FORMED ELEMENTS OF BLOOD

BLOOD IS A CONNECTIVE TISSUE!

- ***Blood is a special type of connective tissue composed of formed elements in a fluid matrix. Plasma is the fluid portion, called serum when depleted of fibrinogen. The formed elements include erythrocytes (red blood cells), leukocytes (white blood cells), and platelets (thrombocytes in birds).***

MAMMALS

ERYTHROCYTES

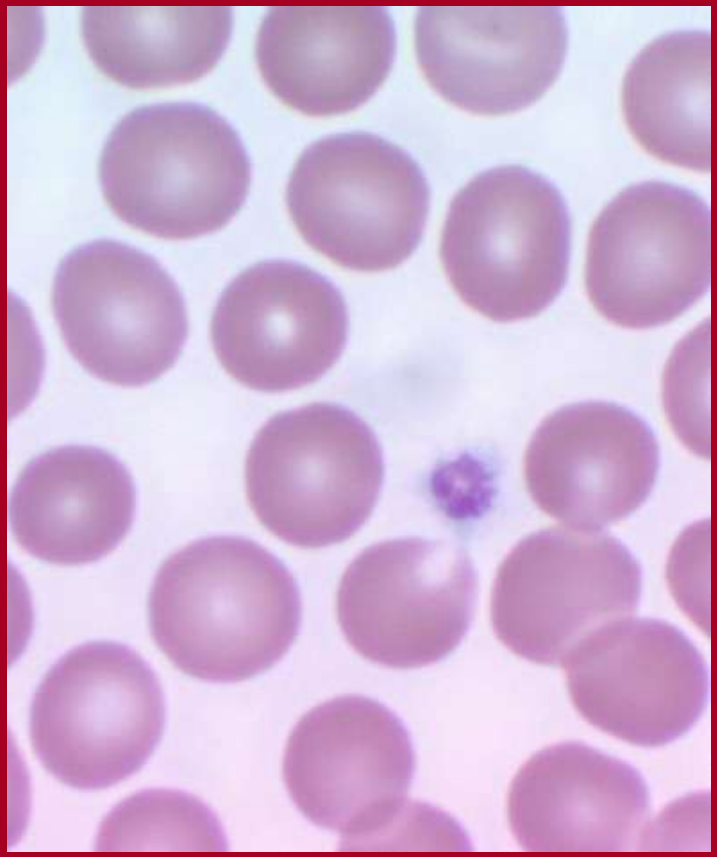
"RED BLOOD CELLS"

- Small Uniform size.
- Biconcave disks.
- Flexible.

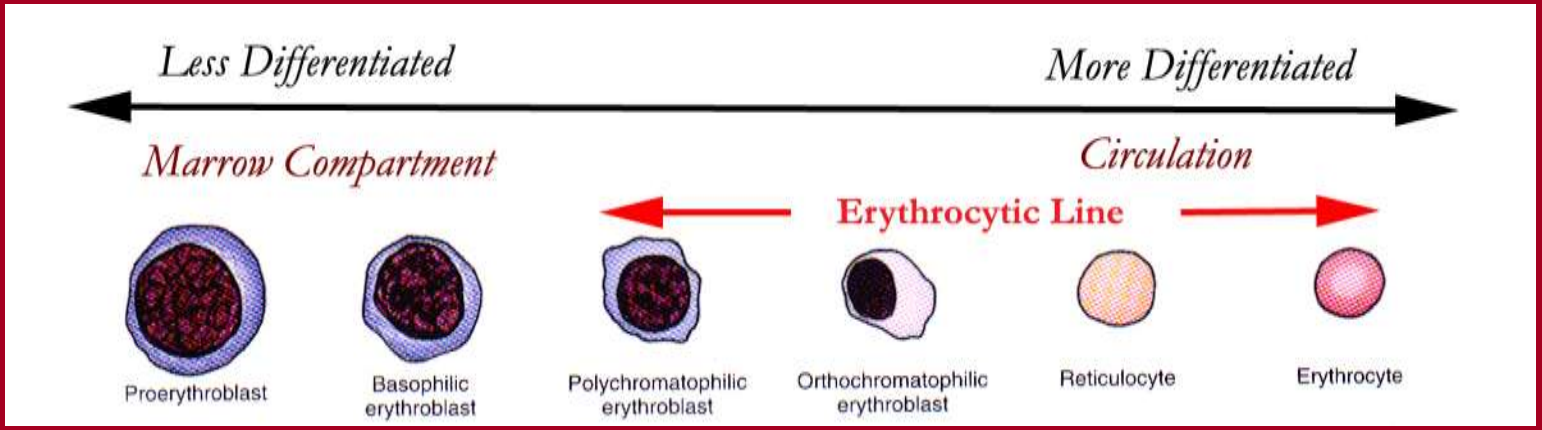
Enucleated, No organelles

- Limited Life.
- adapted to transport oxygen and carbon dioxide to and from tissues

-The average diameter of erythrocytes in smear varies with the species. The erythrocytes of the dog are largest (7.0 .µm), while those of the goat are the smallest (4.1.µm).

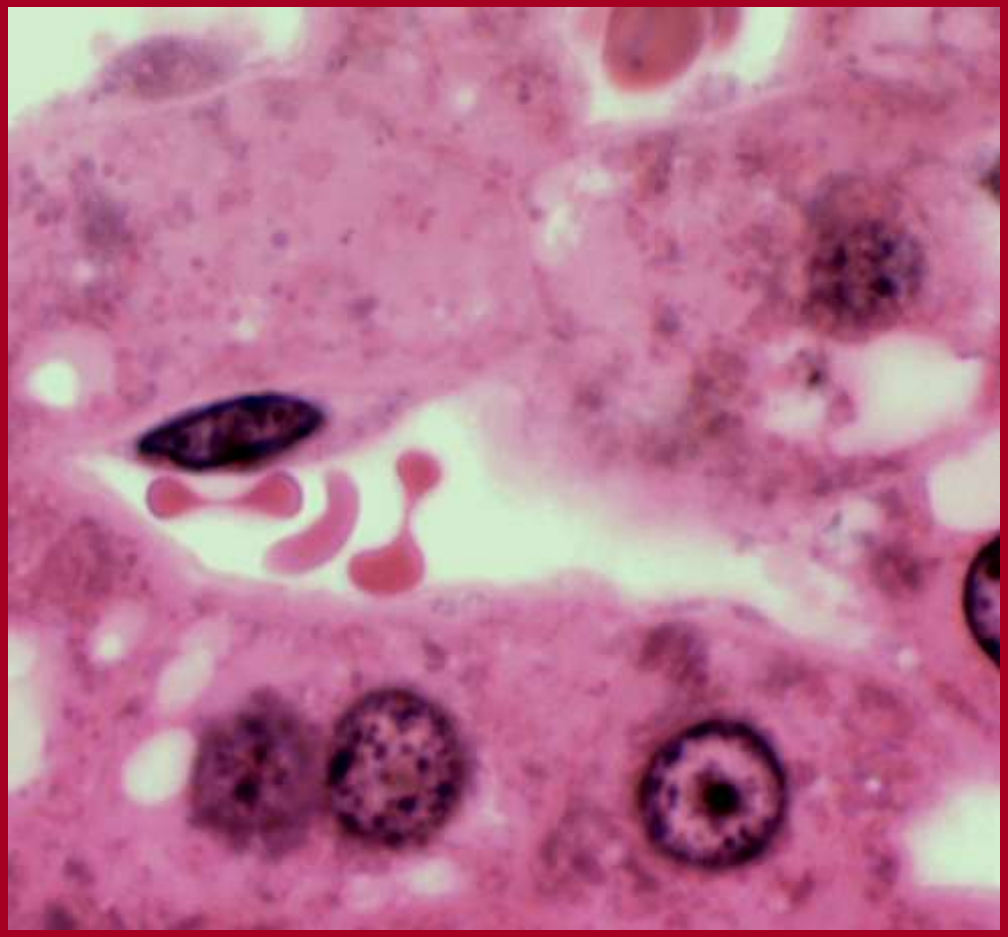


RBC's Impart the color to blood due to Hgb



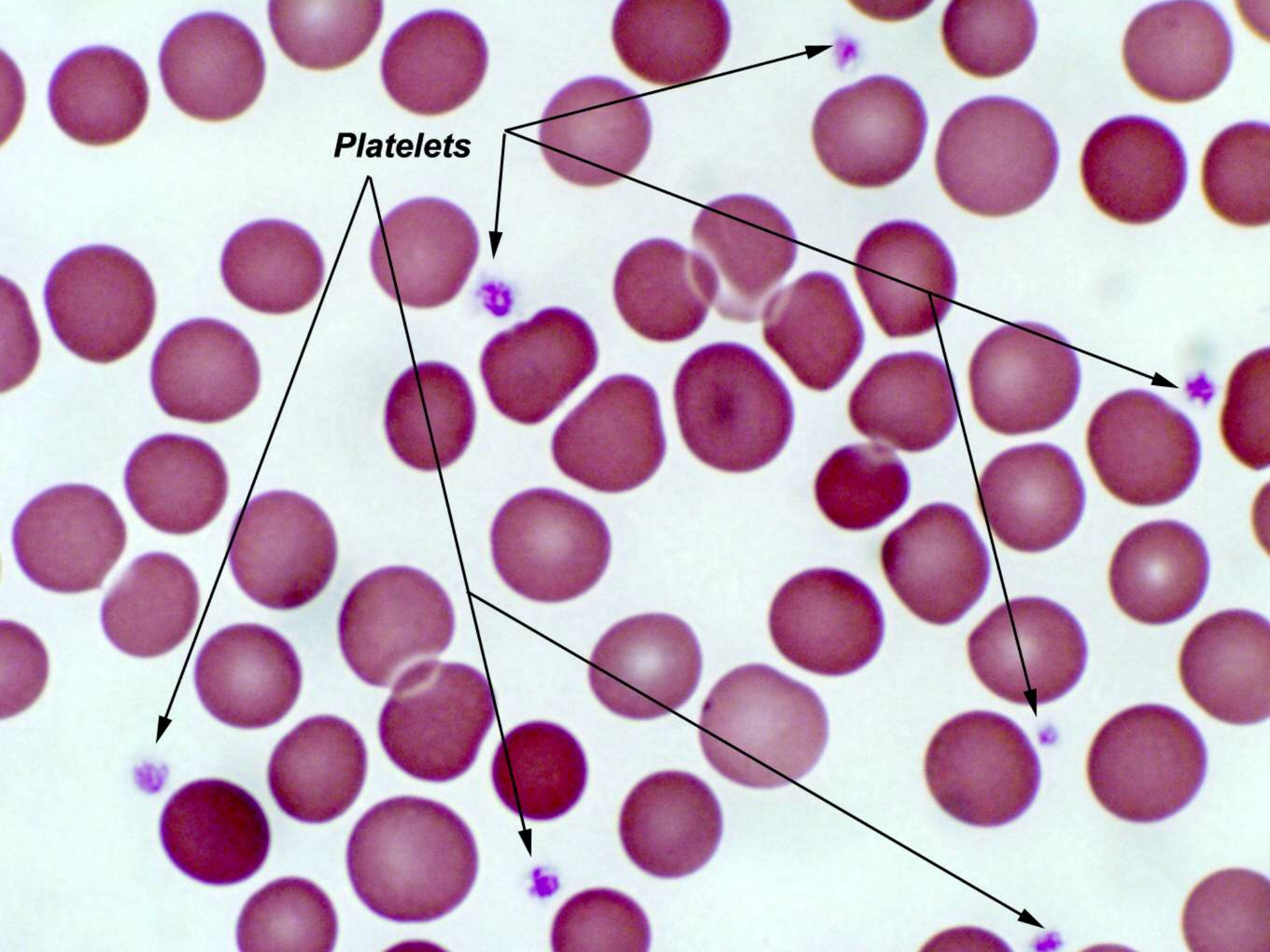
ERYTHROCYTES

- **“Red blood cells”**
  - **Not cells anymore**
  - **Most numerous formed element**
  - **Oxygen transport only function**
  - **Senescent after 90-120 days.**
  - ***sometimes adhere to each other, forming an arrangement resembling a stack of coins, this occurs commonly in the horse and cat. It is rare in ruminants.***



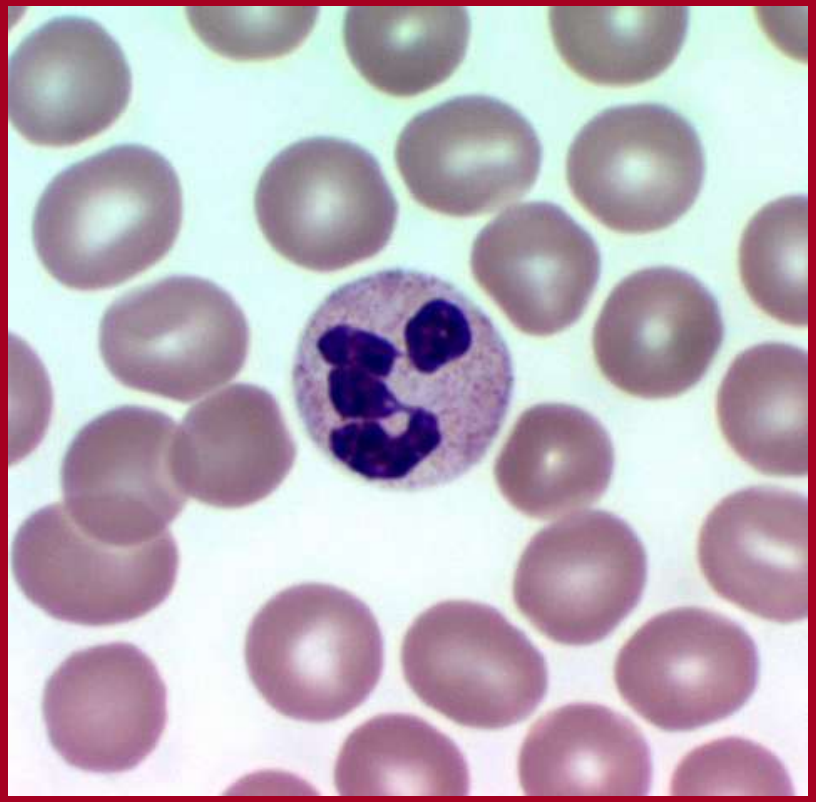
PLATELETS

- Cell fragments
  - Precursor in bone marrow
- Responsible for intial clot formation
- Smallest formed element


Platelets

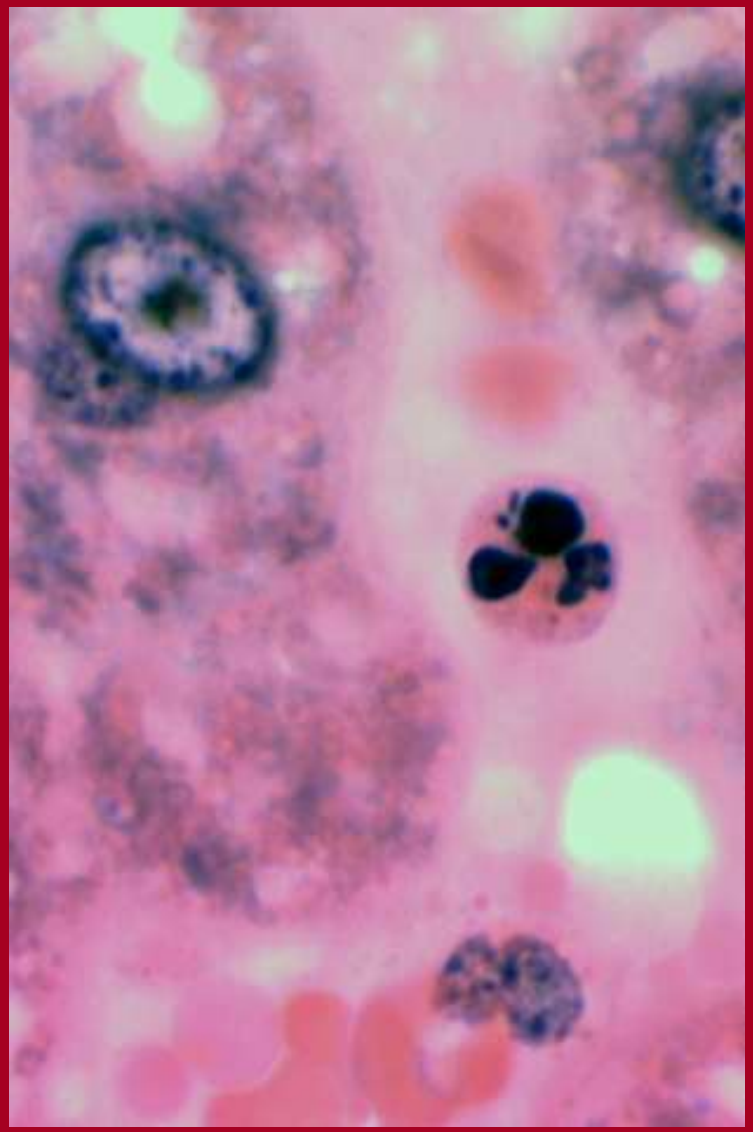
PLATELETS IN ACTION

GRANULOCYTES: NEUTROPHILS



- Multilobed nucleus
- Granules in cytoplasm
  - Lysosomes
- Most numerous of granulocytes
- Phagocytic
- First cell of inflammation response

GRANULOCYTES: NEUTROPHILS

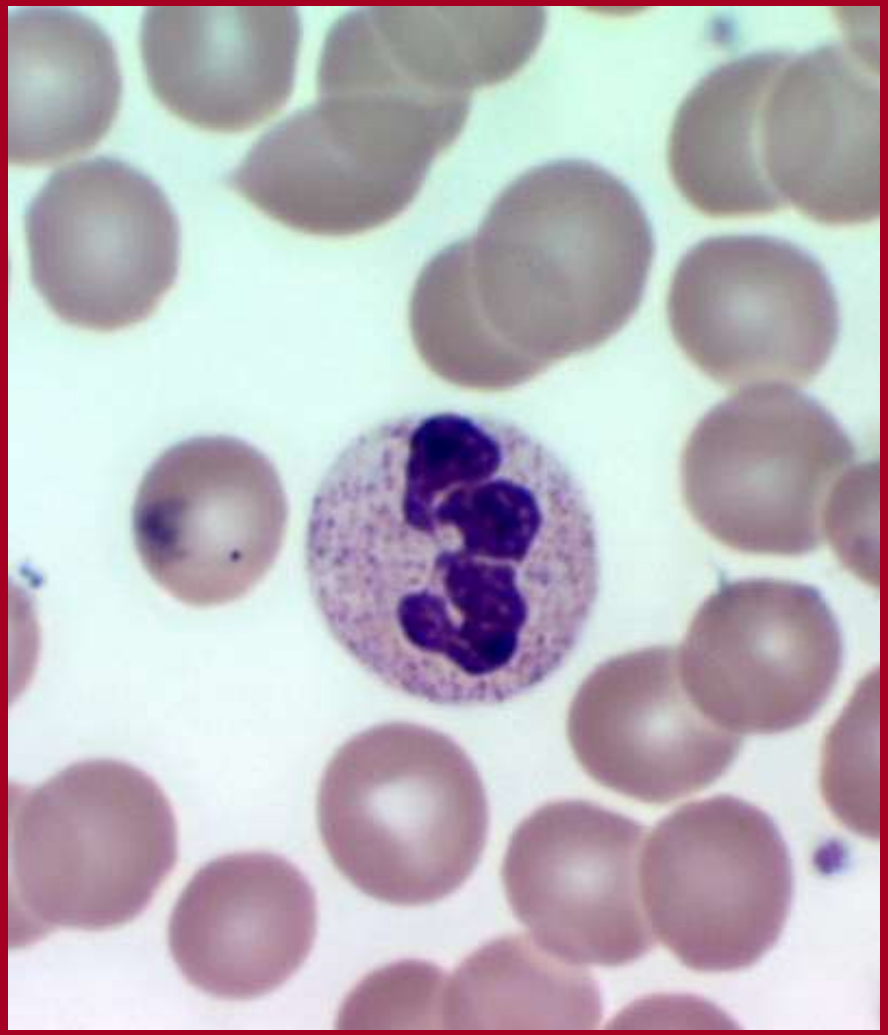


- *In situ* appear smaller
- Nuclear configuration is clue
- Found in circulatory spaces
- Found in CT's especially in inflammation

GRANULOCYTES: EOSINOPHILS

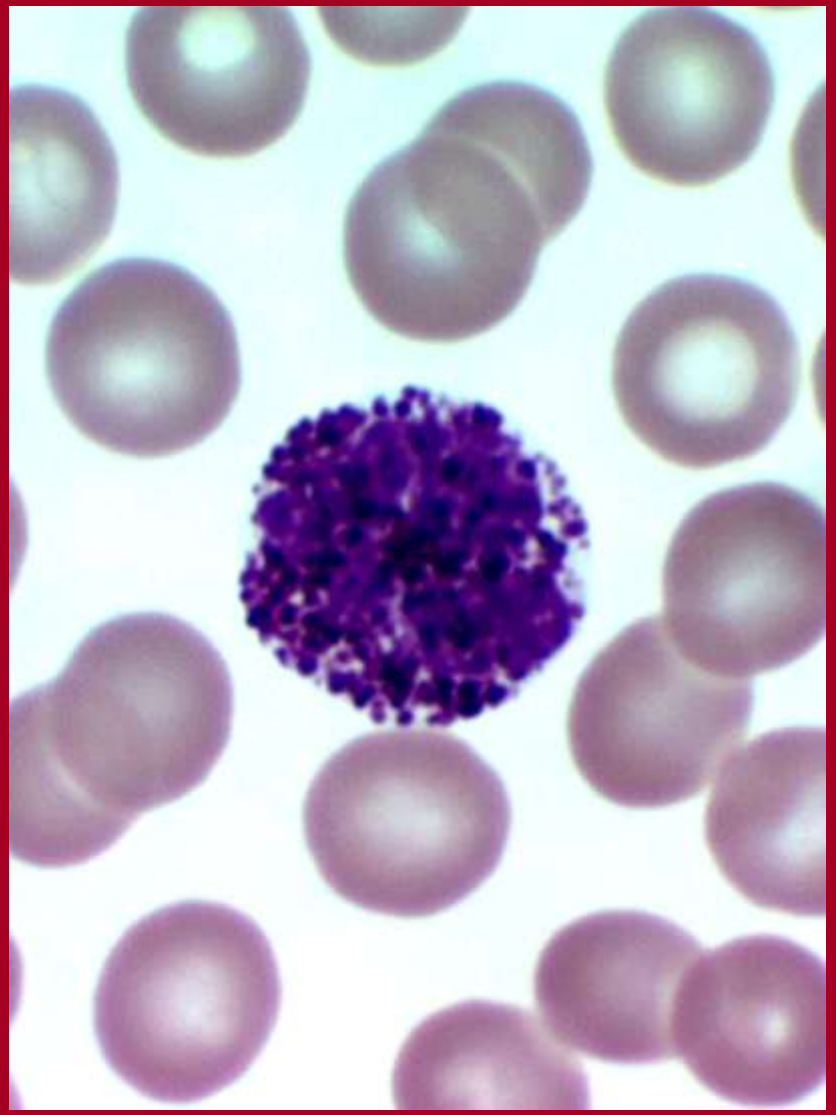
- Prominent granules
- Bilobed nucleus
- Phagocytic
  - Ag/Ab complexes
- Visible in sites of allergic responses
- Species differences in numbers and granule sizes

NEUTROPHIL & EOSINOPHIL

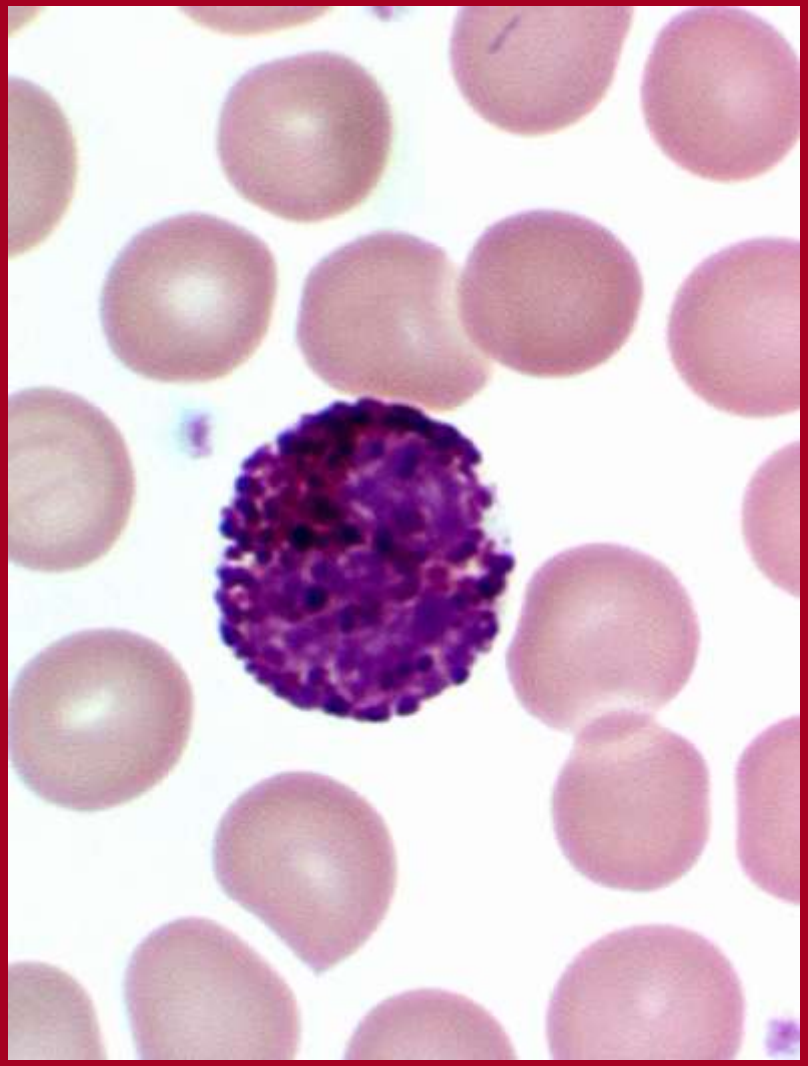


GRANULOCYTES: BASOPHIL

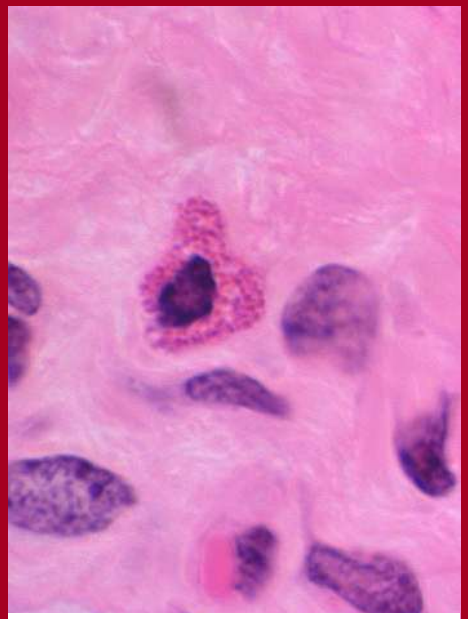
- Rarest cell of blood
  - Absent in some species
- Precursor of Mast Cell of CT
  - Granules contain histamine & heparin



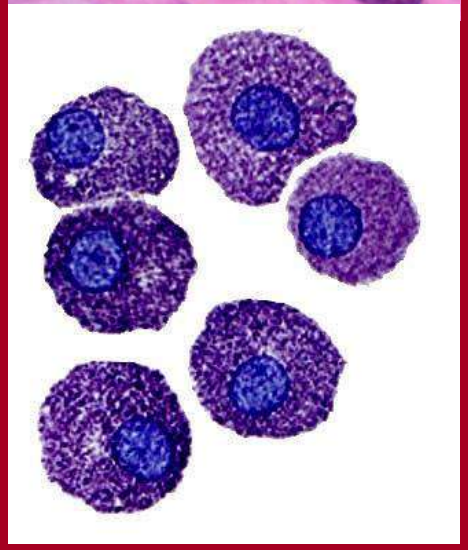
BASOPHIL & MAST CELL



Basophil in Smear, Wright Stain

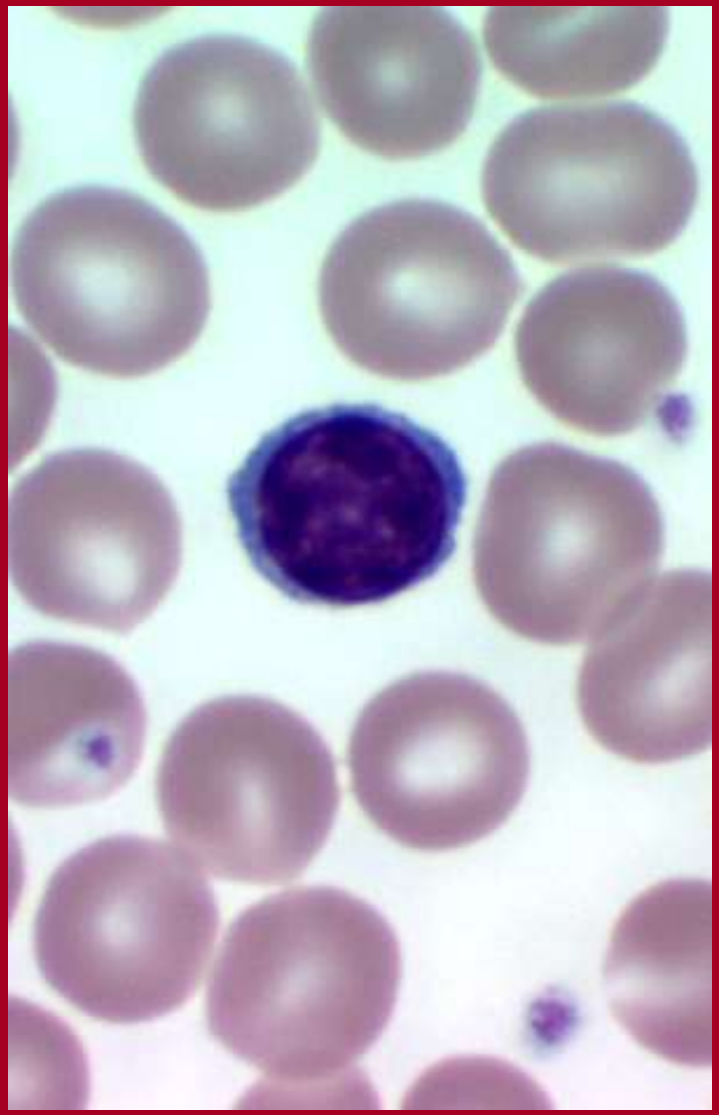


Mast Cells H&E



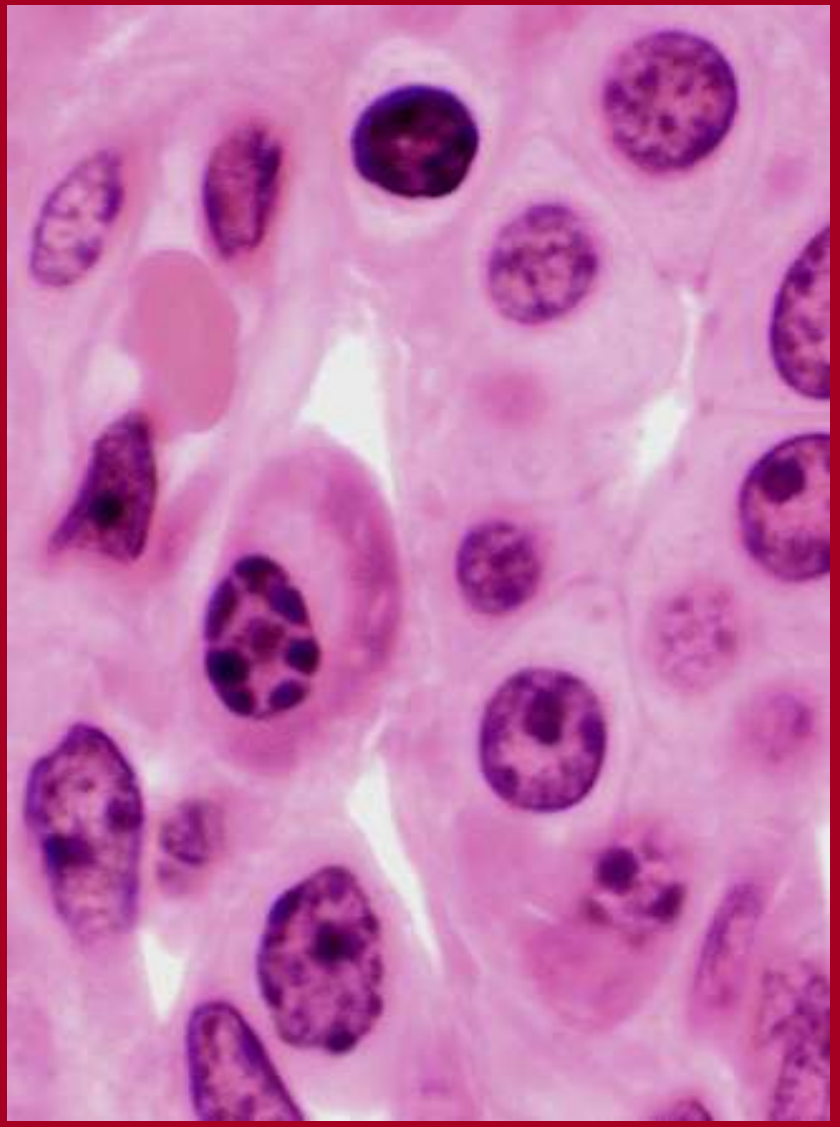
Mast Cells TB

AGRANULOCYTES: LYMPHOCYTE



- The cytoplasm is very few in margin.
- Nucleus condensed & inactive
- Quiescent cell in transit to CT
  - Immune response functions

LYMPHOCYTE & PLASMA CELL



AGRANULOCYTES: MONOCYTE

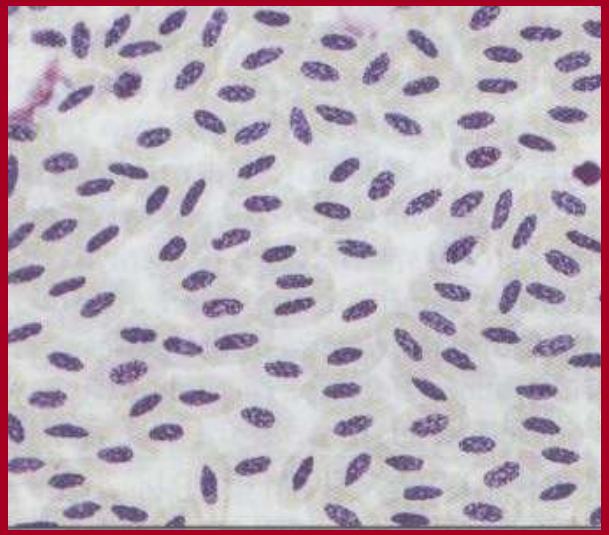
- Very large cell
- More cytoplasm than lymphocyte
- Precursor to macrophages of CT
- Indented “spaghetti & meat balls” nucleus

- **Texas A&M University**
- **UK Chlorine Council**

Dr. James Homer Wright
1869-1928

Dedicated to Dr
James Homer Wright
(1869-1928)

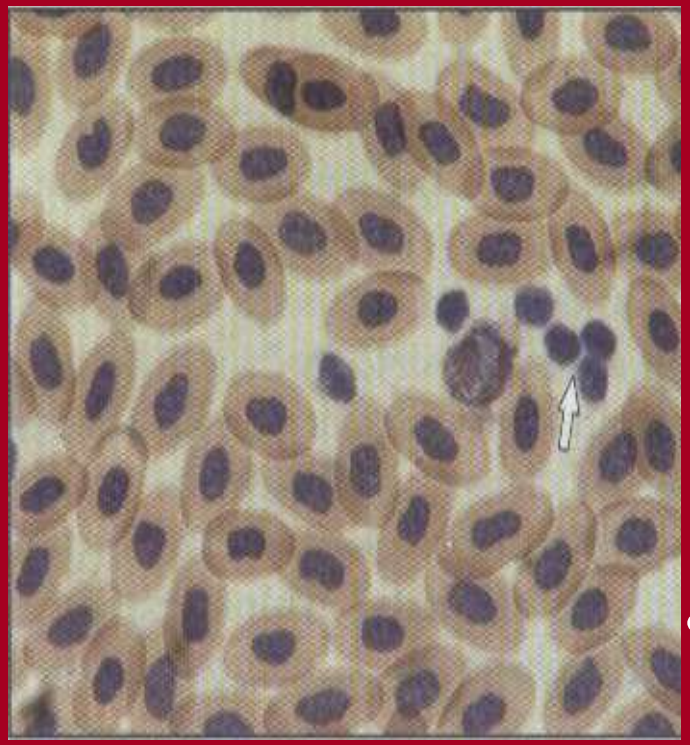
Birds
Mature erythrocytes



- *: of the birds are very different from those of domestic mammals. They are large, elongated, flat cells with an oval nucleus. They range from approximately 9 to 12 µm long and 6 to 8 µm wide. Their size varies with the breed and the sex of the bird.*

Birds

Thrombocytes:



- *:*
- *are nucleated cells, related in function to the platelets of mammals. They are smaller and less elongated than erythrocytes and have a larger, more round nucleus.*
- *The pale, dull blue cytoplasm.*

Lymphocytes are the most numerous of the leukocytes in the chicken. Their size varies from small to large, as in mammals. The cytoplasm is slightly basophilic.

Heterophils are the most abundant of the granulocytes. Both heterophils and eosinophil have acidophilic, specific granules. The granules of the heterophil are rod shaped.

The basophils of the chicken are much more numerous than in mammals. Their specific granules are deeply basophilic, and the nucleus is usually unlobed and pale.