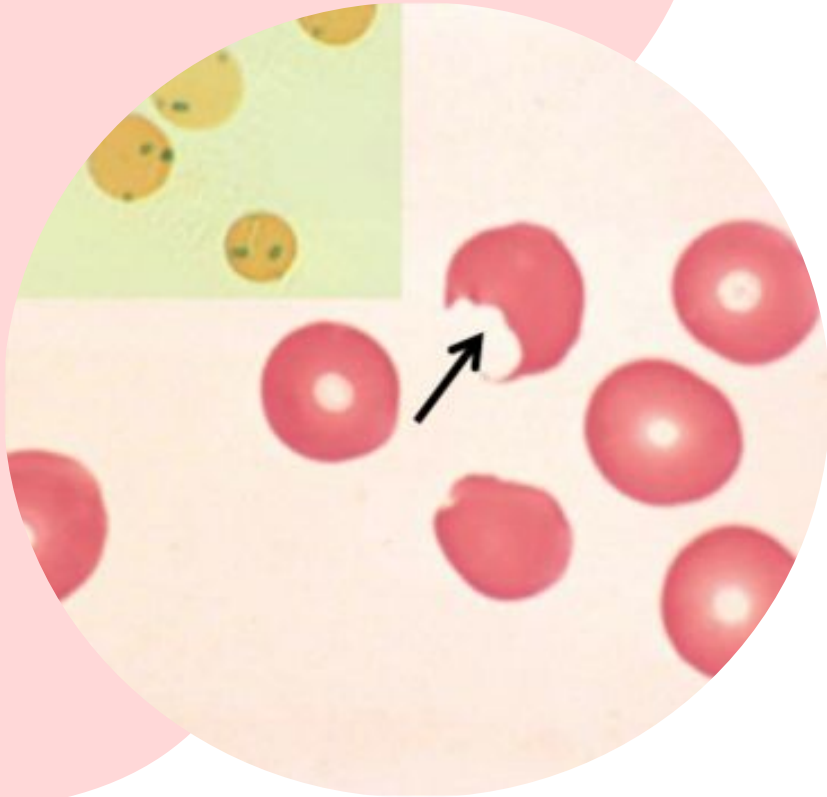
- Immature RBCs, bigger than spherocytes
- Blue/Purple Coloring
- Due to Acute Blood Loss, Hypoxia, RBC Destruction or IMHA

# Color: Howell- Jolly Bodies



- Small Round Remnants of nuclear DNA inside of cell
- Seen with Hemolytic Anemias

# Color: Heinz Bodies & Bite Cells



- Splenic macrophages remove Heinz bodies from the membrane of red blood cells, which results in a "bitten" appearance of the cell.
- Heinz Bodies can be seen with a special dye that looks like a dot on the membrane.