HOW TO LOOK AT A BLOOD SLIDE

STAINED WITH

WRIGHT STAIN

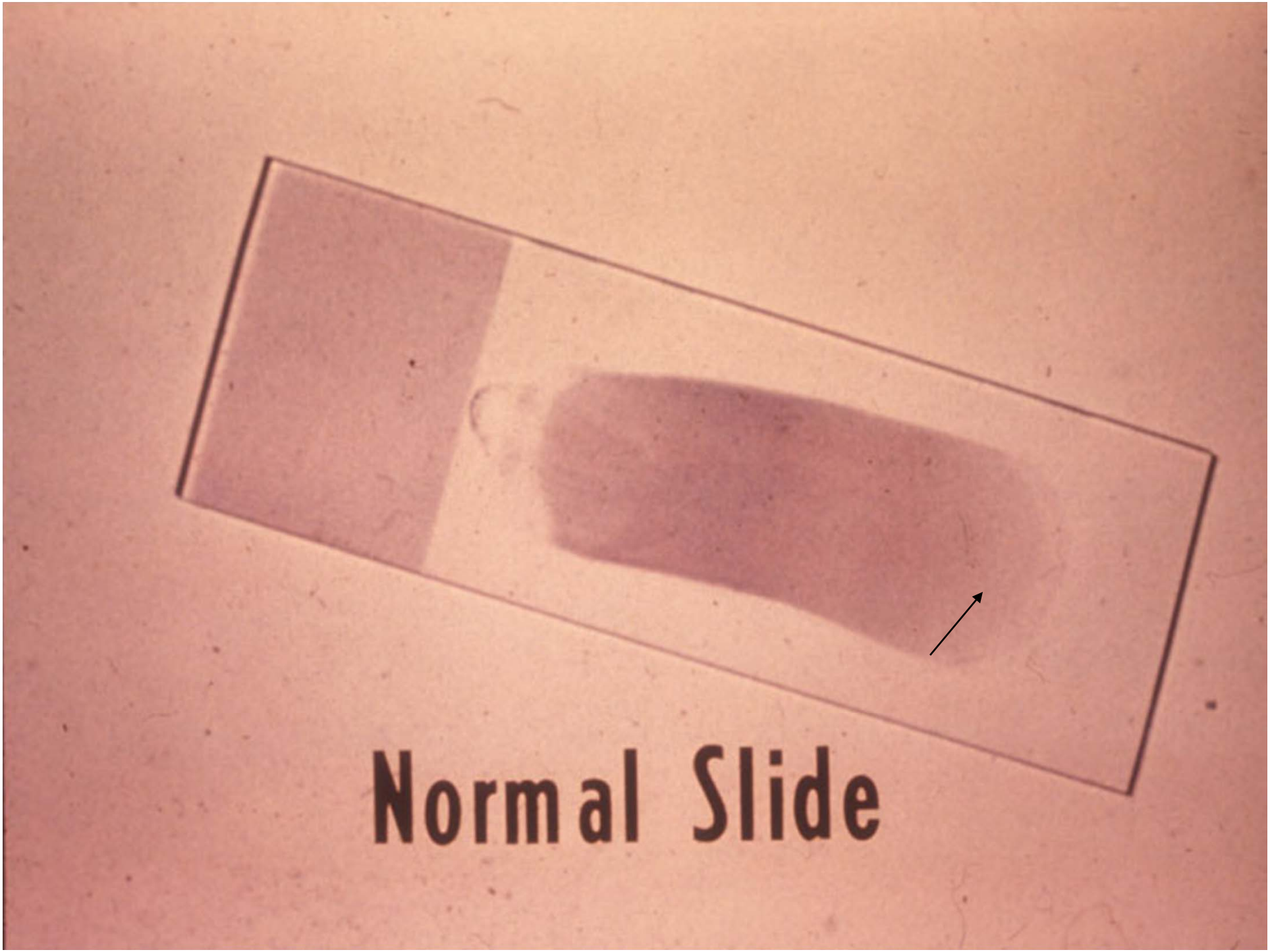
WITH CONTRIBUTIONS FROM JAN SCHWENN

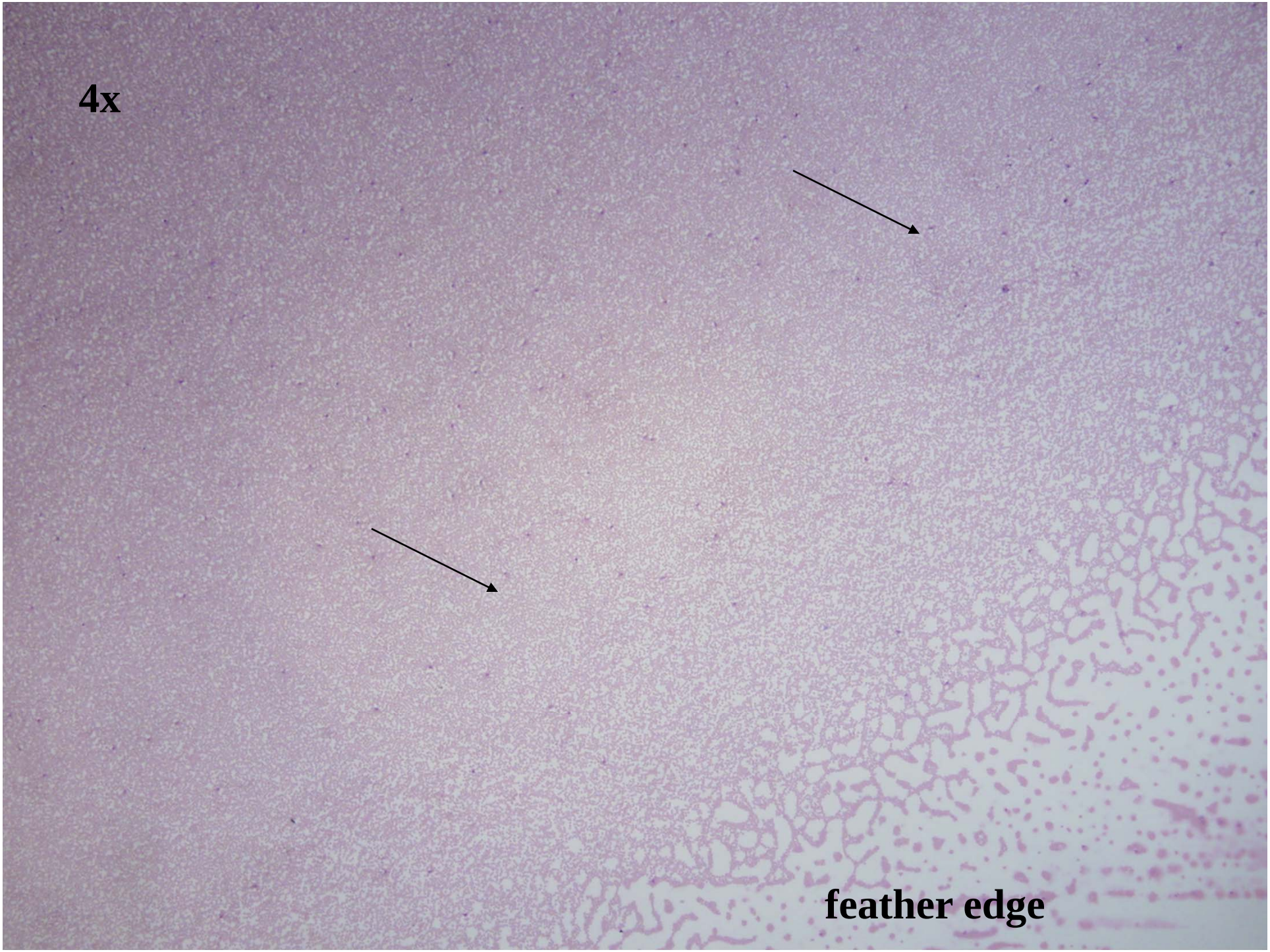
FIND A GOOD VIEWING AREA
Low Power (10x)

A properly made blood smear is divided into

- region where the drop of blood was applied to the slide (left part of smear on next slide)
- central region
- feather edge (right part of smear on next two slides)

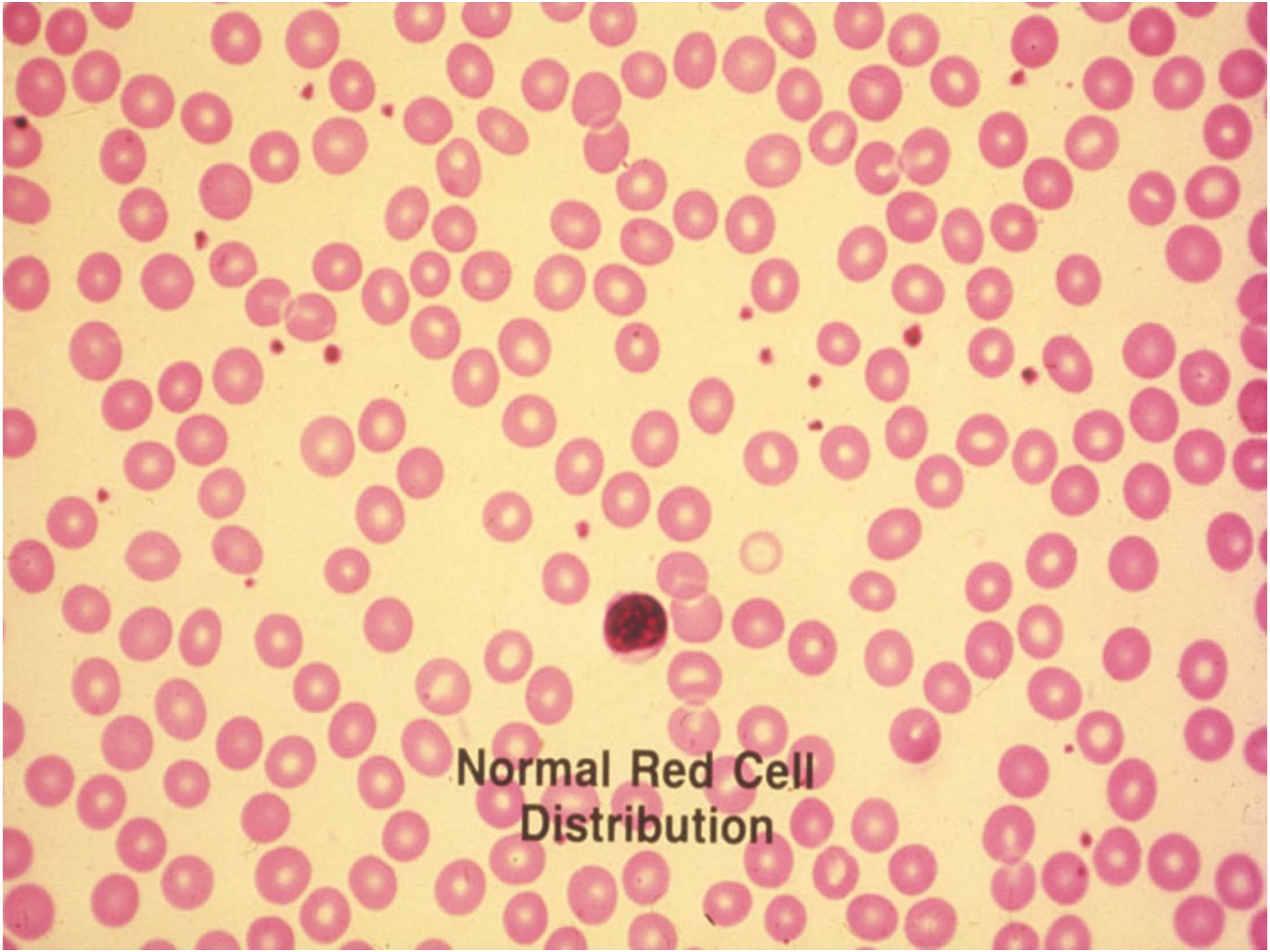
Appropriate viewing region is in from the feather edge where RBCs are just touching each other (beginning at arrows on next 2 slides).


Normal Slide


4x
feather edge

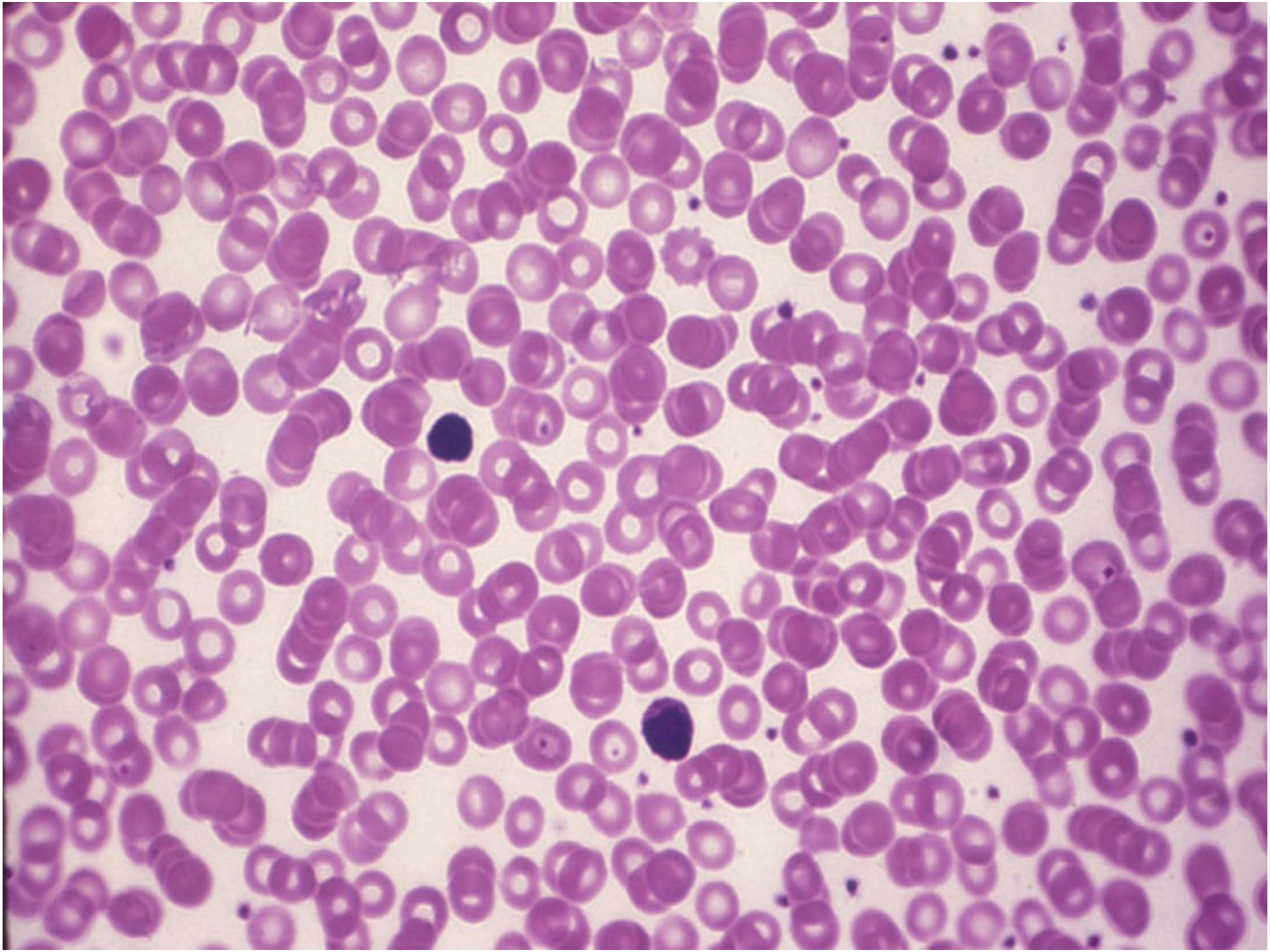
APPROPRIATE AREA FOR VIEWING Low Power (10x)

- View area where cells are well spread but still touching each other.
- Note normal RBCs in this area show central pallor.


Normal Red Cell
Distribution

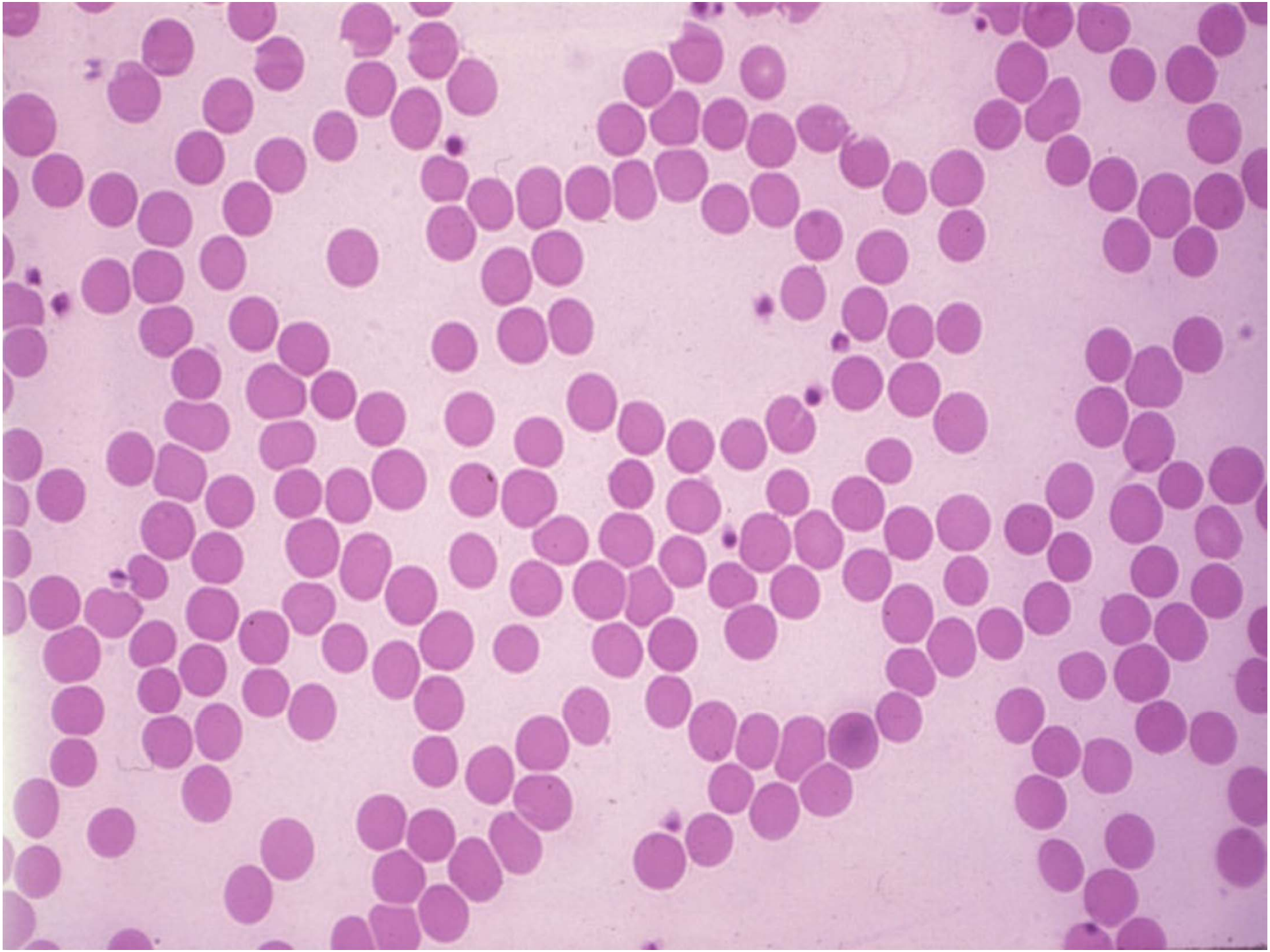
In the area too far in from the feather edge

- the blood is too thick
- cells overlap and are distorted
- RBCs appear small
- area of central pallor is exaggerated



In the area too near the feather edge

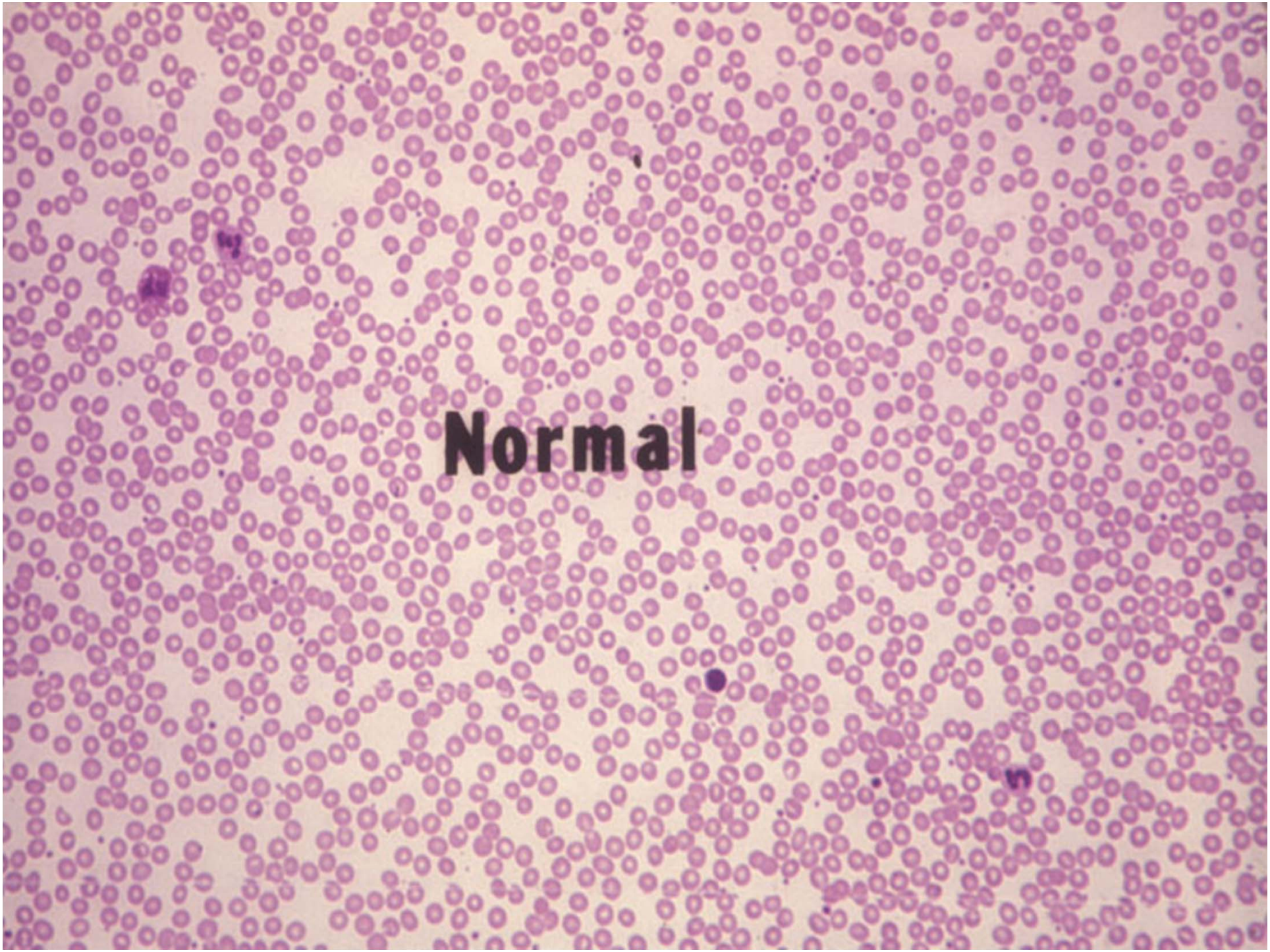
- the RBCs are not touching
- the cells appear large
- central pallor is not apparent

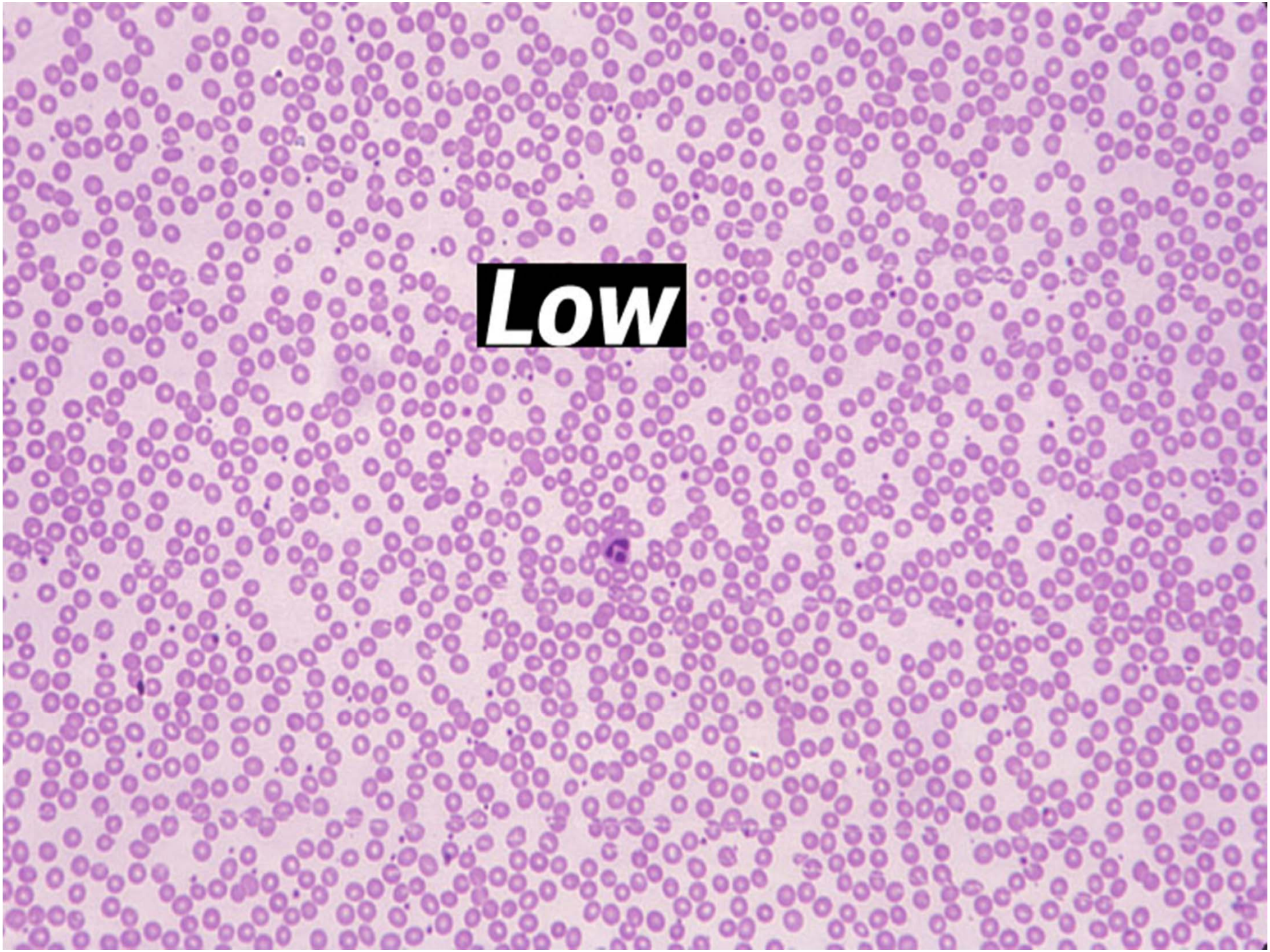


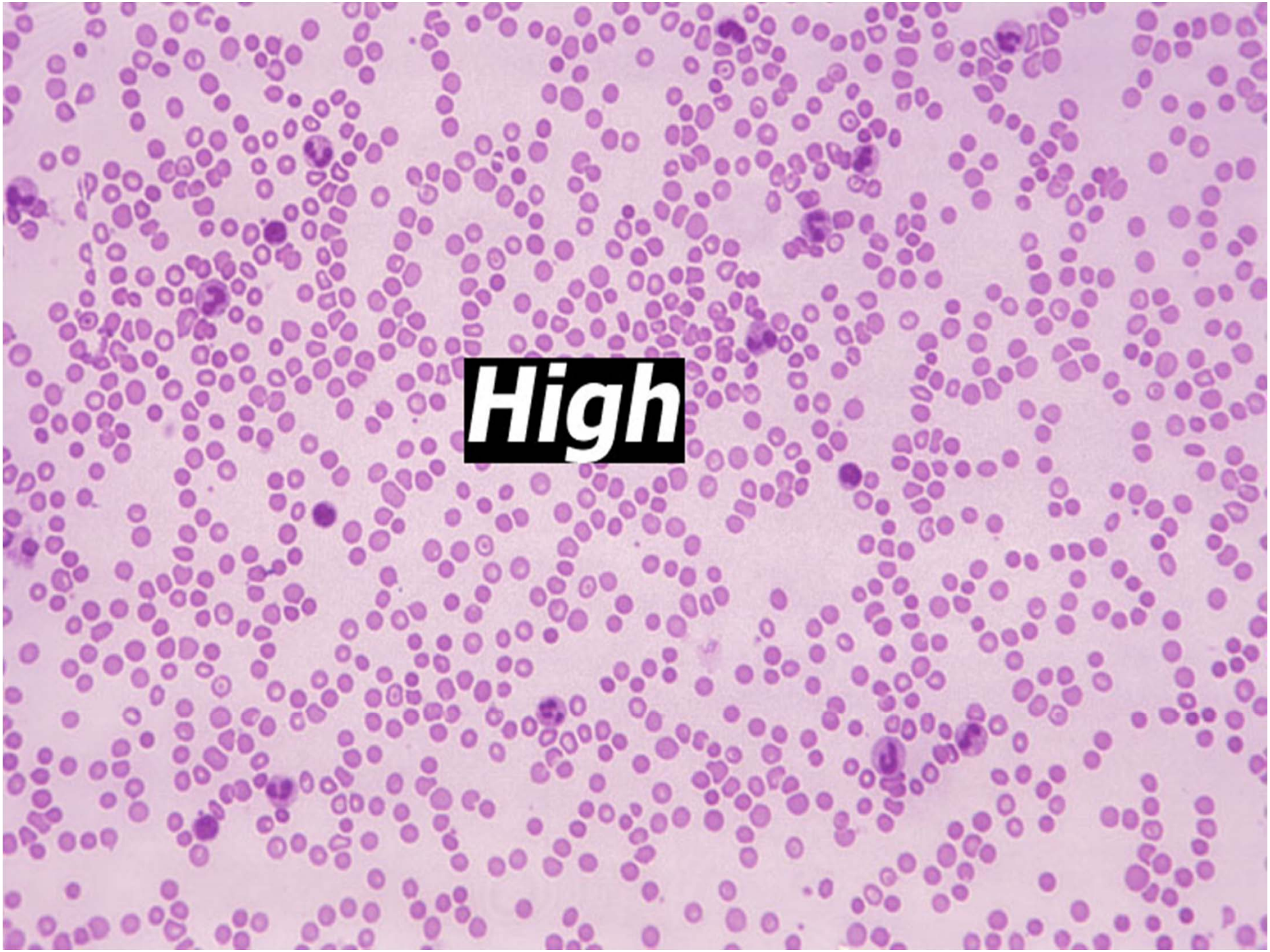
Get an idea of the total white blood cell count.

5WBCs / low power = 5,000-10,000/μL

The normal ratio of WBCs to RBCs is about 5,000 to 5,000,000 (1:1000).


Normal

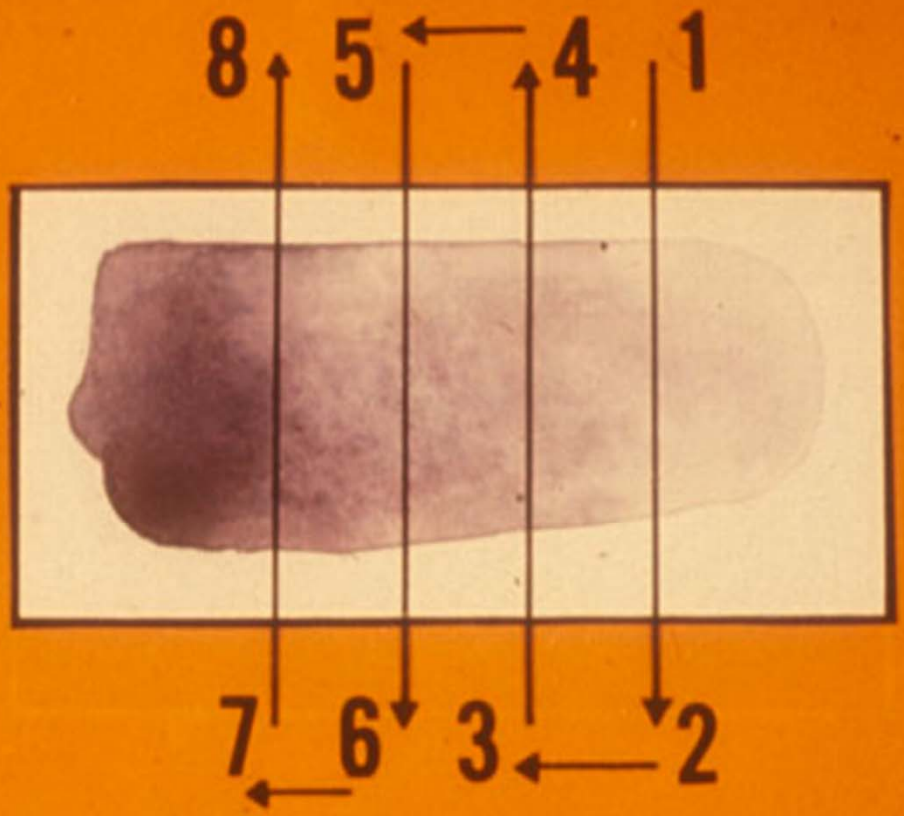

Low


High

IDENTIFY WHITE BLOOD CELLS

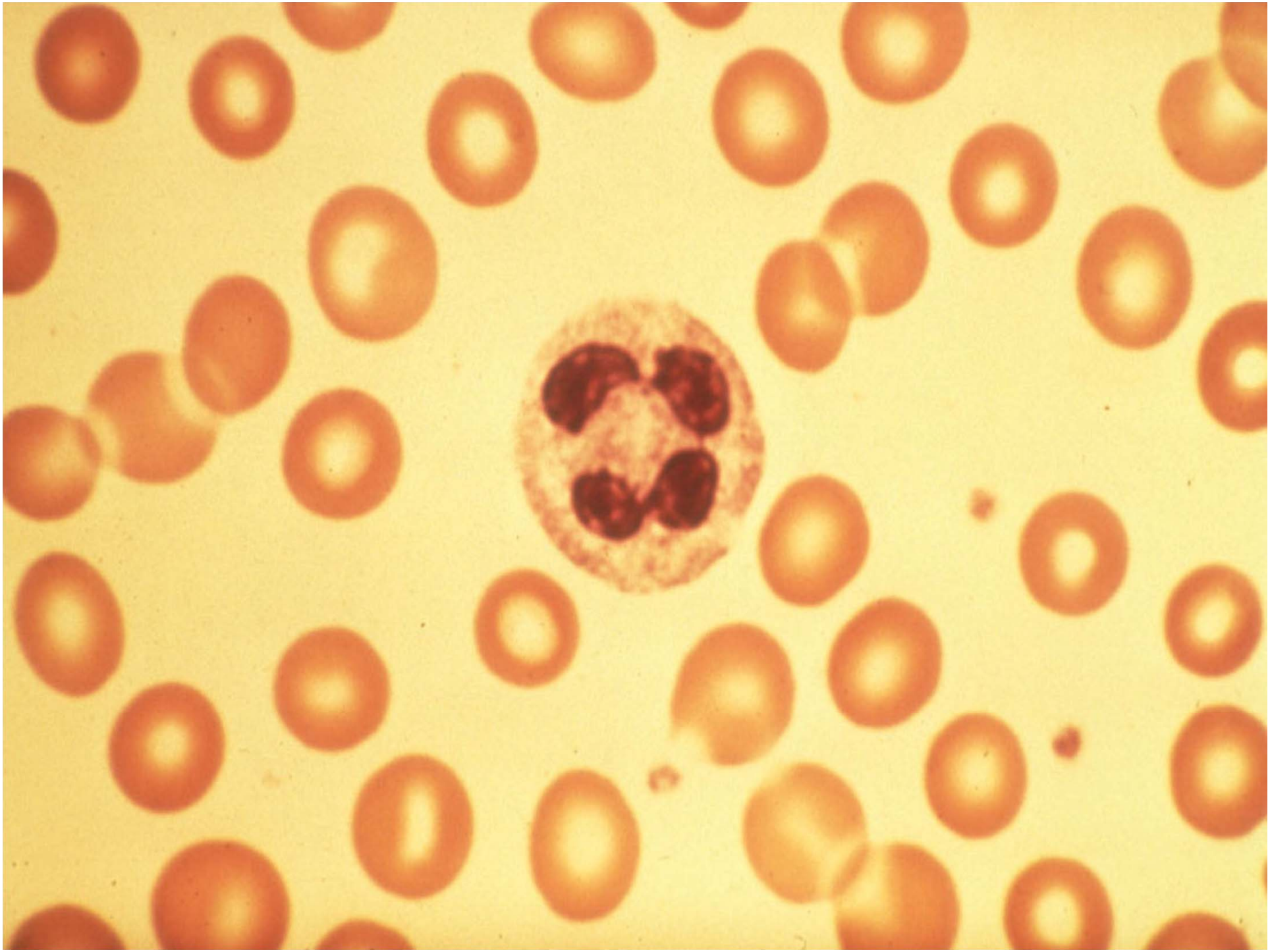
- Scan WBC morphology using low power lens, identify cell by size, shape of nucleus, N:C, and color of cytoplasm.
- Examine cell with high power.
- To perform differential white cell count, scan in a systematic manner at high power.

Path of examining blood smear for a differential white cell count



NORMAL NEUTROPHIL
WITH SEGMENTED NUCLEUS

- Also called polymorphonuclear leukocyte (PMN)
- Sometimes referred to as seg or poly



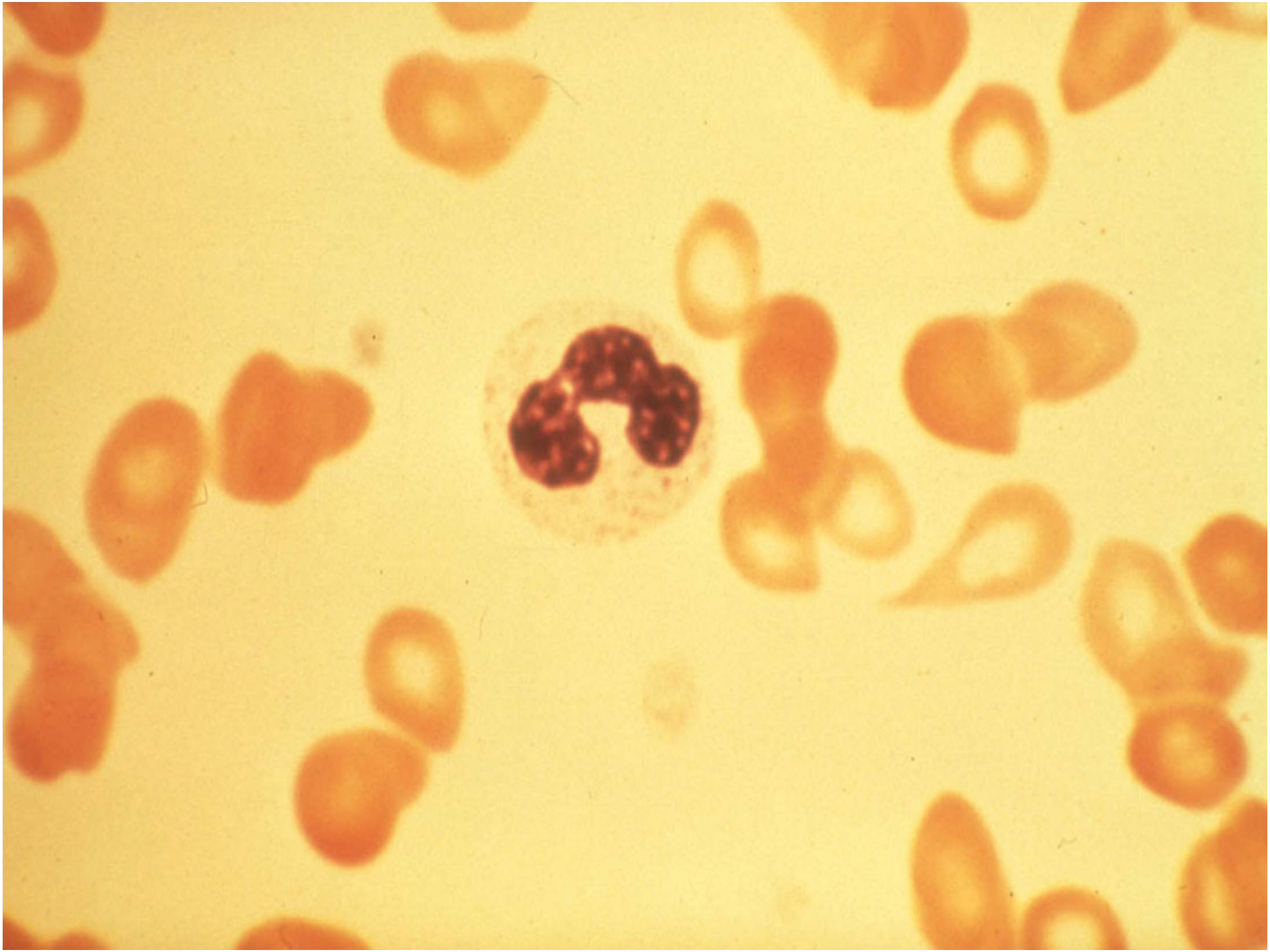
NORMAL NEUTROPHIL

WITHOUT SEGMENTS IN NUCLEUS

- Referred to as band (in contrast to seg)
- Band is younger than segmented neutrophil

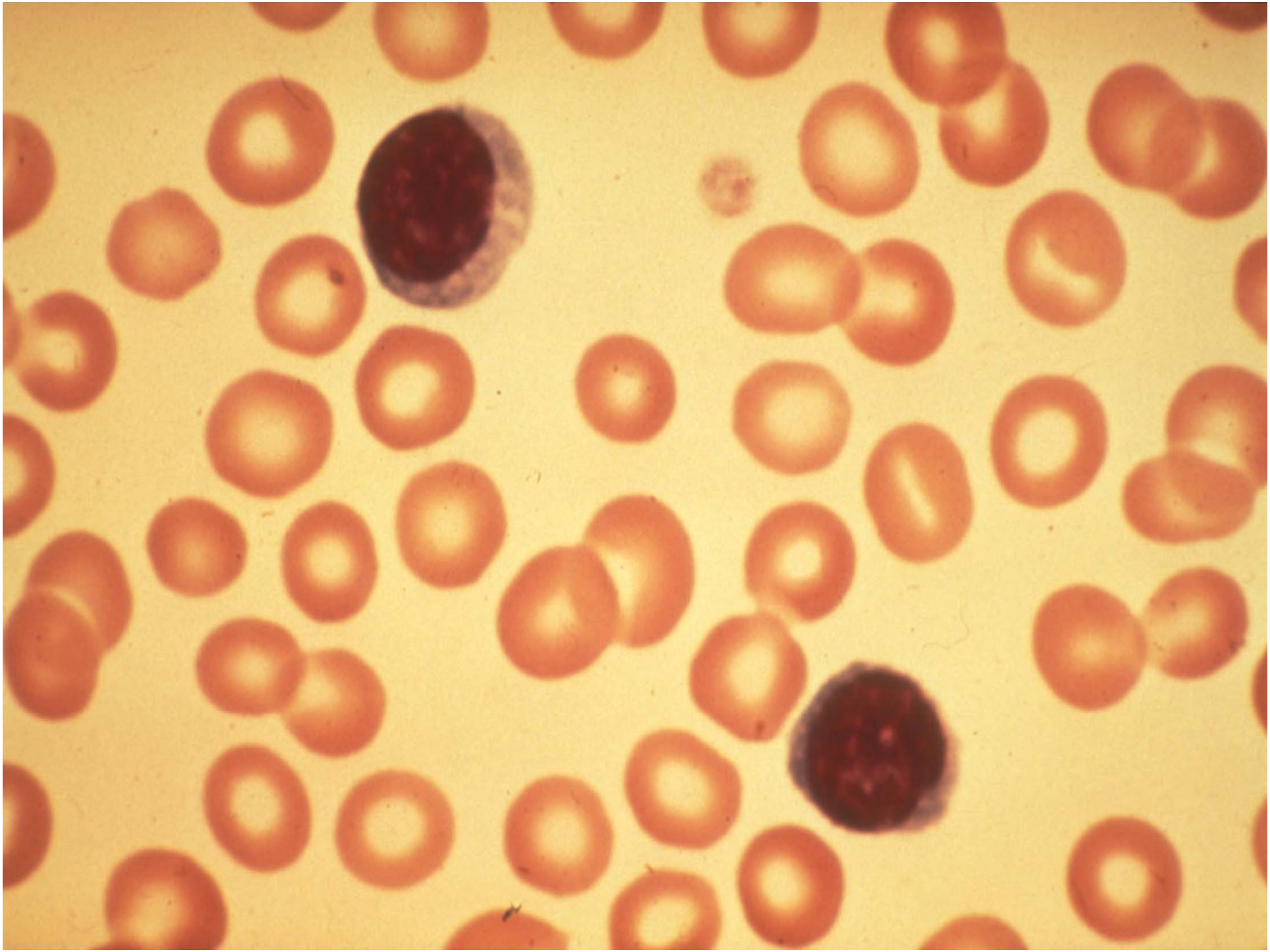
NORMAL NEUTROPHIL
(BAND OR SEG)

- Colorless background composed of secondary neutrophilic granules
- Red granules are primary granules



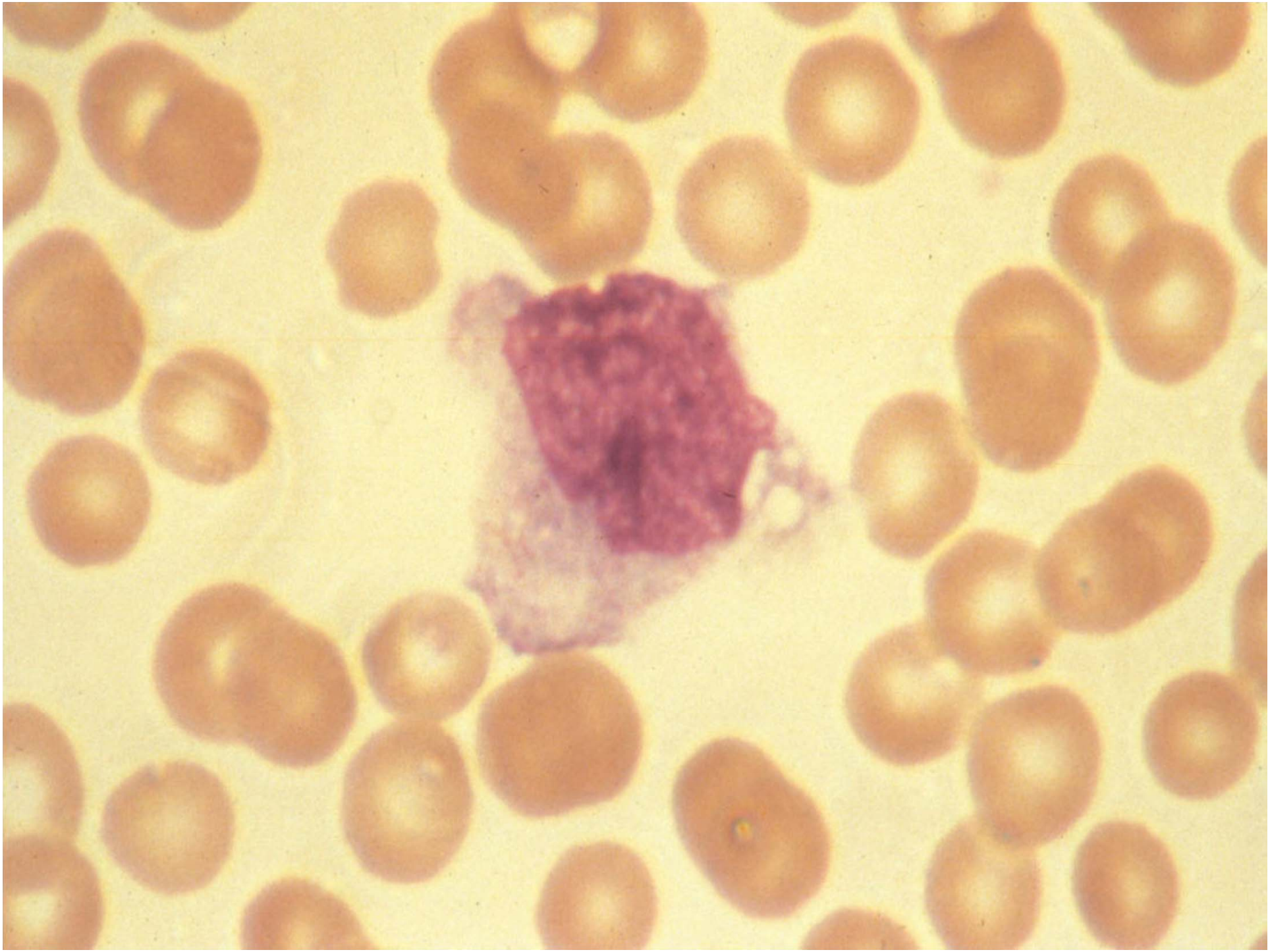
NORMAL SMALL LYMPHOCYTE

- Note size of nucleus is slightly larger than size of normal RBC



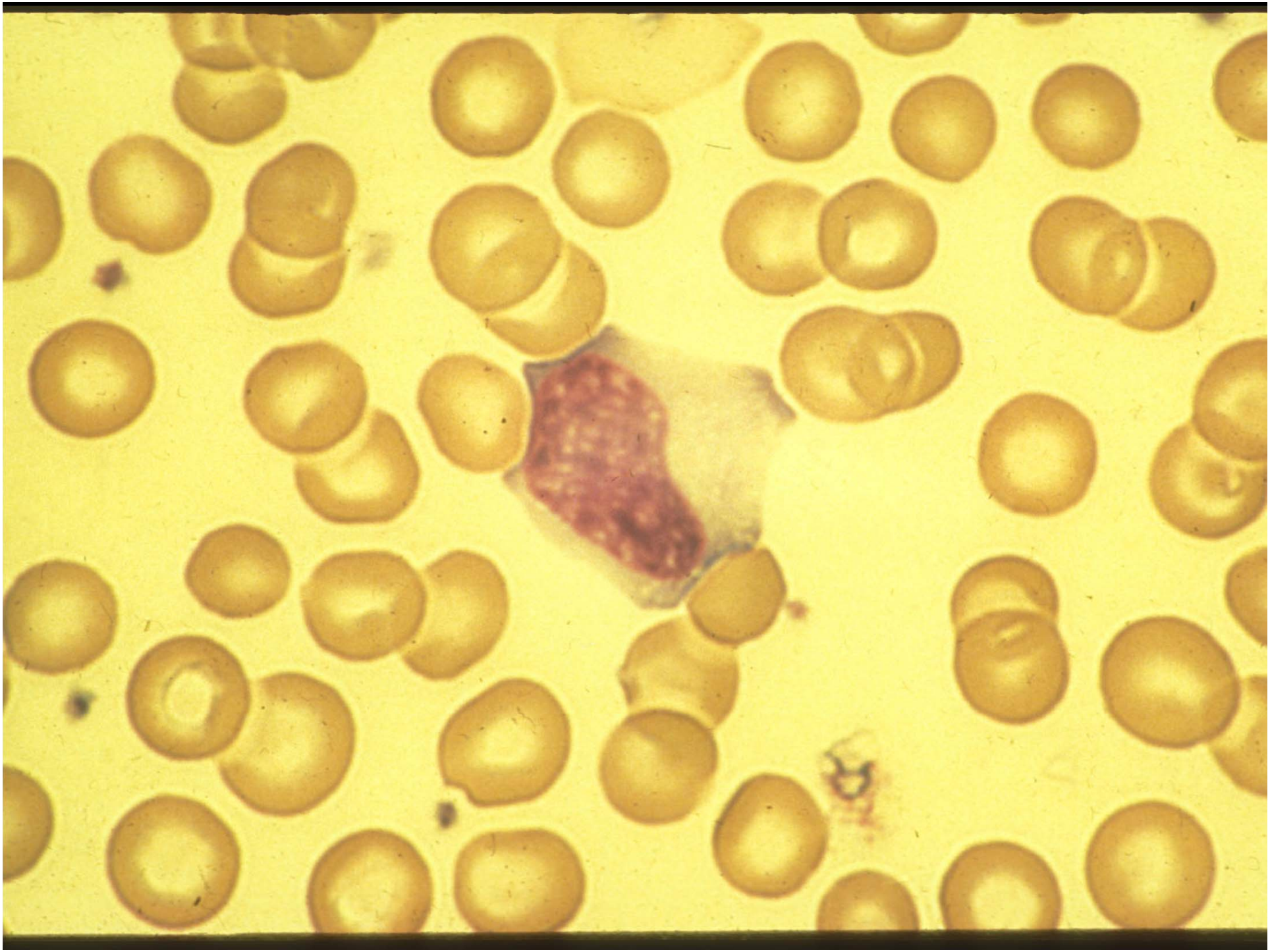
NORMAL MONOCYTE

- Largest normal cell on blood smear
- Moderate N:C
- Nucleus with folds and indentations
- Light chromatin
- Nucleolus may be present
- Cytoplasm appears grey and granular
- Vacuoles may be present

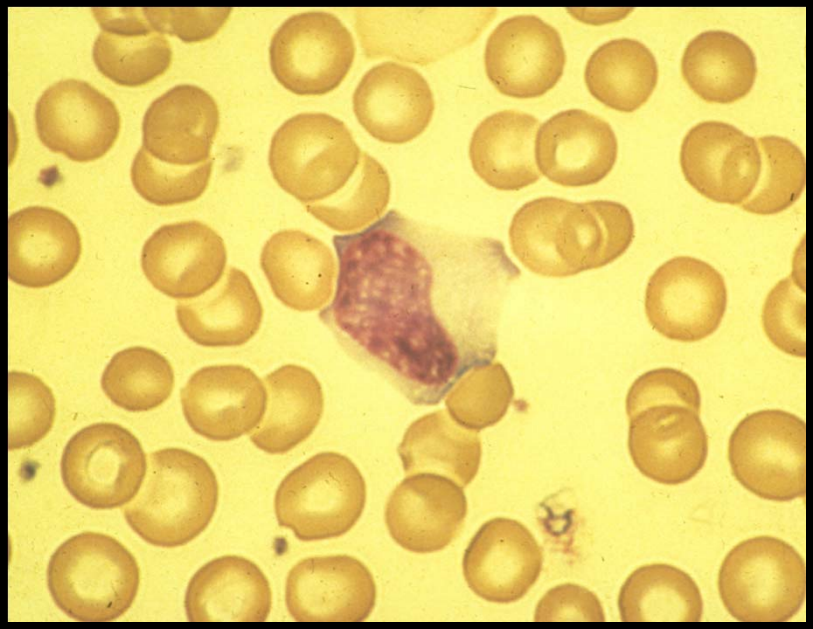


REACTIVE LYMPHOCYTE

- Can be as large as a monocyte
- Nucleus with smooth outline, oval shape
- Chromatin darker and more clumped than monocyte chromatin
- Nucleolus may be present
- Watery blue cytoplasm, may have small red granules
- Adjacent red cells indent cytoplasm

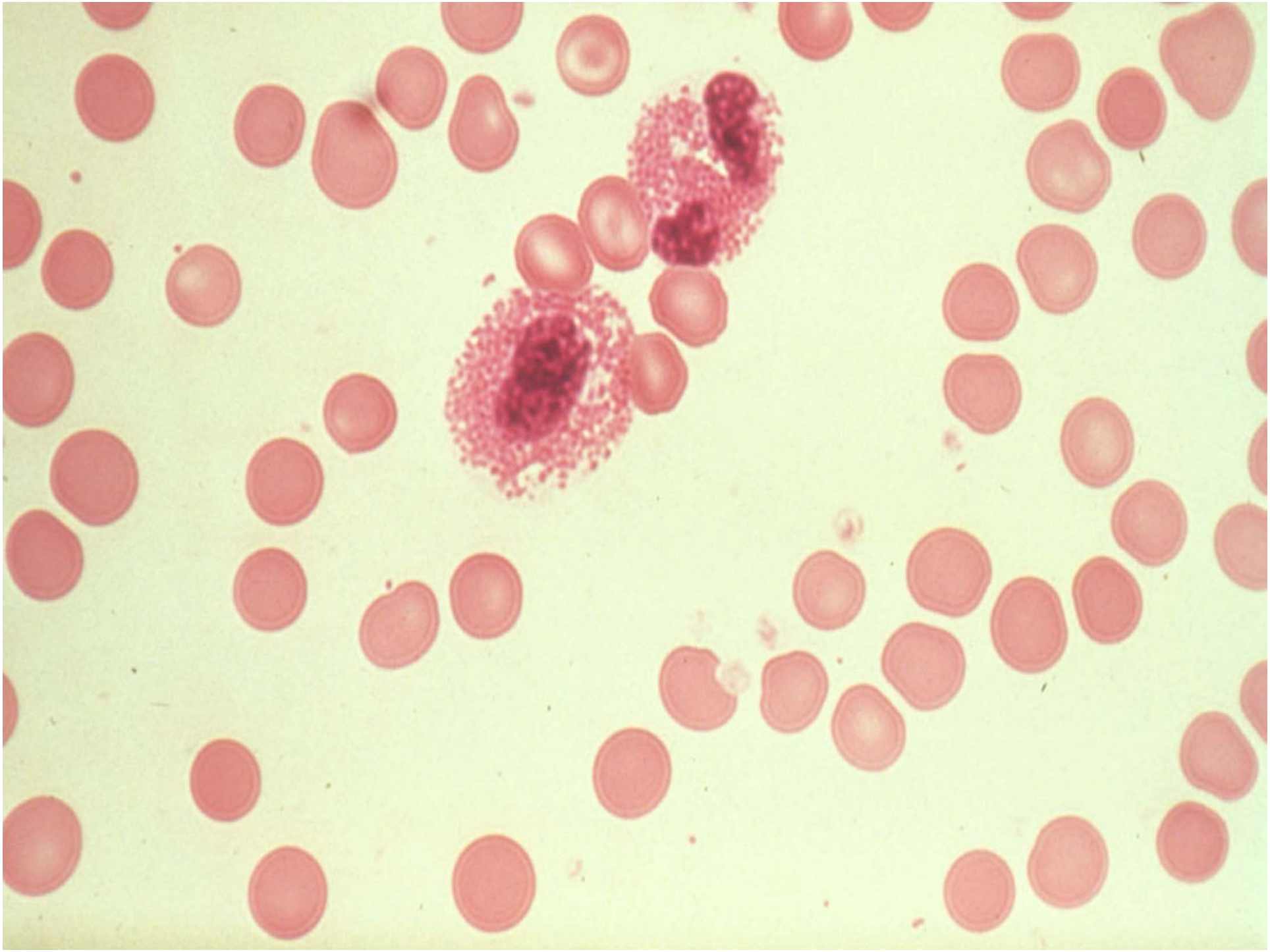


REACTIVE LYMPHOCYTE / MONOCYTE



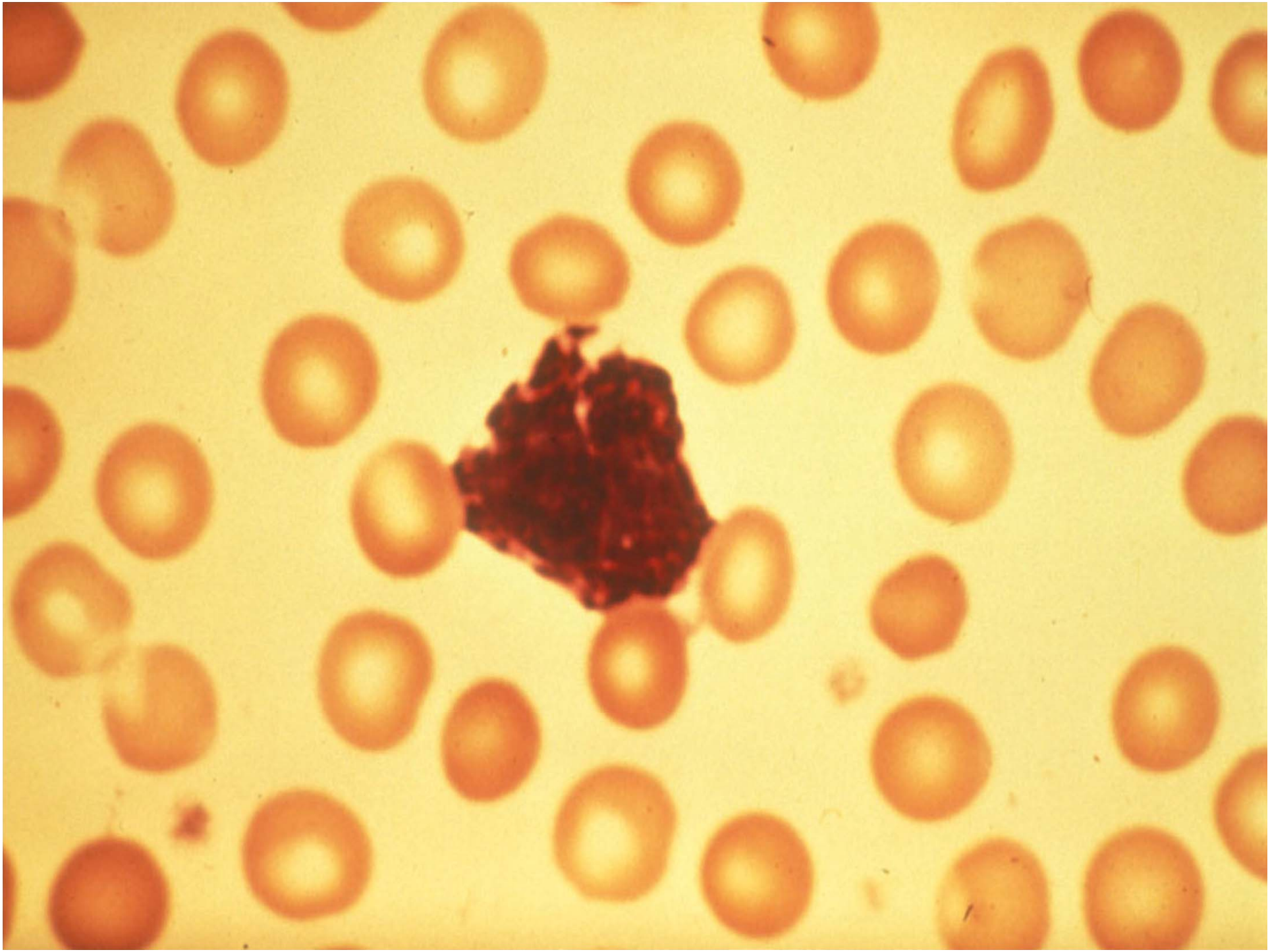
NORMAL EOSINOPHIL

- Segmented nucleus is often bilobed
- Granules are large, refractile, red-orange (eosinophilic)
- Sometimes referred to as Eo



NORMAL BASOPHIL

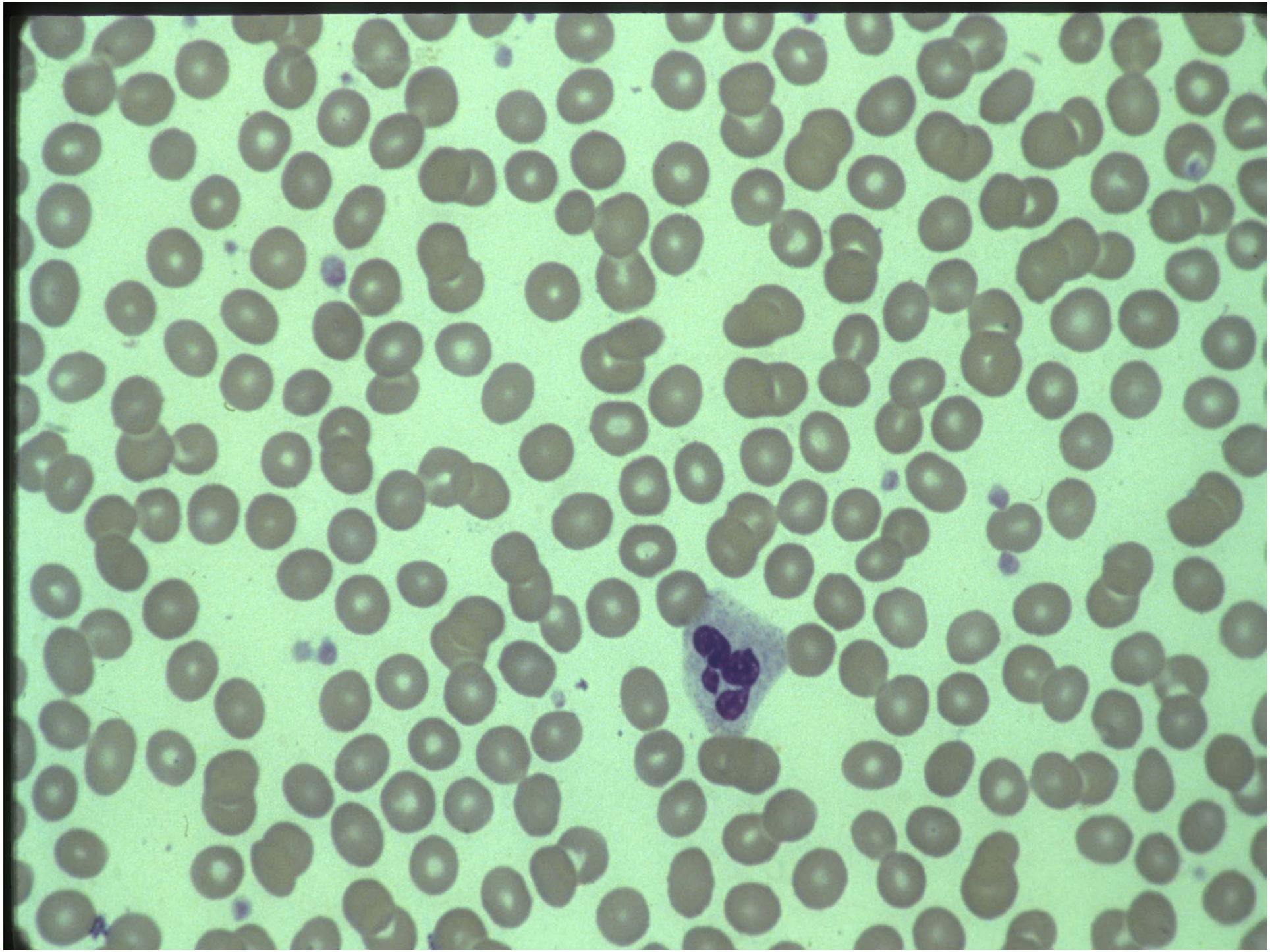
- Has segmented nucleus
- Has large, dark blue granules which obscure the nucleus and other cell detail
- Sometimes referred to as baso

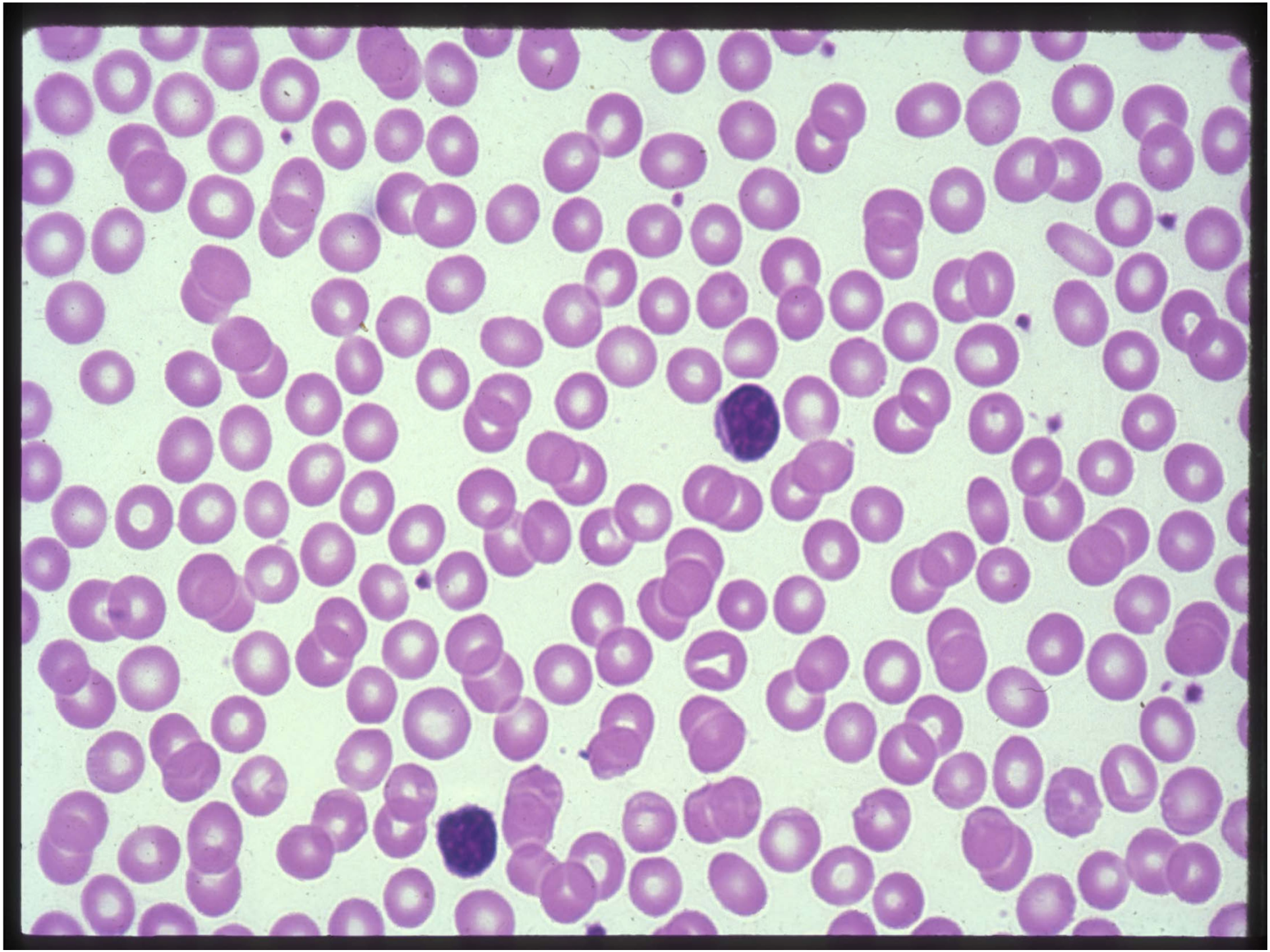


Get an idea of the total platelet count by examining several fields using the high power (oil) lens.

~10 platelets / oil field = 150,000-250,000/μL

The normal ratio of platelets to RBCs is about 250,000 to 5,000,000 (1:20).






For RBC morphology
scan the slide
under oil immersion.

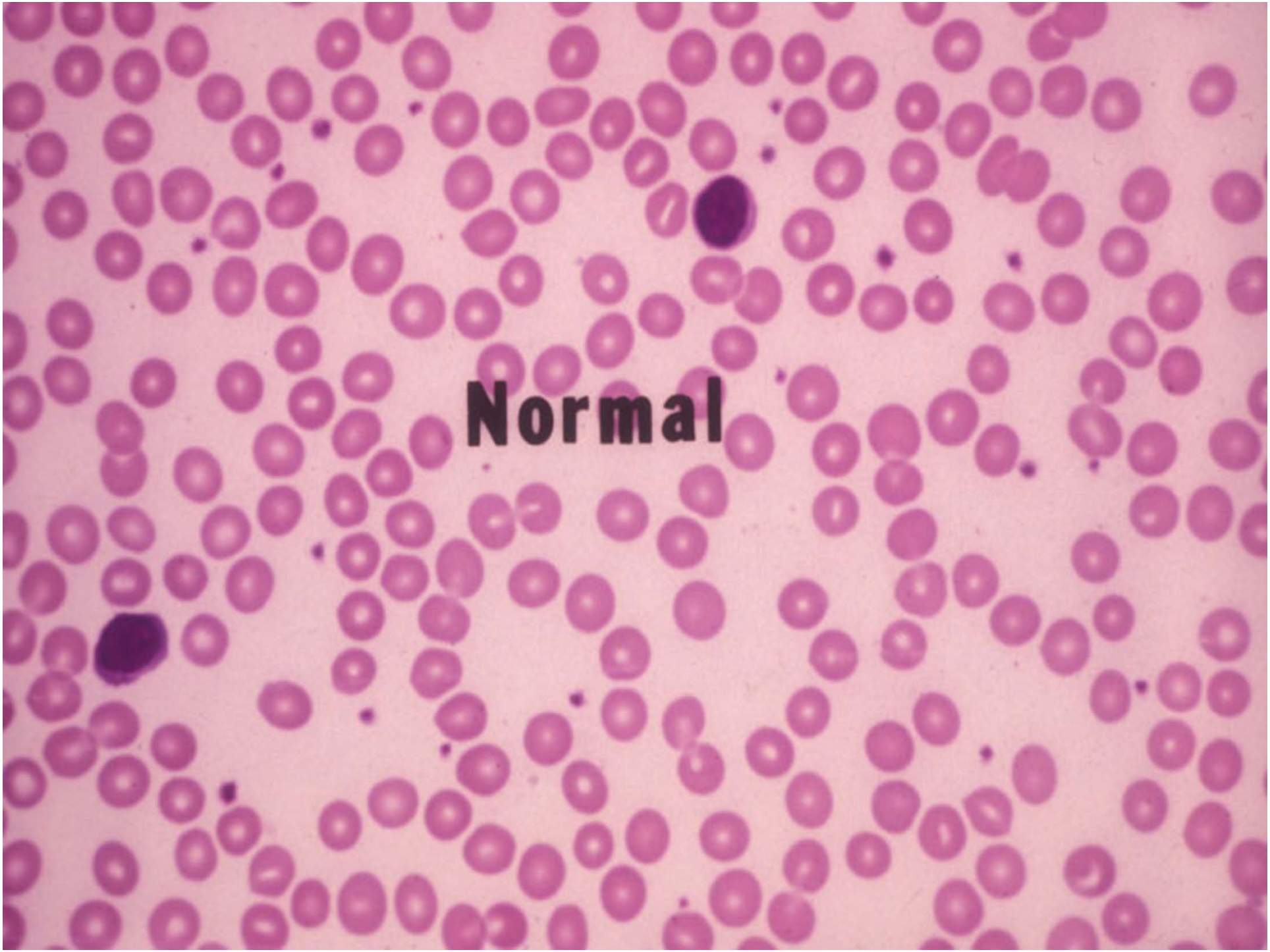
Technical terminology

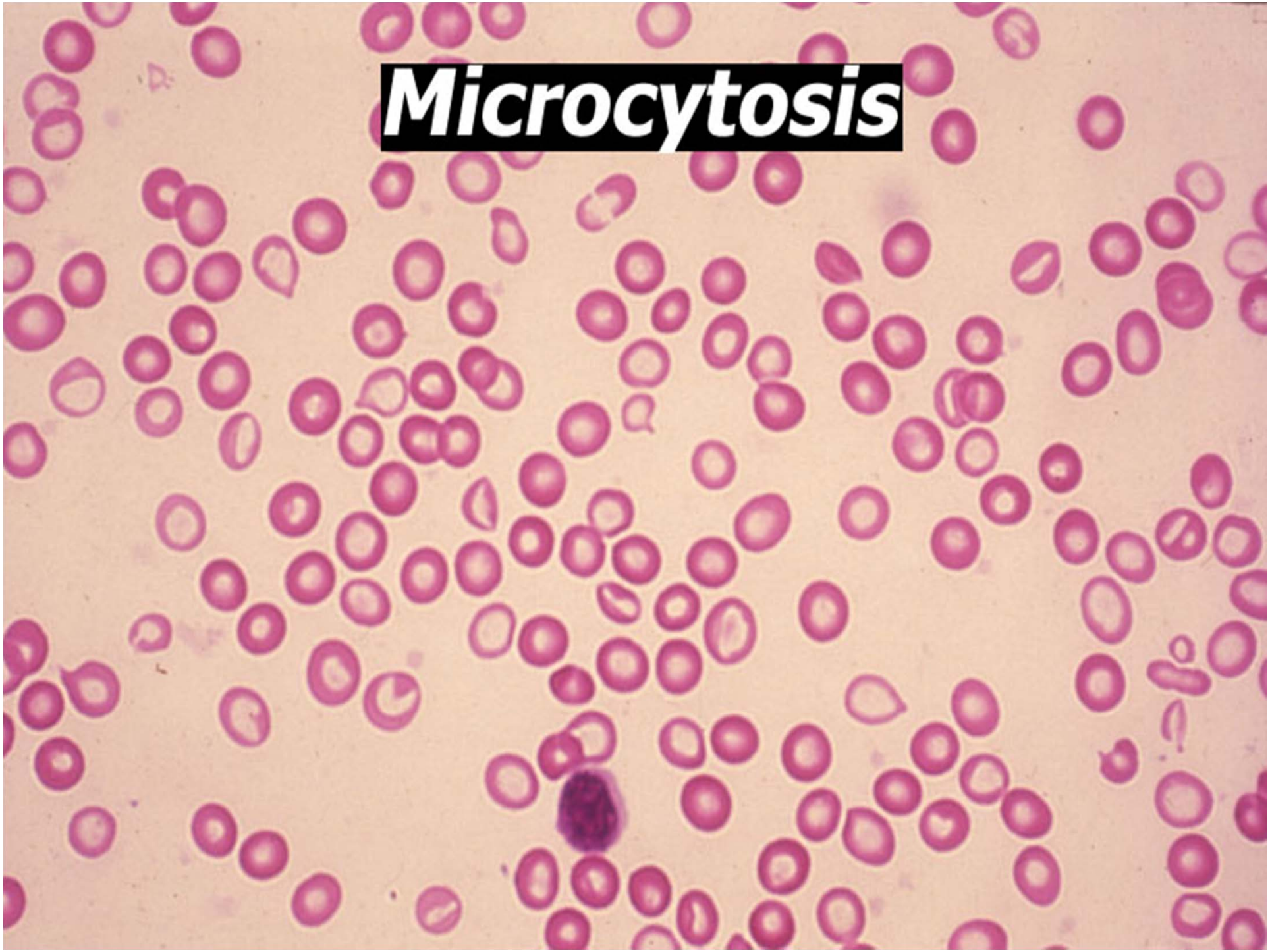
Variation in size—ANISOCYTOSIS
variation in shape—POIKILOCYTOSIS
variation in hemoglobin content—
NORMOCHROMIC
HYPOCHROMIC

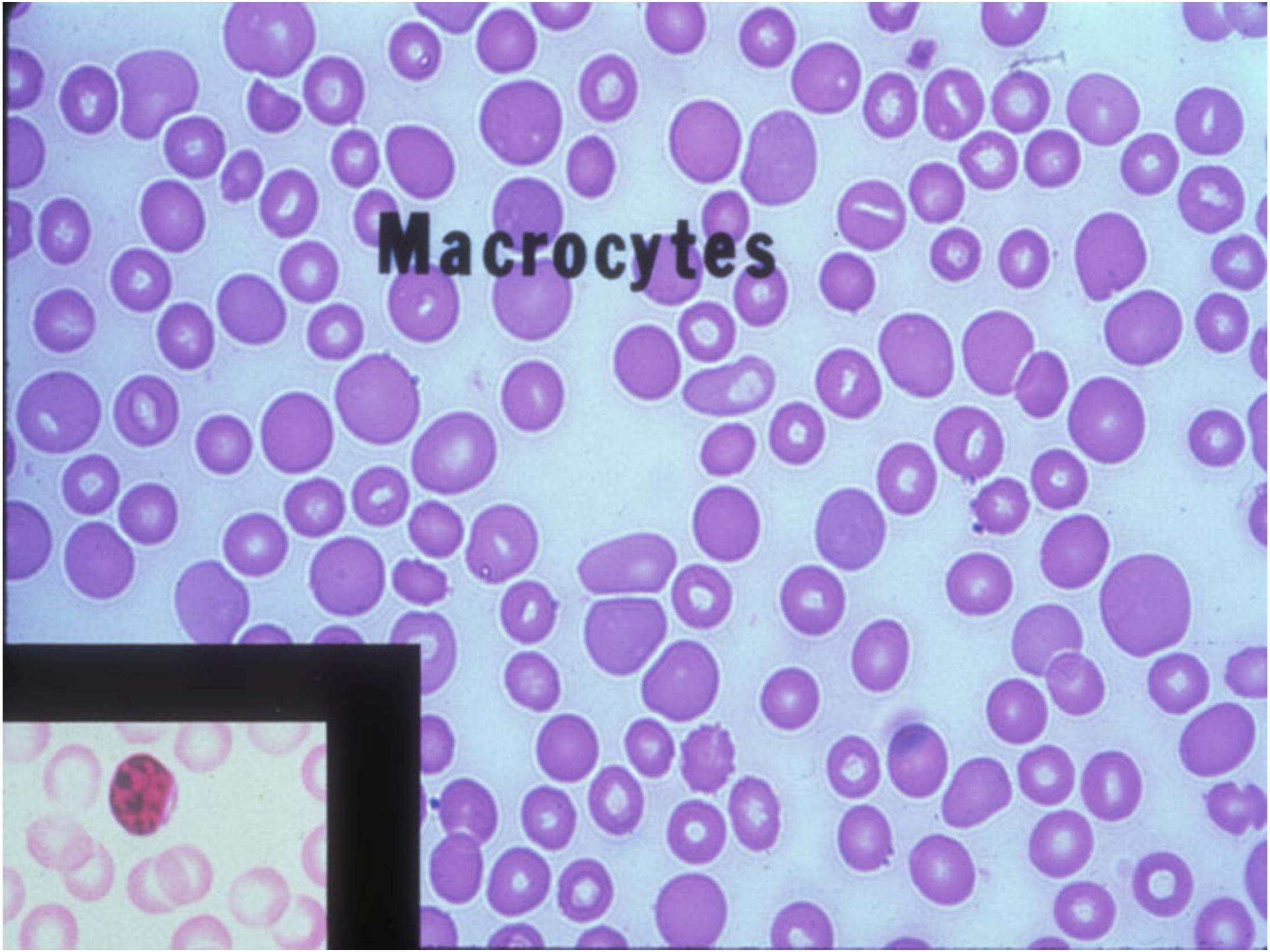
Color: (bluish RBC's)– POLYCHROMOPHILIA

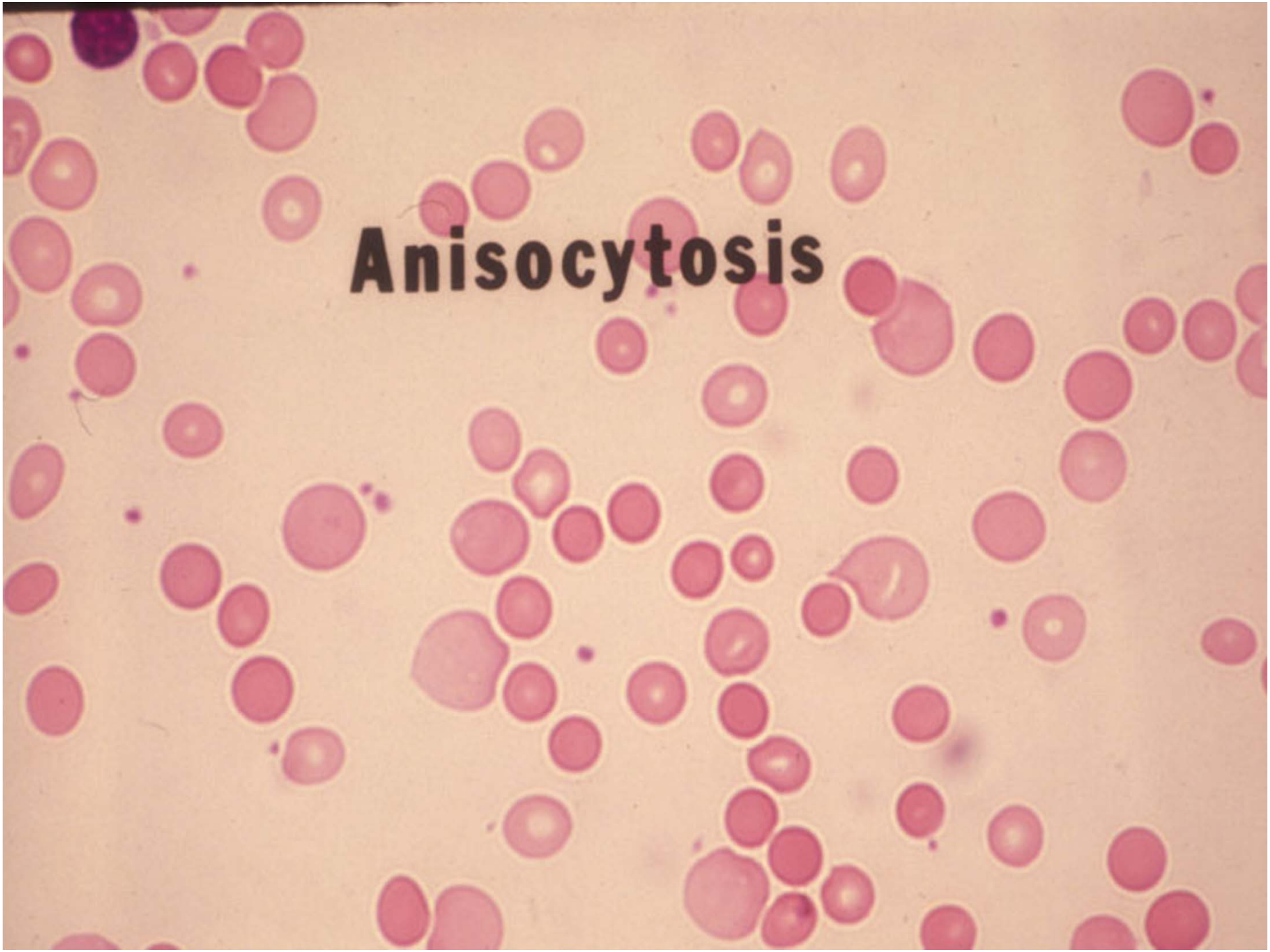
Evaluate red cells for size:

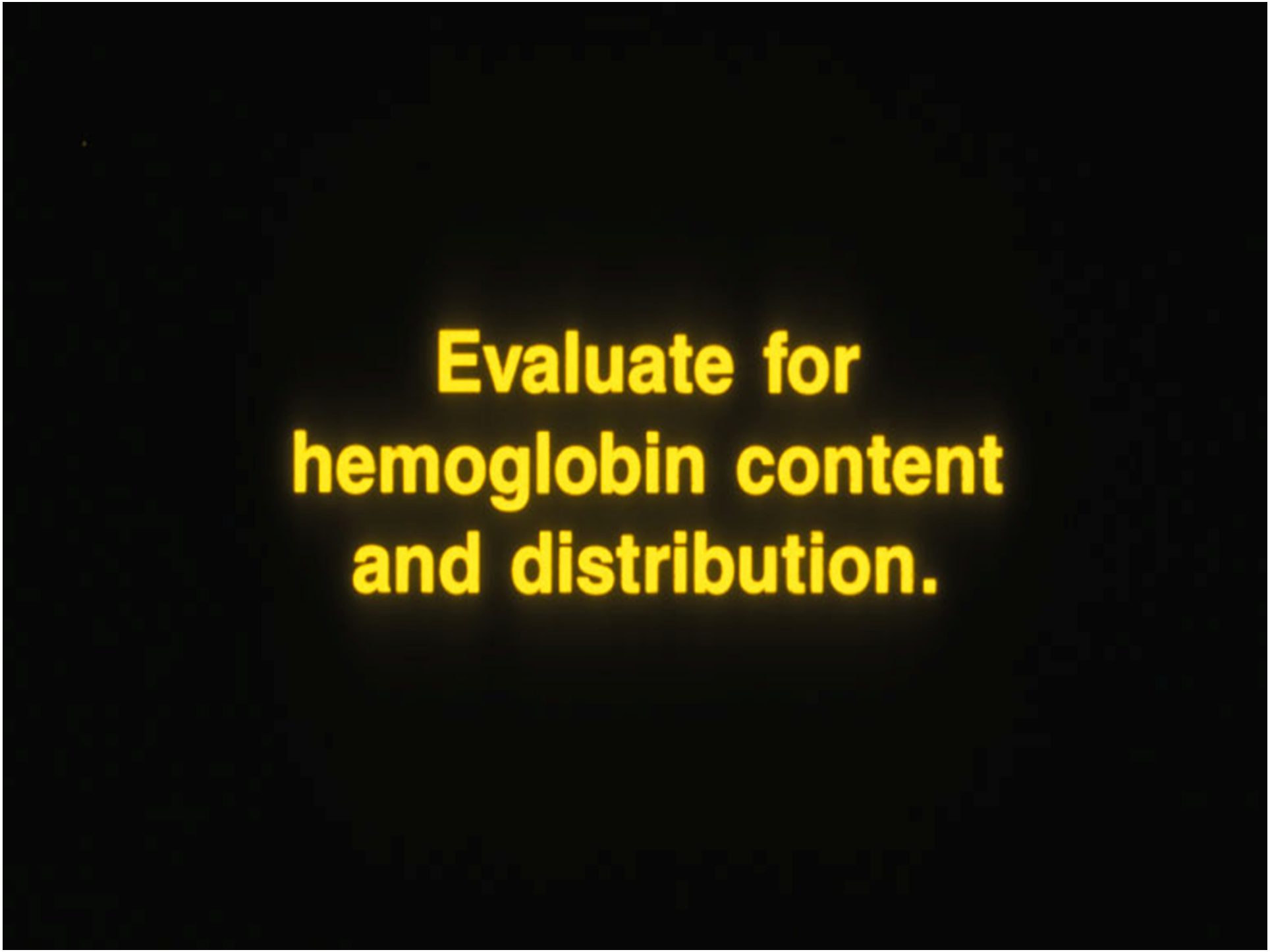
A normal cell should
be the size of
a lymphocyte nucleus.

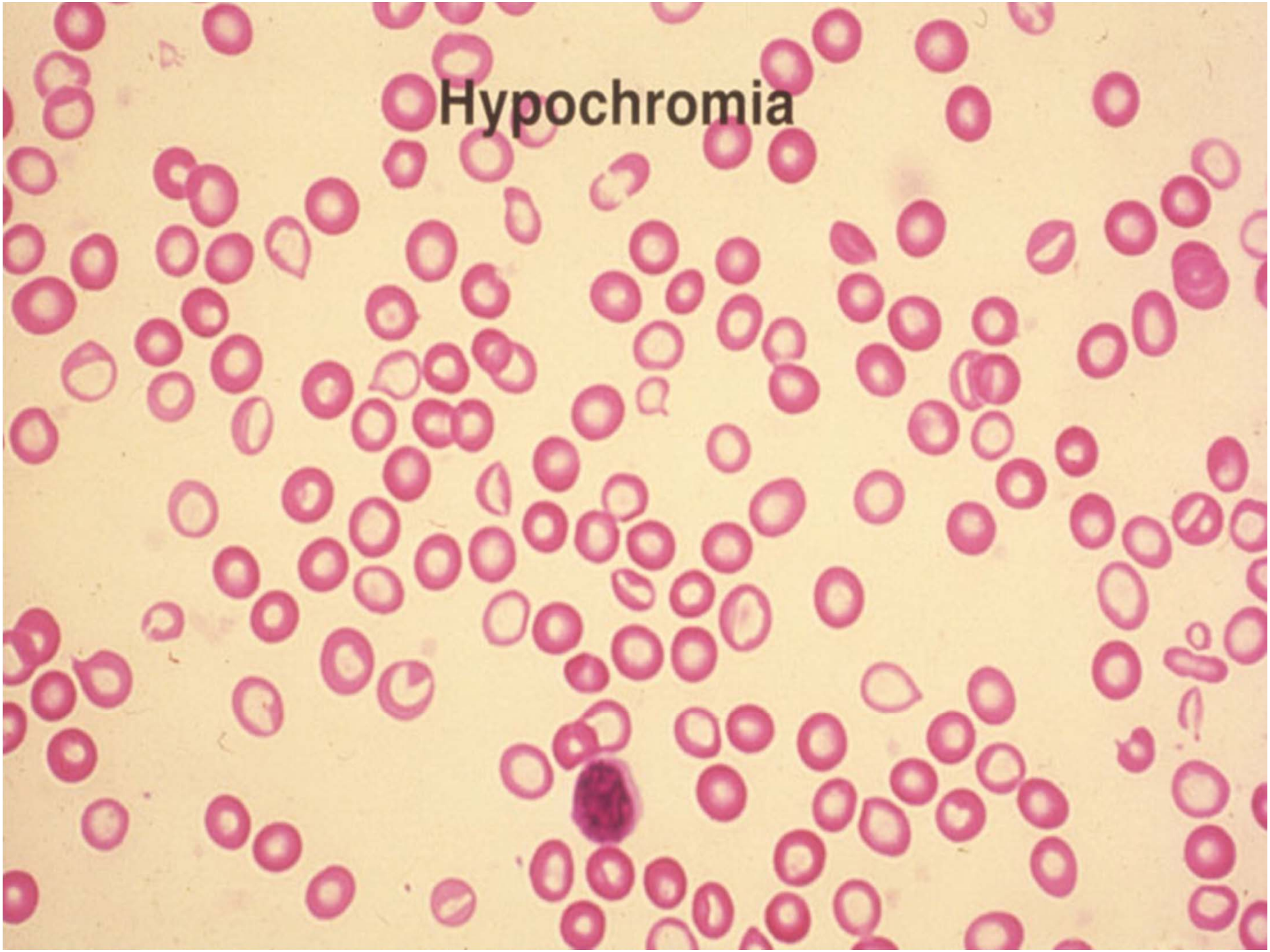

Normal


Microcytosis


Macrocytes


Anisocytosis


Evaluate for
hemoglobin content
and distribution.


Hypochromia

VARIATION IN COLOR

CONDITION

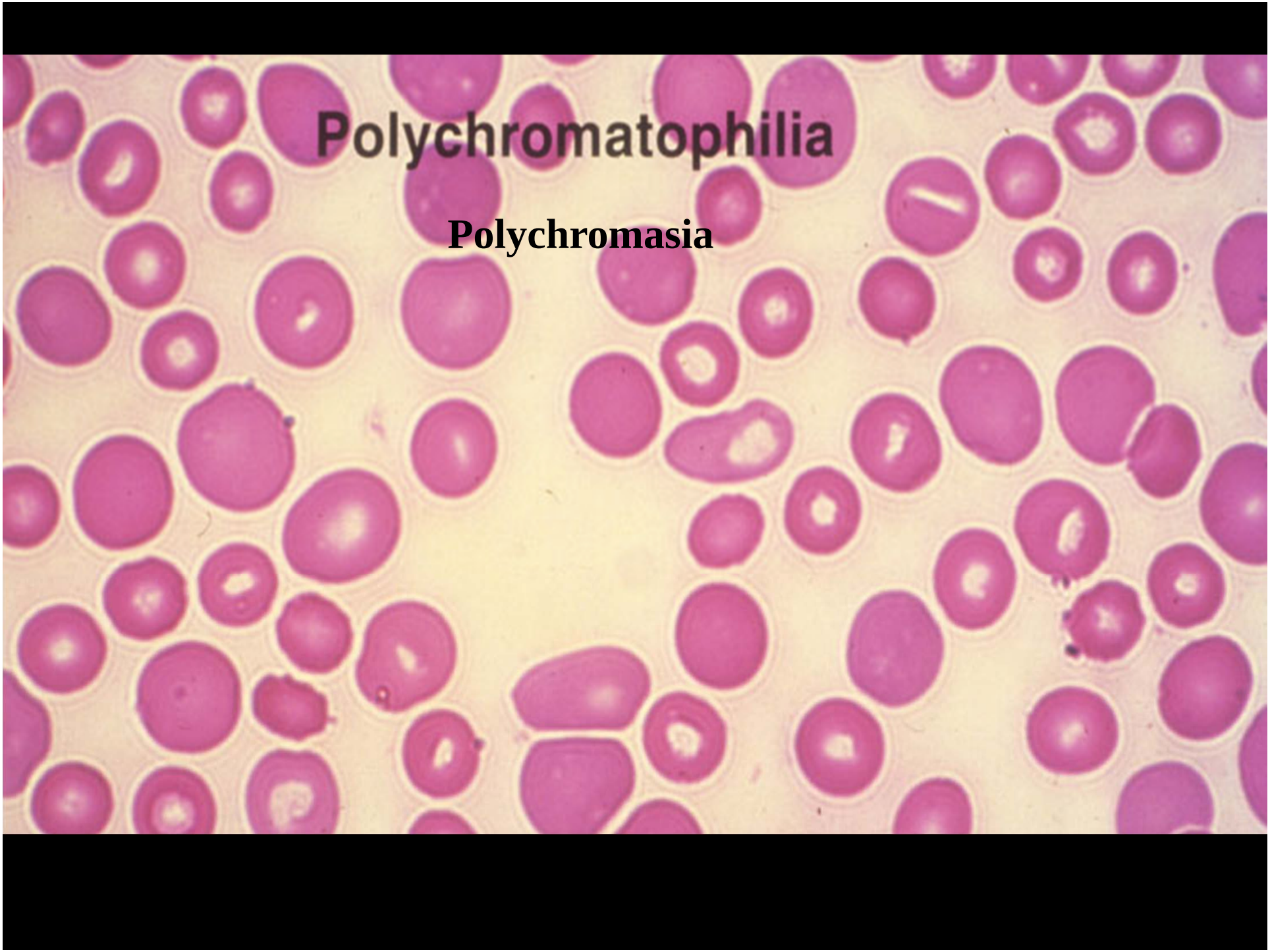
- **Polychromatophilia or Polychromasia**

CELLS

- **Polychromatophilic, Polychromatic or Polychromic macrocyte or**
- **Shift cell**

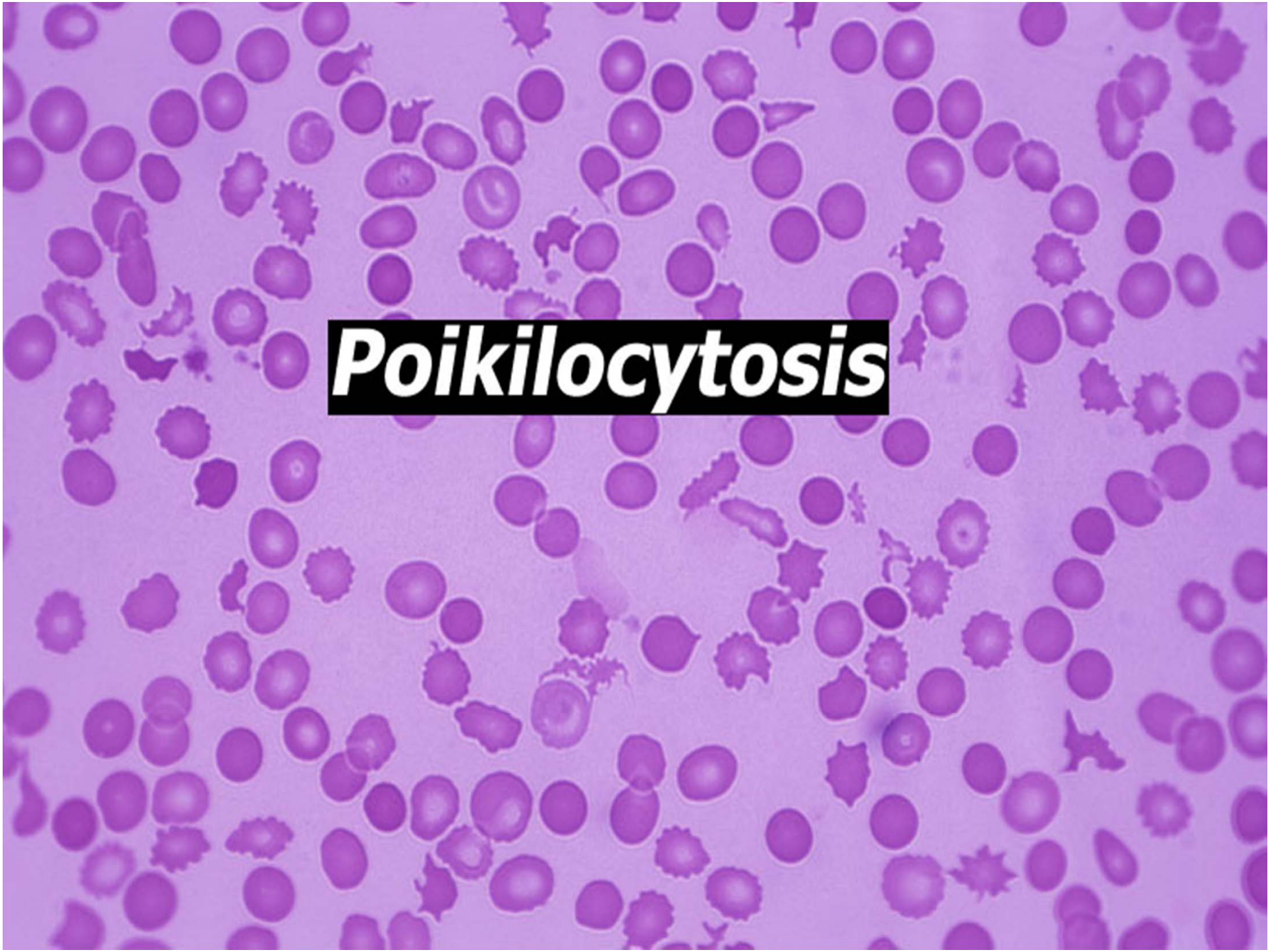
INDICATES

- **Presence of young reticulocytes or**
- **Early released reticulocytes and**
- **Influence of erythropoietin in anemia**



Polychromasia

EVALUATE RBC SHAPE USING OIL LENS


Poikilocytosis

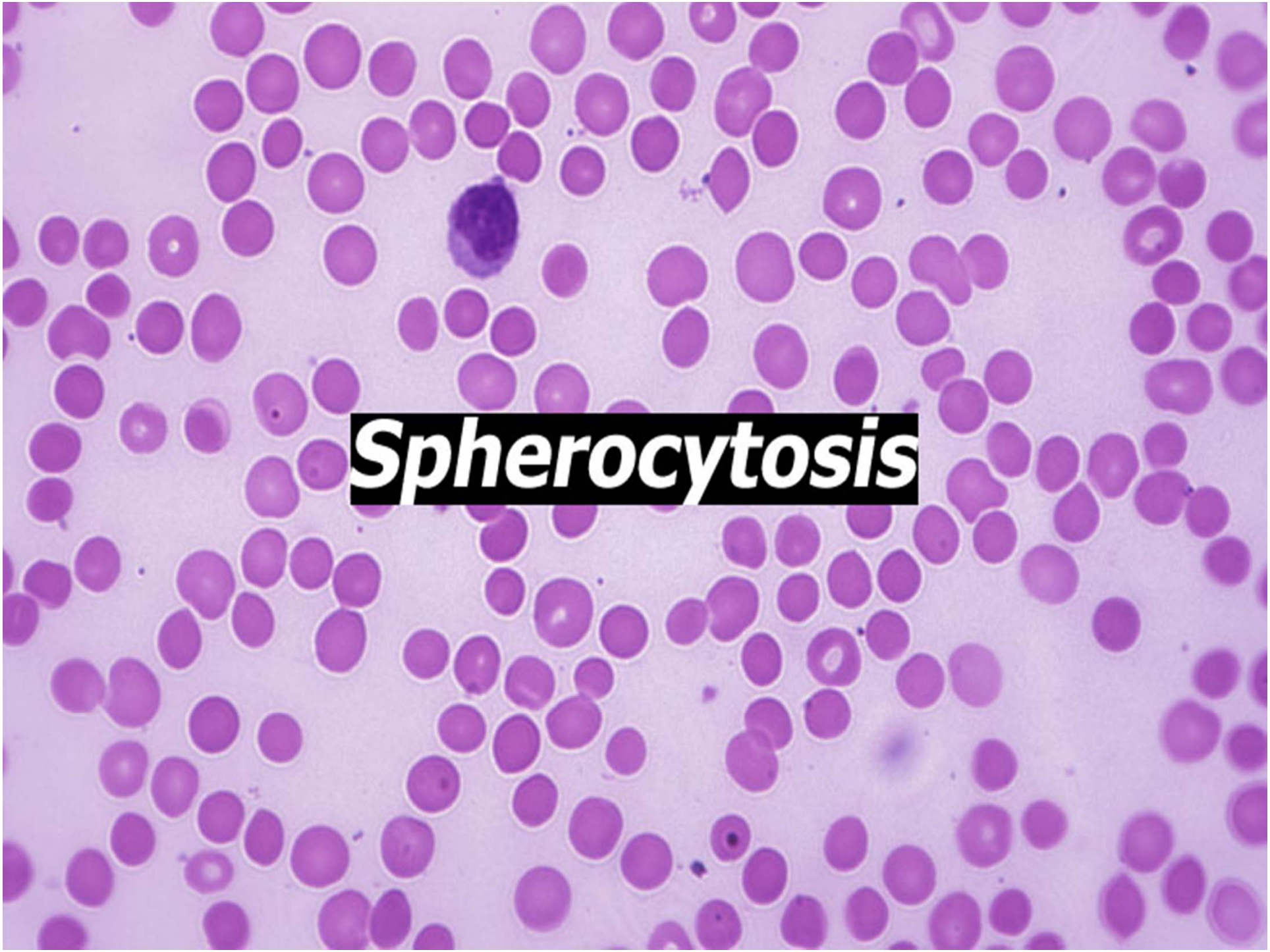
THE FOLLOWING SLIDES INTRODUCE
ABNORMAL RBC
SHAPES, DISTRIBUTION & INCLUSIONS
THAT WE WILL STUDY
ON DAYS 4, 5, 7, 11 & 13

RECOGNIZE ABNORMAL FROM NORMAL

SPHEROCYTES

HAVE SMALLER DIAMETER THAN NORMAL RBC
LACK CENTRAL PALLOR

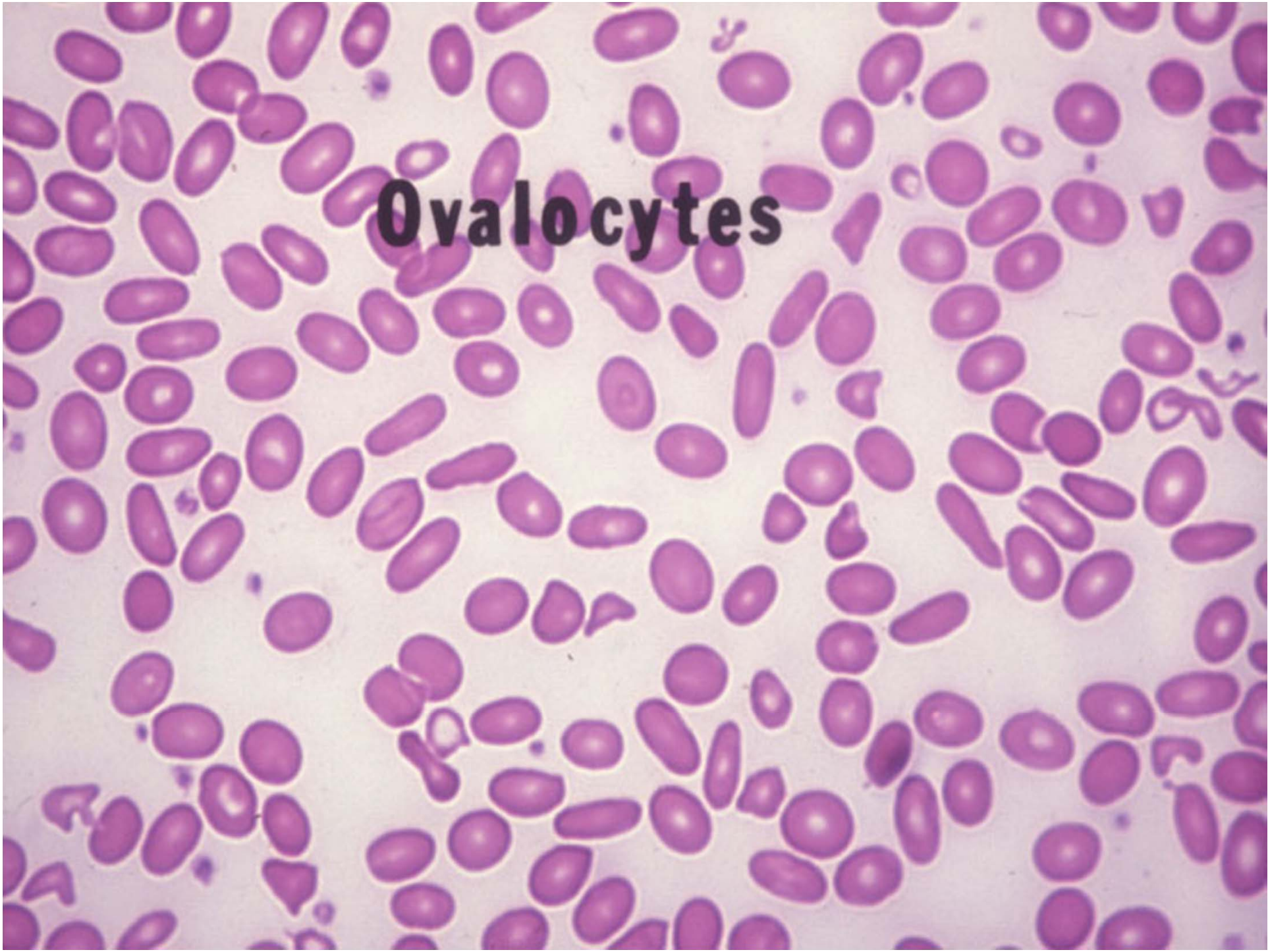
SEEN IN HEREDITARY SPHEROCYTOSIS (DAY 4)
SEEN IN AIHA(AUTOIMMUNE HEMOLYTIC ANEMIA) DAY 7
SEEN WITH RBC TRAUMA (DAY 7)


Spherocytosis

OVALOCYTES OR ELLIPTOCYTES

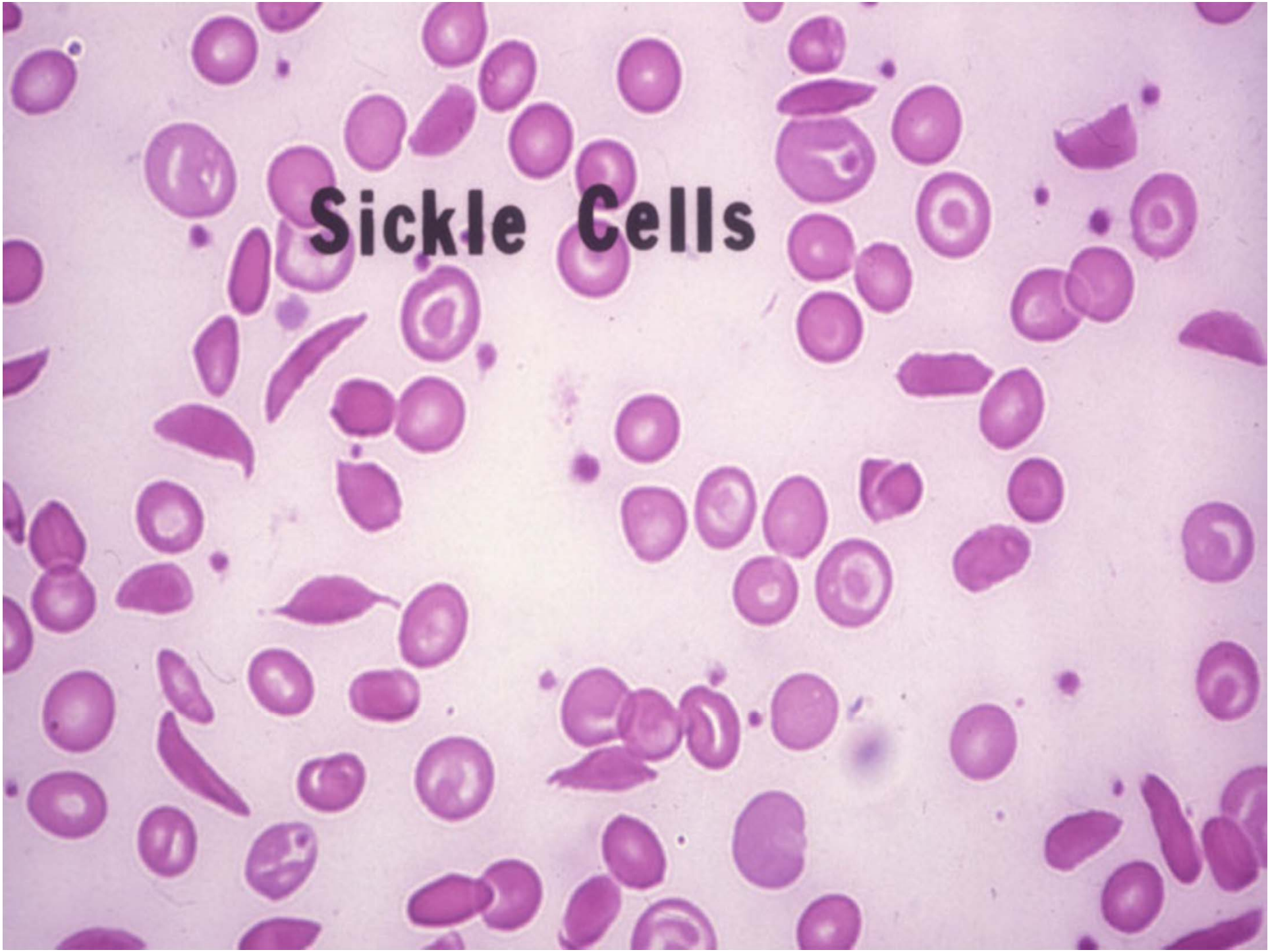
SEEN IN HEREDITARY ELLIPTOCYTOSIS (DAY 4)

SEEN AS MACROCYTES IN MEGALOBLASTIC ANEMIA (DAY 3)


Ovalocytes

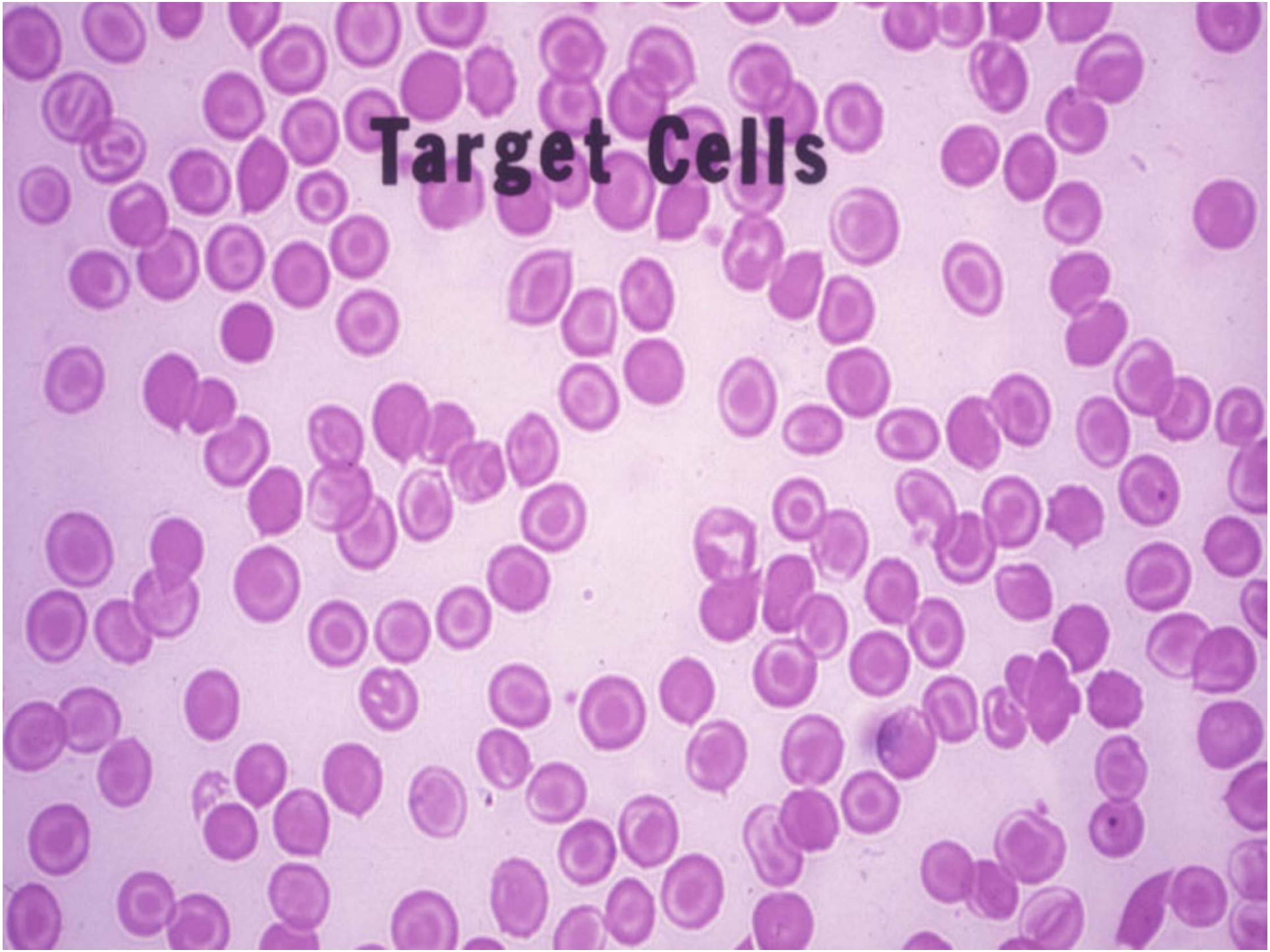
SICKLE CELLS

SEEN IN SICKLE CELL DISEASE (DAY 5)


Sickle Cells

TARGET CELLS

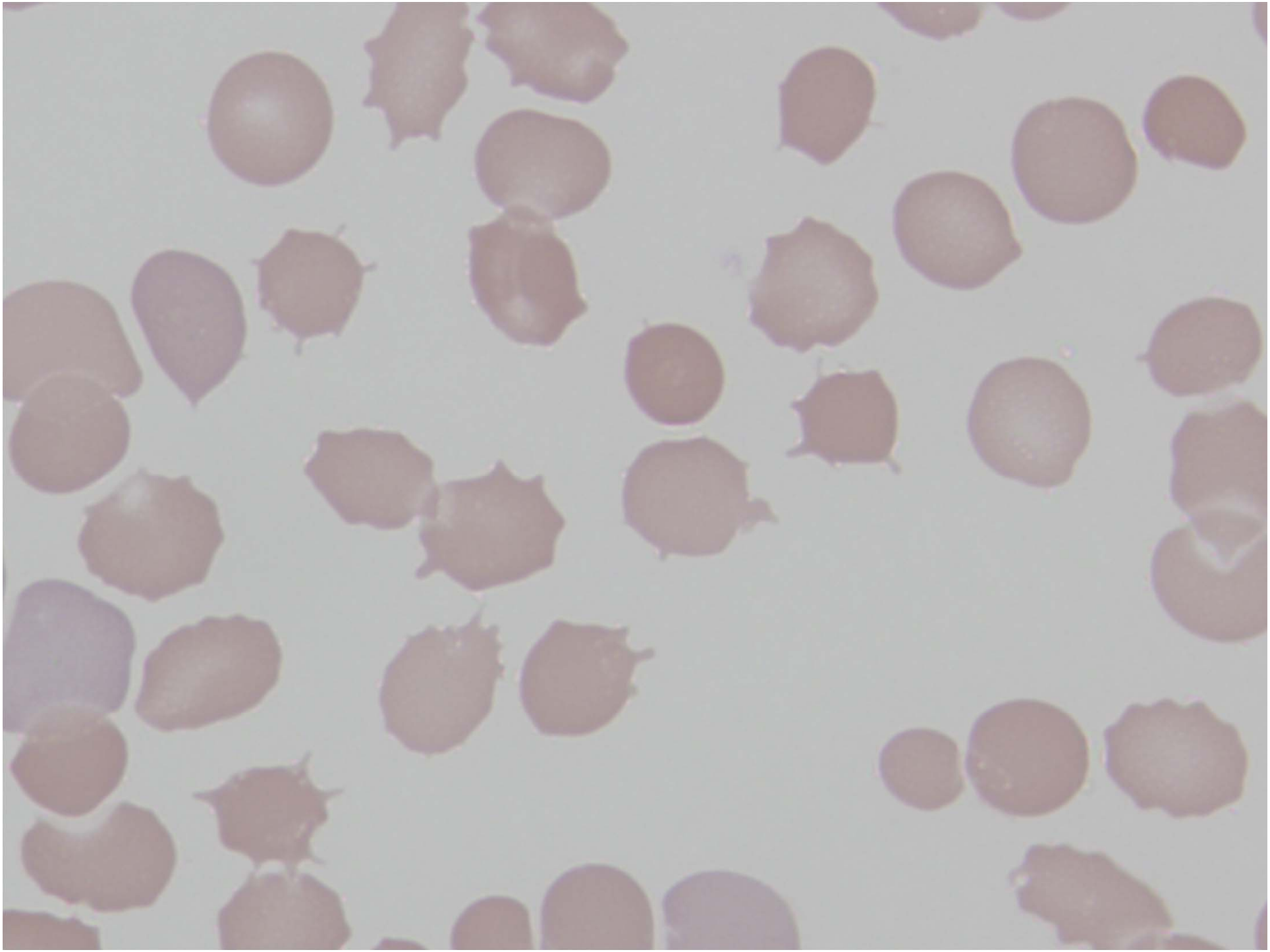
SEEN IN
IRON DEFICIENCY (DAY 2)
THALASSEMIA (DAY 5)
SICKLE CELL DISEASE (DAY 5)
PRESENCE OF Hb C GENE (DAY 5)
LIVER DISEASE


Target Cells

SPUR CELLS (ACANTHOCYTES)

SEEN IN

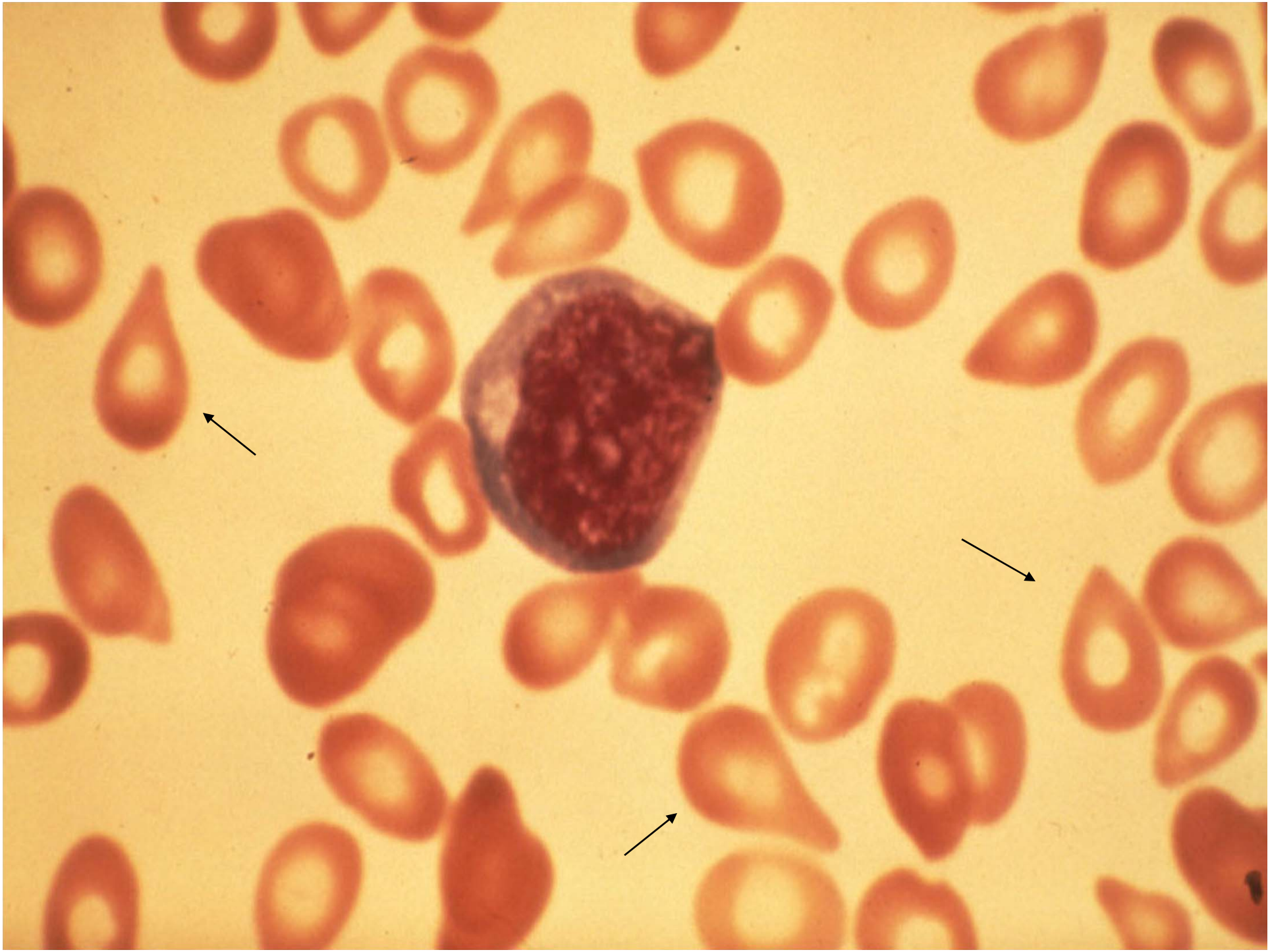
LIVER DISEASE (Day 7)



TEARDROP SHAPED RBCS

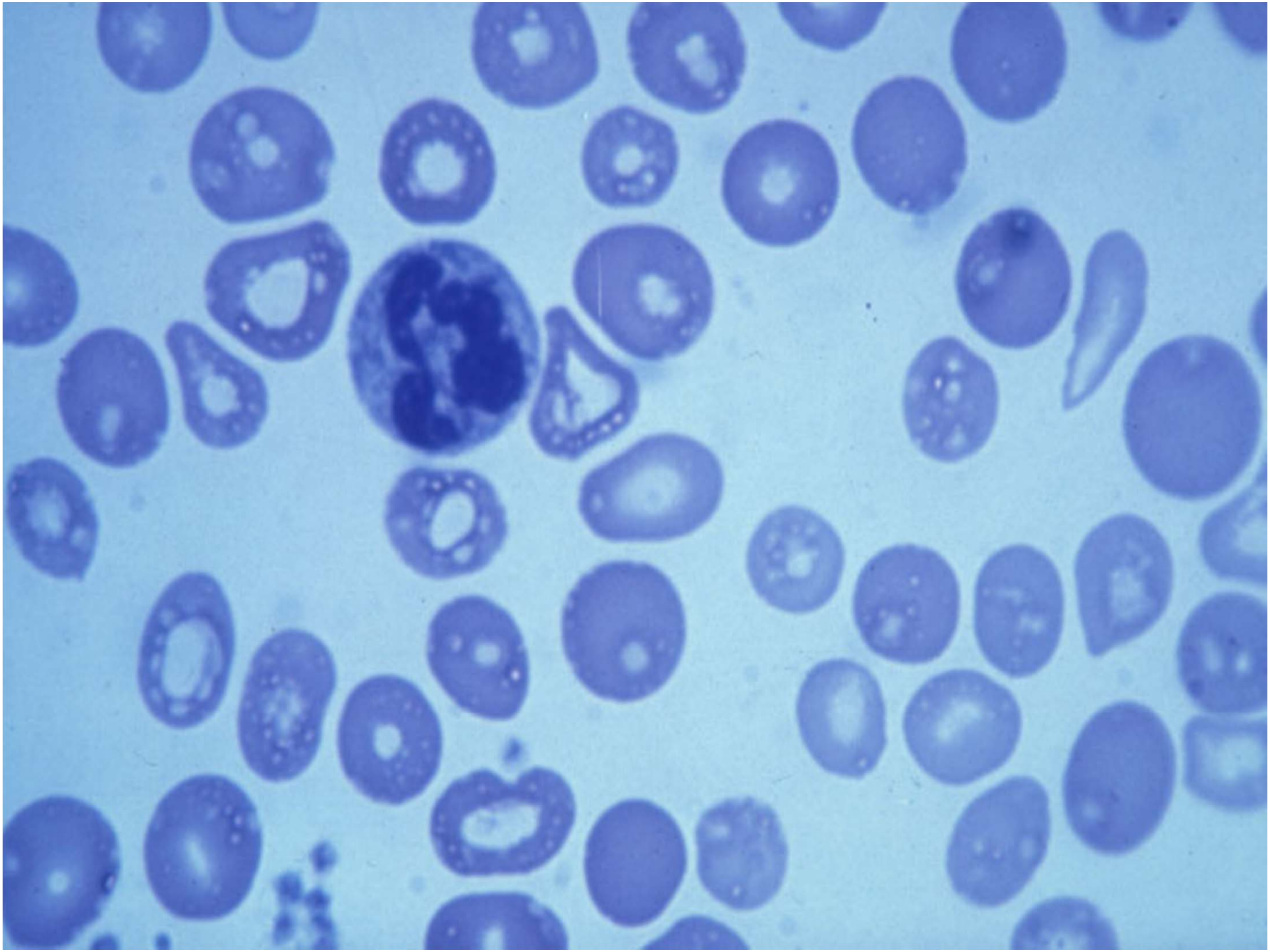
Teardrop cells seen in myelofibrosis (Day 11)

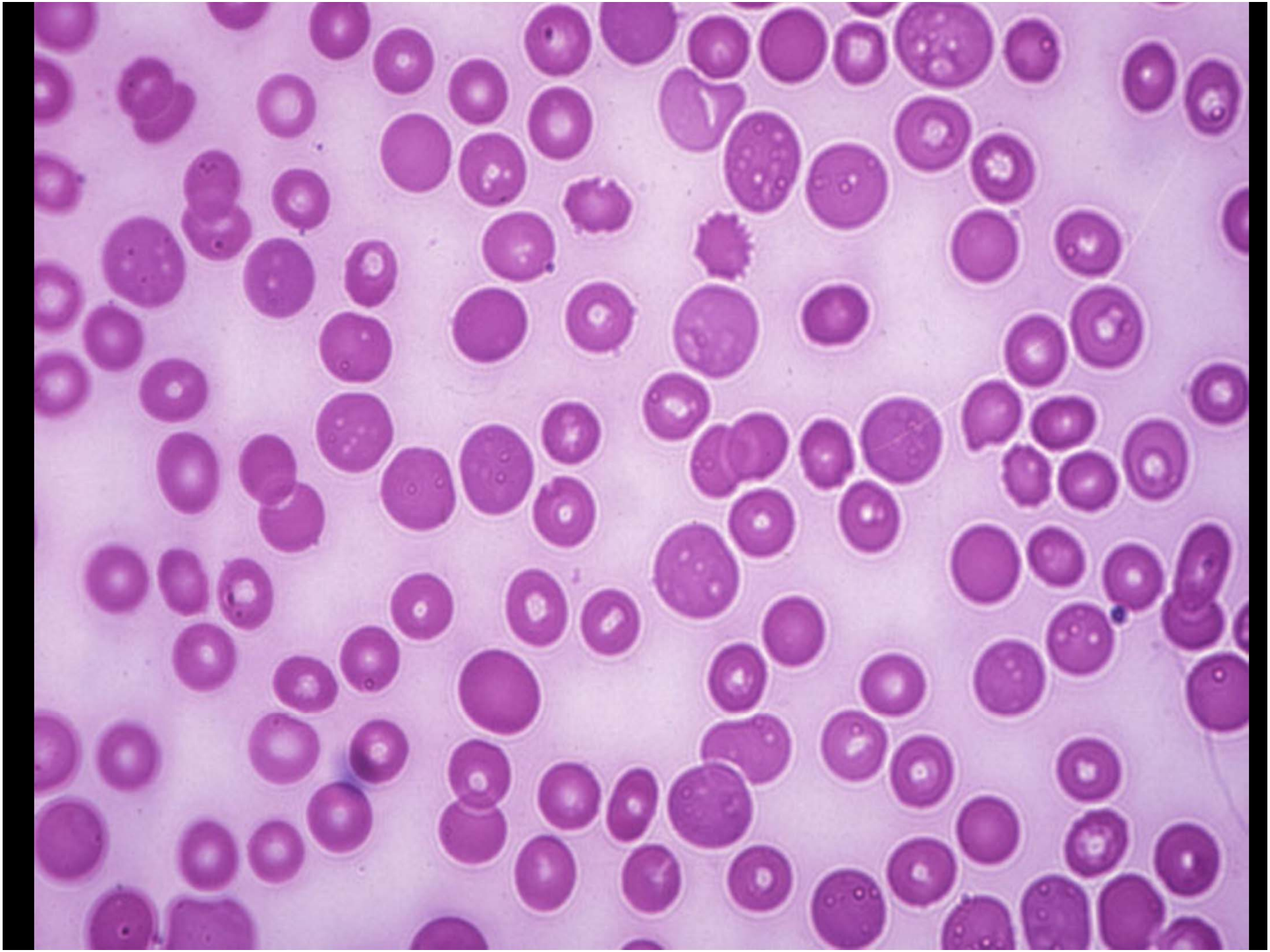
(The large nucleated cell is a blast. Blasts are not normally found in blood.)

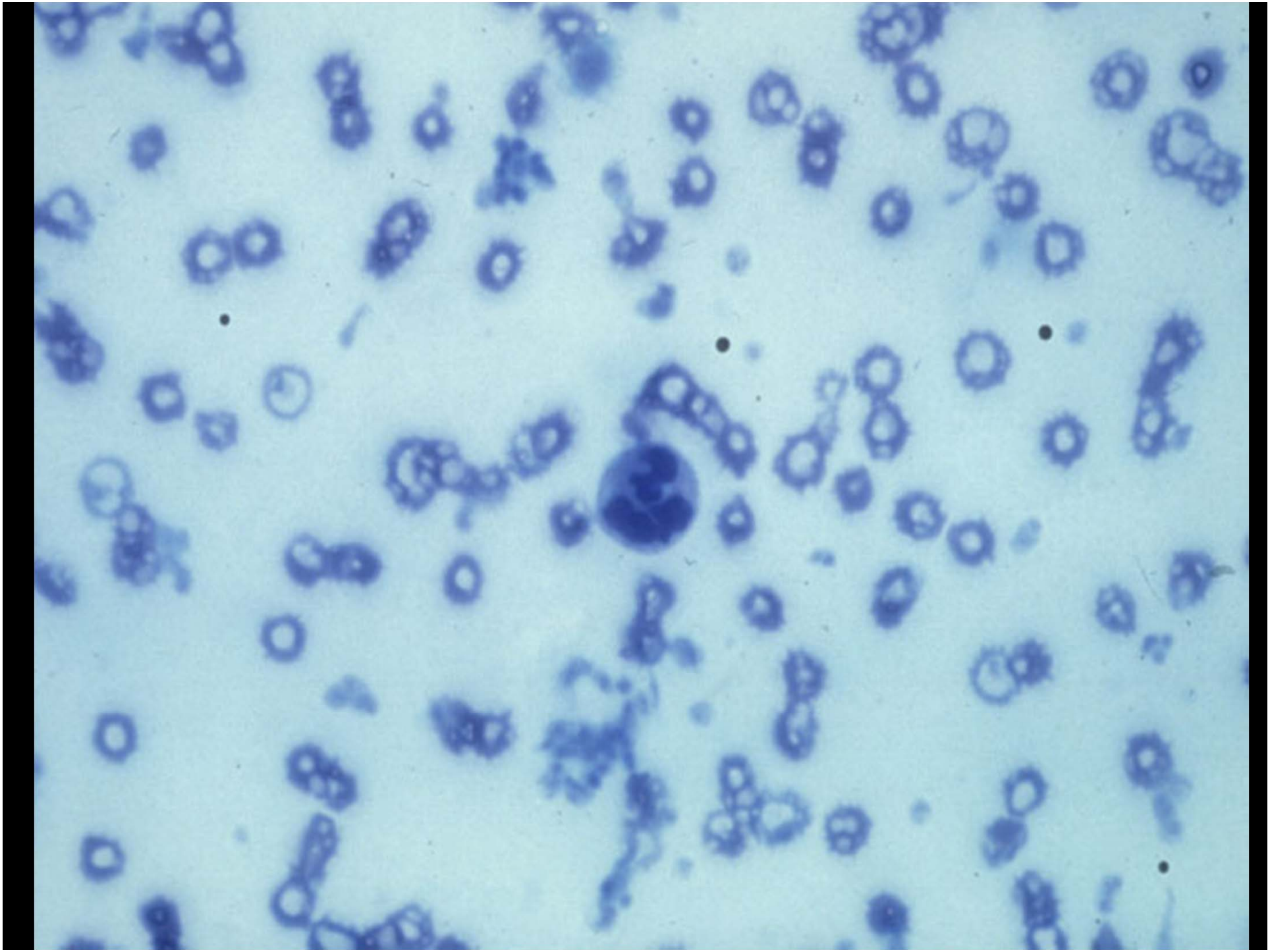



Beware of artifacts!

The next 3 slides
show water spots.



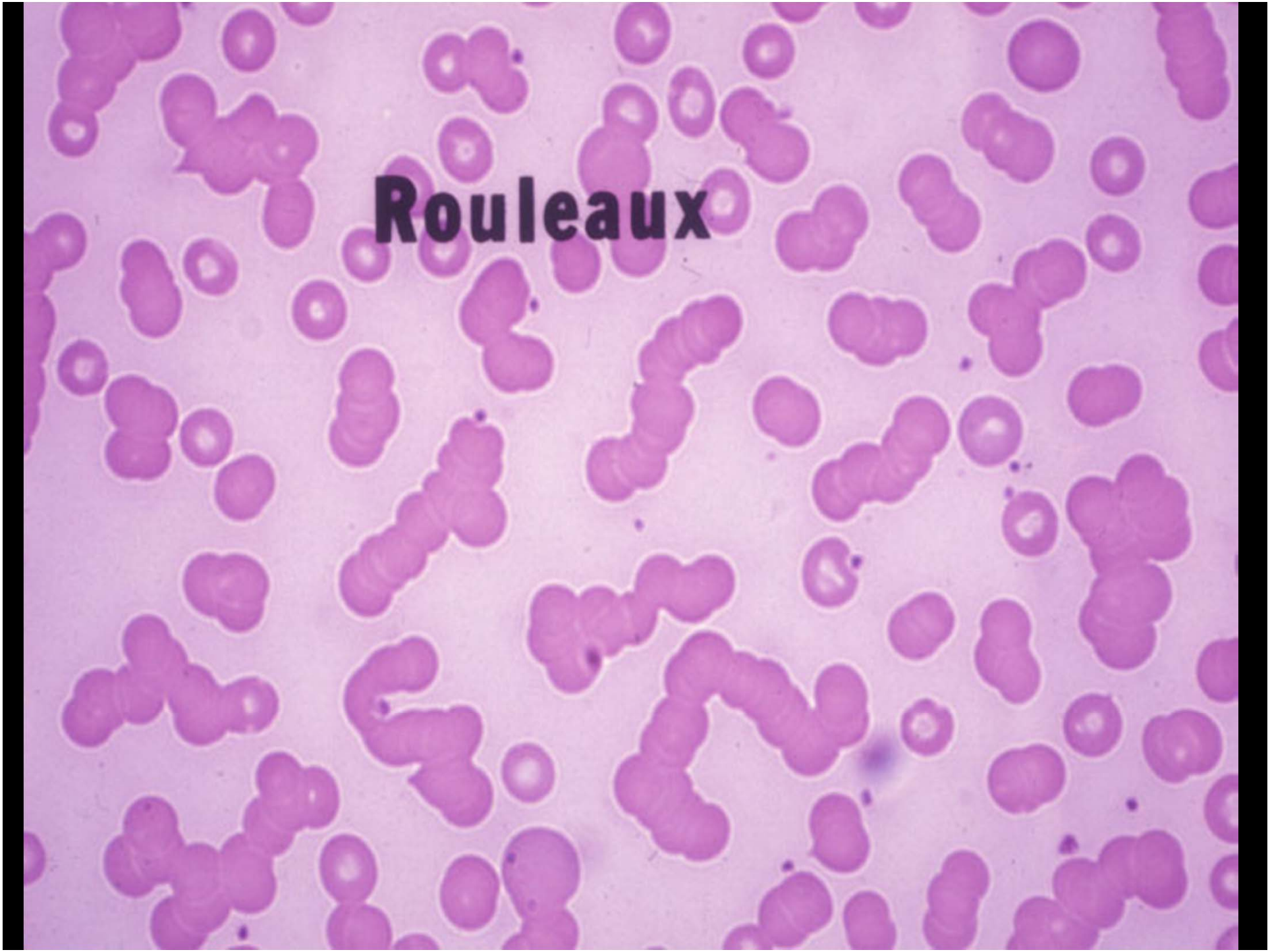




Evaluate for
distribution of red cells.

ROULEAUX

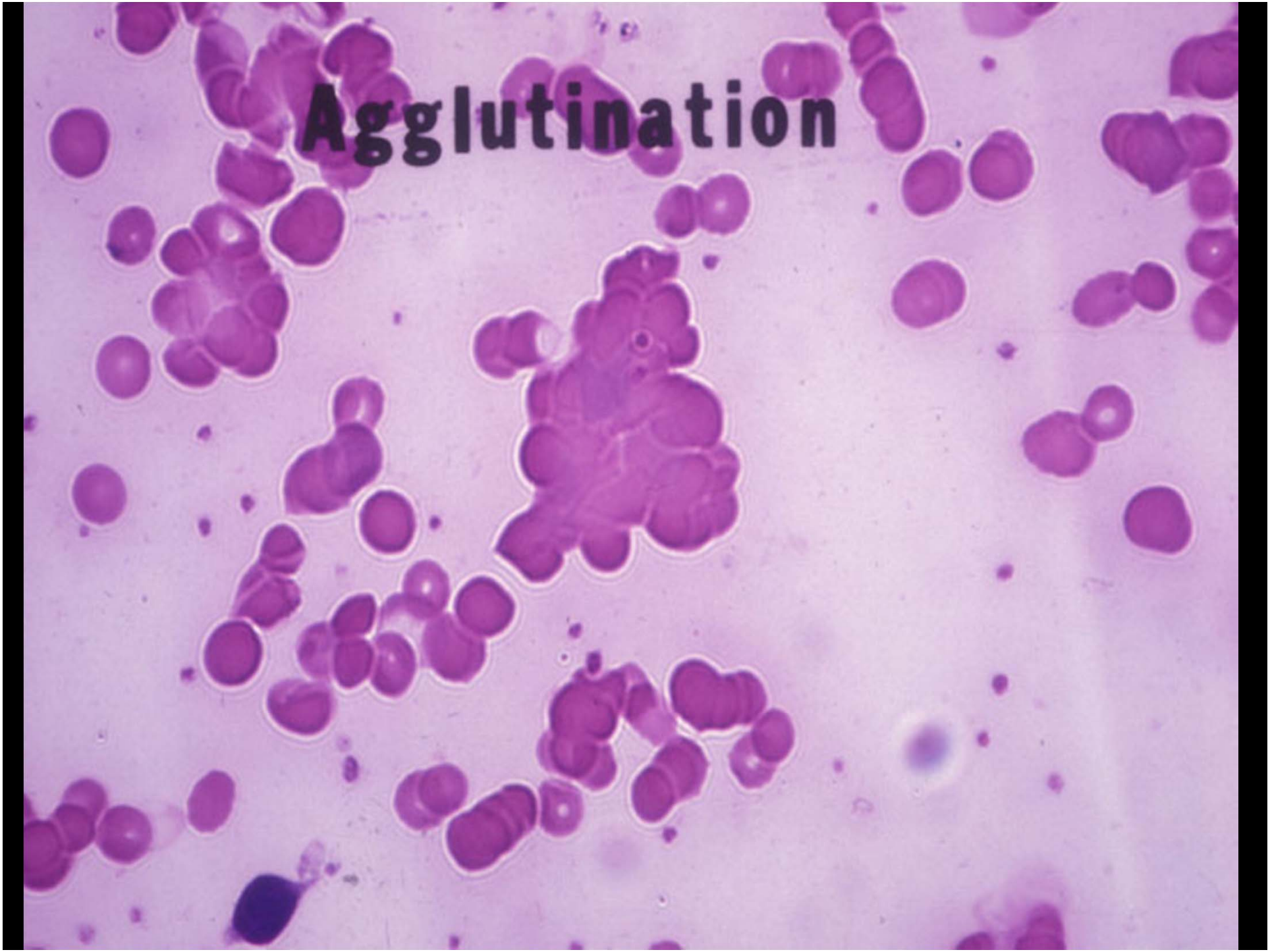
SEEN IN MULTIPLE MYELOMA
WITH
HYPERGAMMAGLOBULINEMIA (DAY 13)


Rouleaux

AGGULTINATION

IgM reacts with antigens of multiple RBCs causing clumping

SEEN IN COLD AGGLUTININ DISEASE (DAY 7)


Agglutination

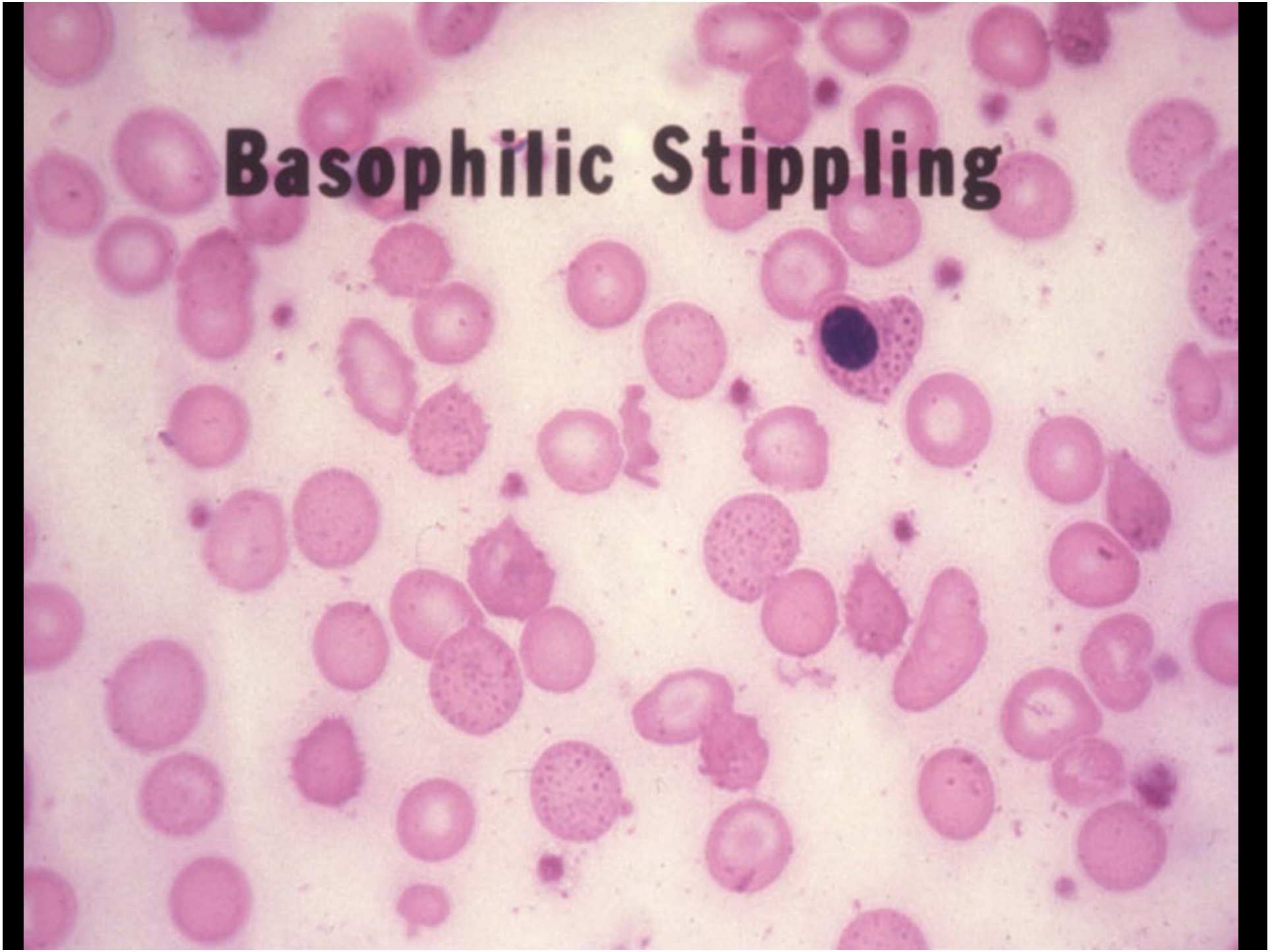

Look for
red cell inclusions.

BASOPHILIC STIPPLING

CAUSED BY ABNORMAL AGGREGATES OF RIBOSOMES

SEEN IN SEVERE THALASSEMIA (DAY 5)
SEEN IN LEAD POISONING

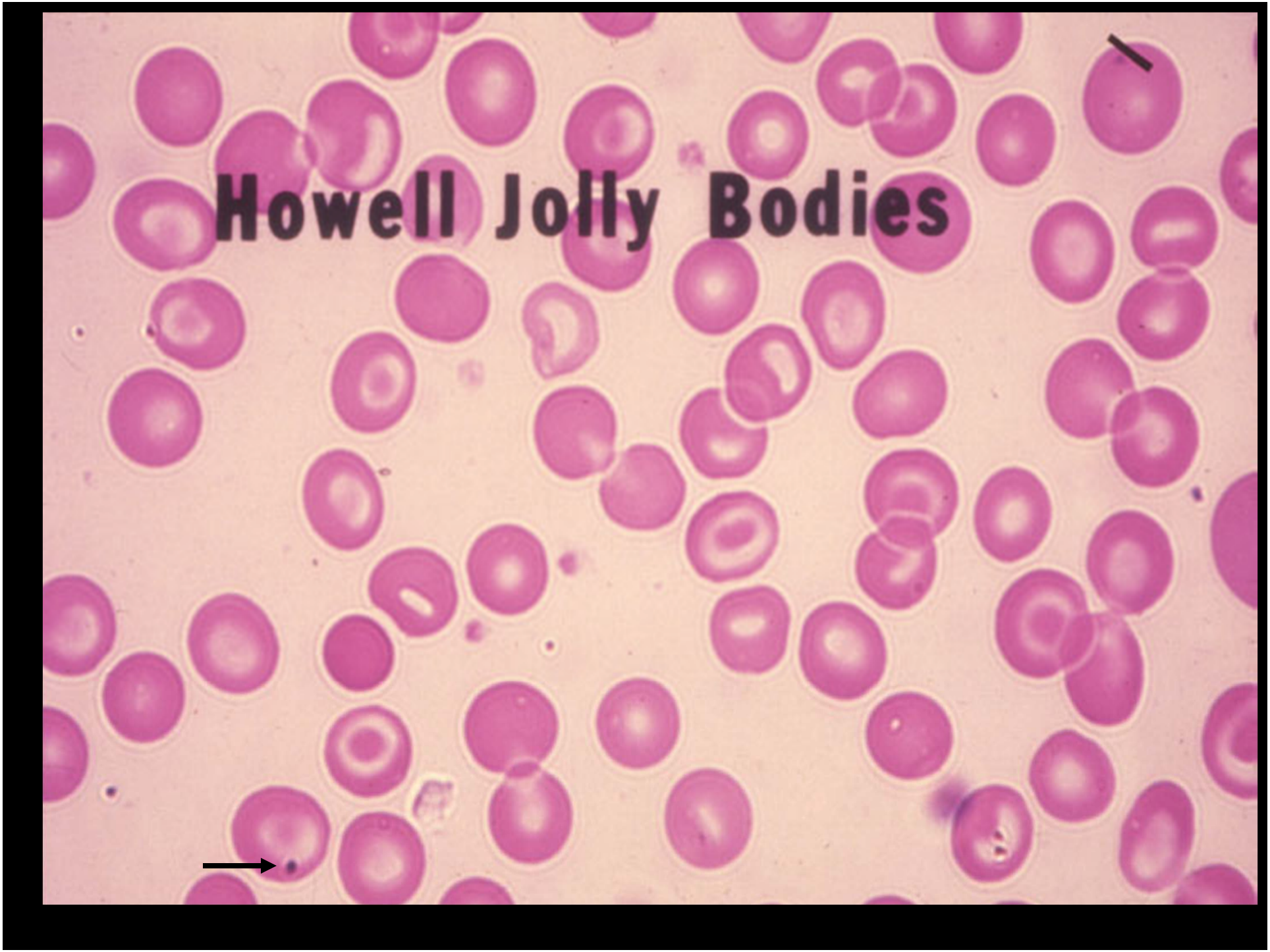
NOTE nRBC is also present in next slide.
nRBCs are not normally found in blood after neonatal period.


Basophilic Stippling

HOWELL JOLLY BODY

IS REMNANT OF NUCLEUS

SEEN IN FUNCTIONAL ASPLENIA (DAY 5)
SEEN AFTER SPLENECTOMY
INCREASED IN MEGALOBLASTIC BONE MARROW (DAY 3)


Howell Jolly Bodies

CELLS NOT SEEN IN NORMAL BLOOD INCLUDE

PLASMA CELLS

NUCLEATED RED CELLS

BLASTS