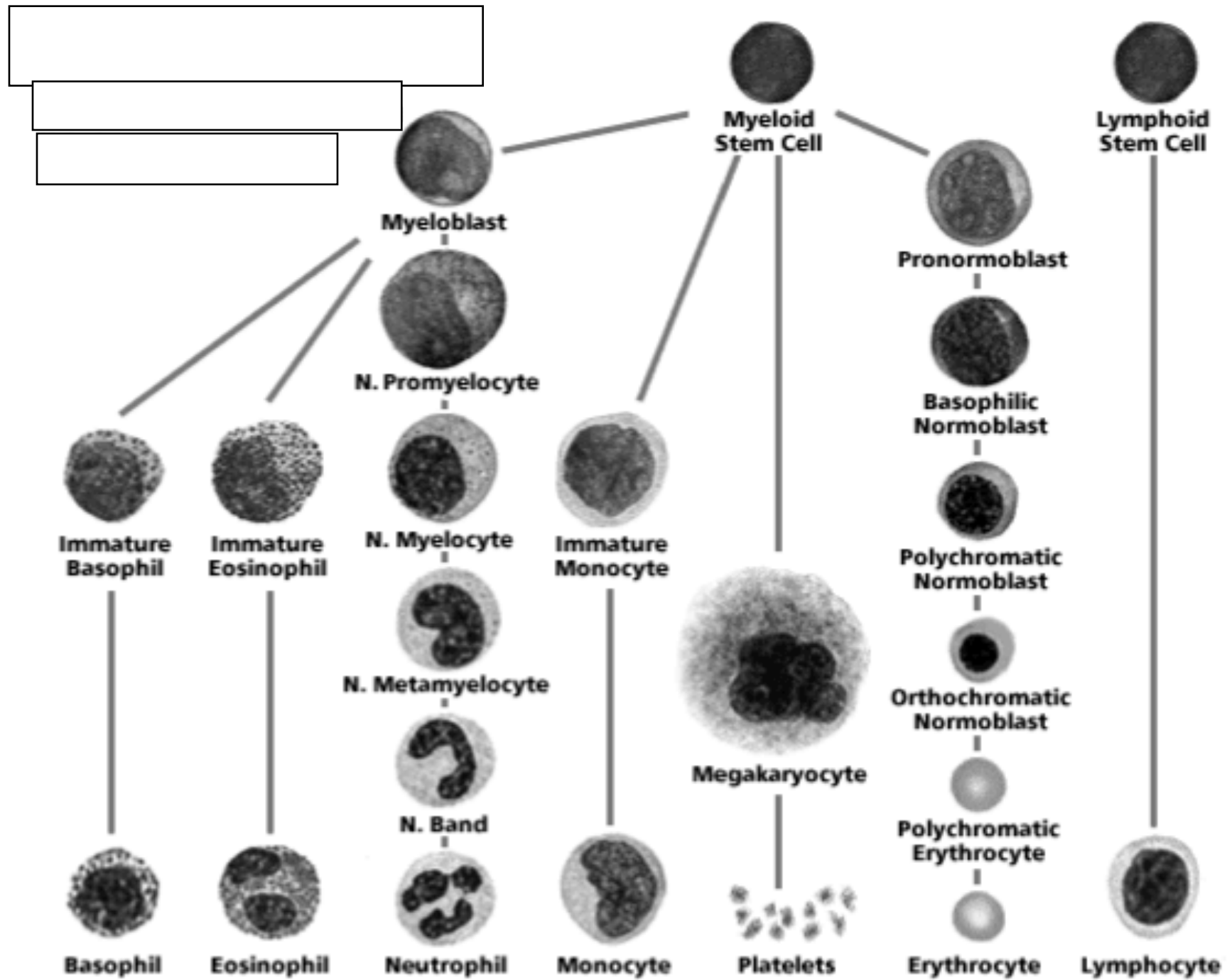


Benign Leukocytoses

Kristine Krafts, M.D.



Benign Leukocytoses

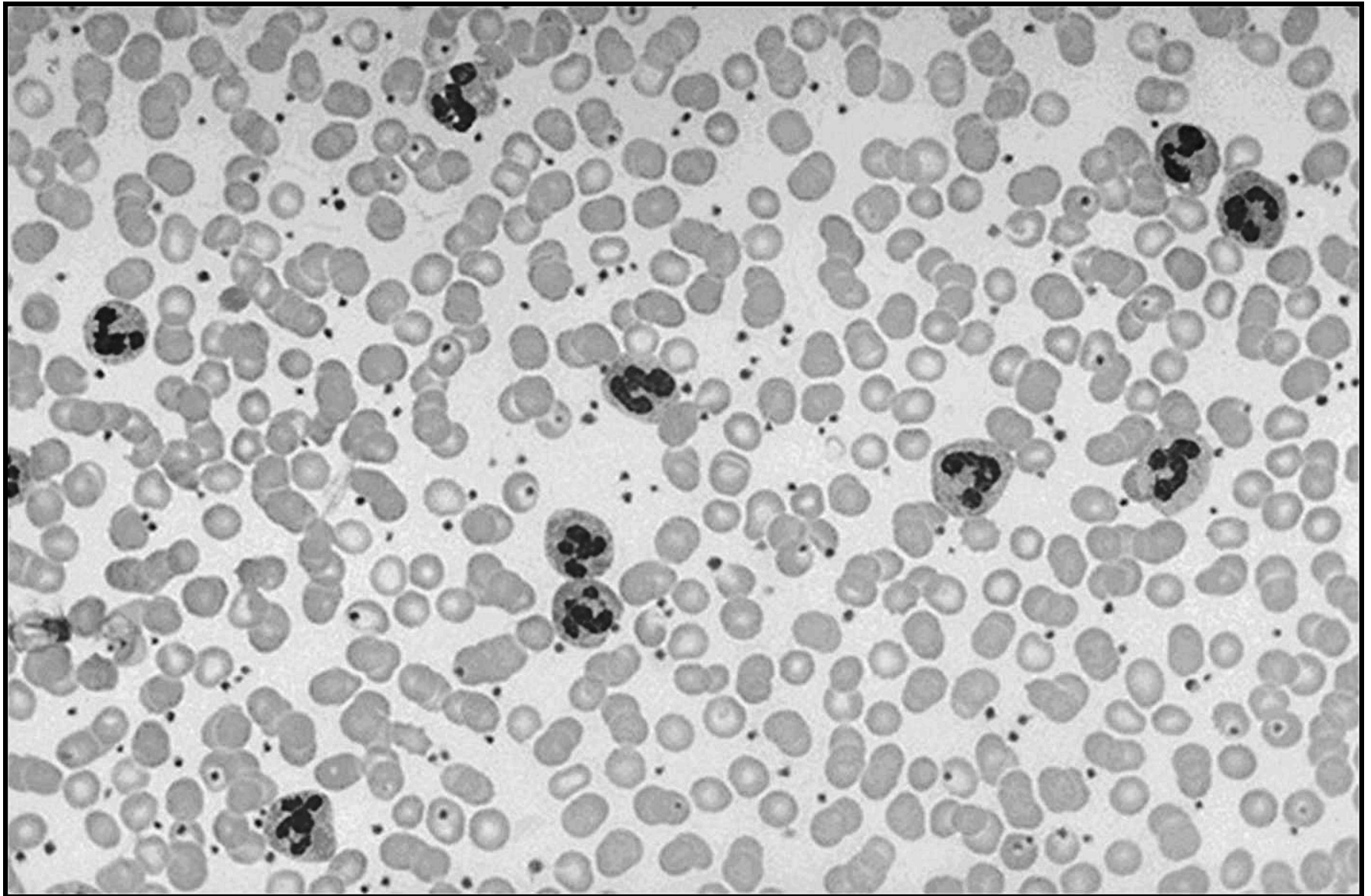
- Neutrophilia
- Lymphocytosis
- Basophilia
- Monocytosis
- Eosinophilia

Neutrophilia

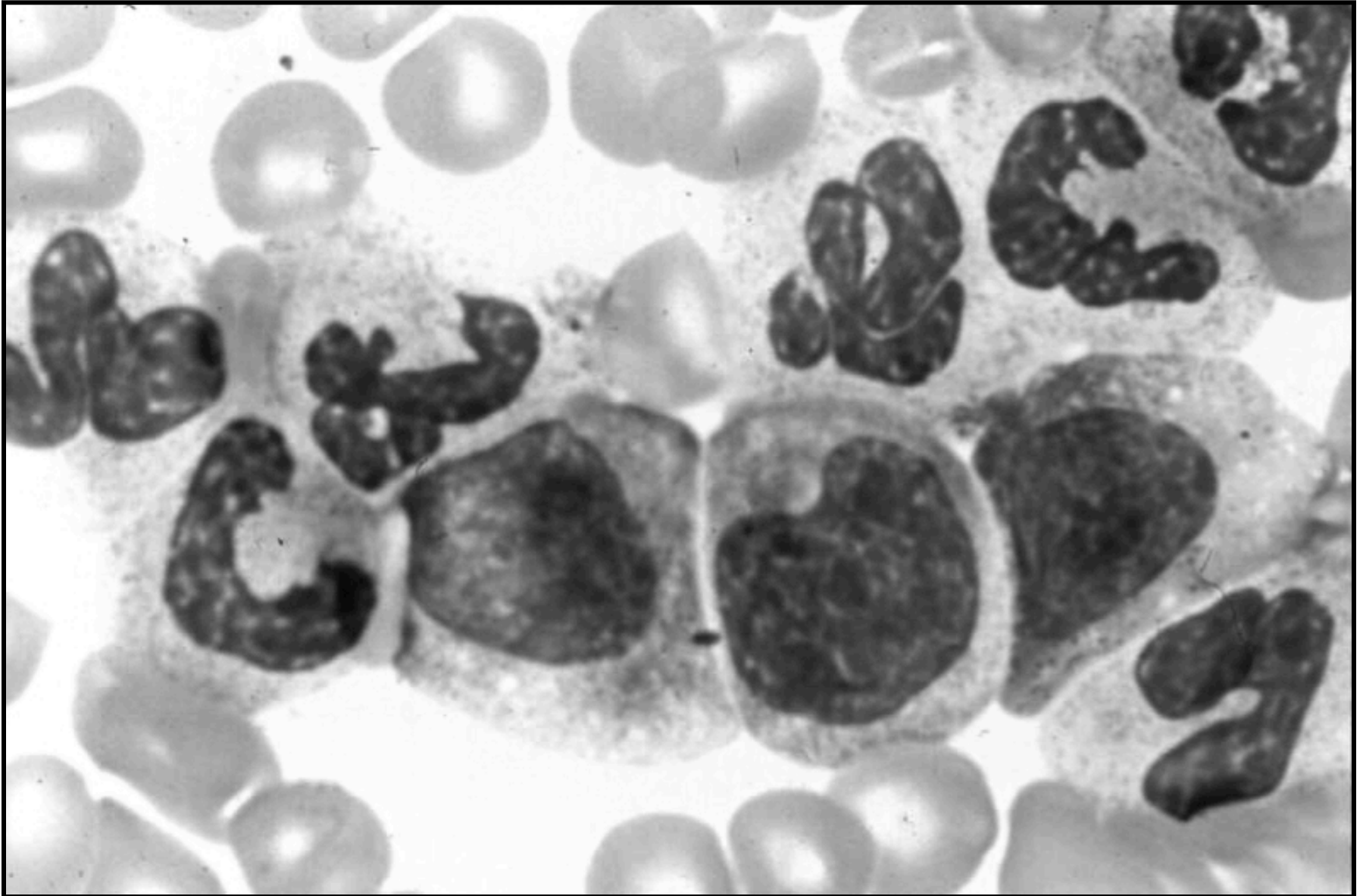
- Neutrophils fight infection, participate in inflammatory responses
- Bone marrow
 - Most neutrophils live here
 - All stages of maturation
- Blood
 - Only 5% of all neutrophils are here
 - Normally only segmented neutrophils
 - Half are marginated

Types of Neutrophilia

- Mature (lots of segmented neutrophils)
- Immature (lots of immature neutrophils)



Mature neutrophilia



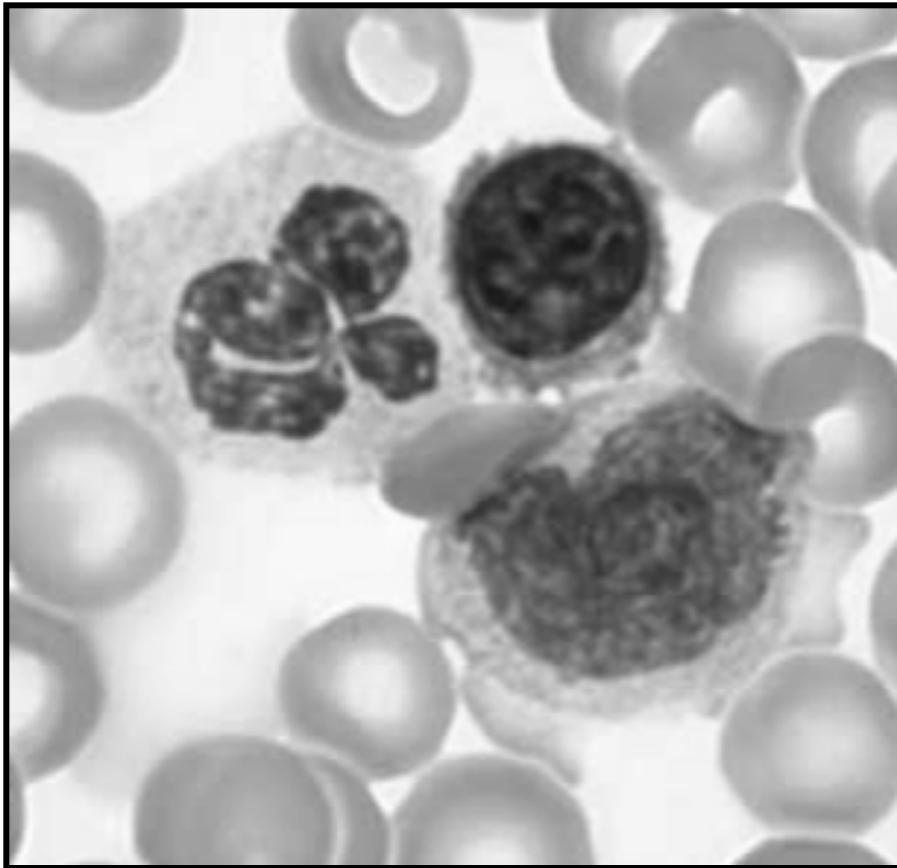
Immature neutrophilia

Causes of Mature Neutrophilia

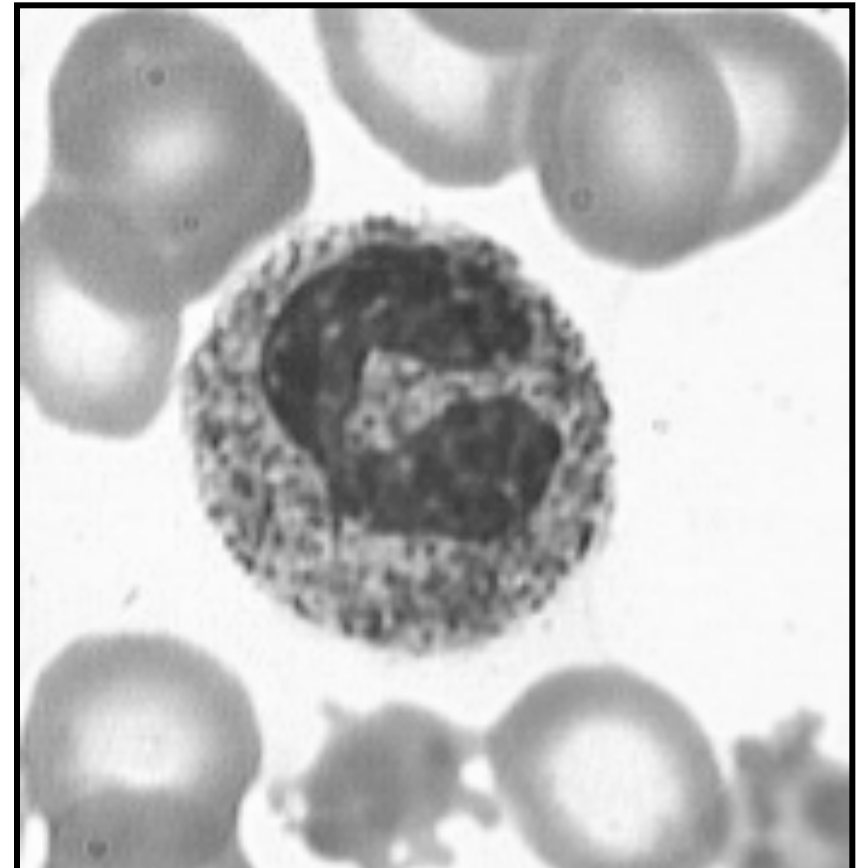
- Infection (bacterial)
- Inflammation
- Physiologic things
 - Stress
 - Hormones

Toxic Changes

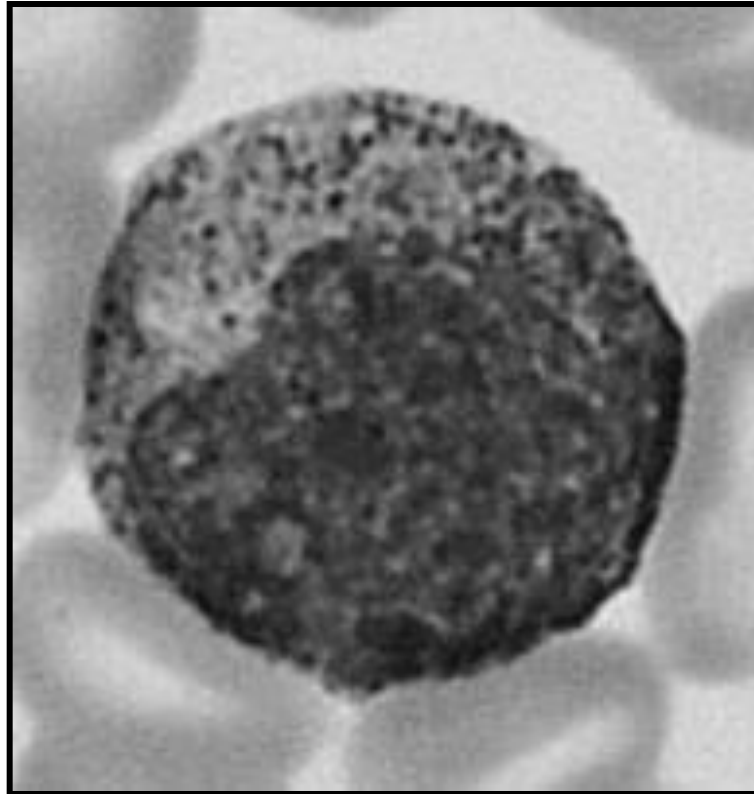
- Seen only in infection!
- Toxic granulation, D
cytoplasmic vacuolization
- Scariest: cytoplasmic vacuolization



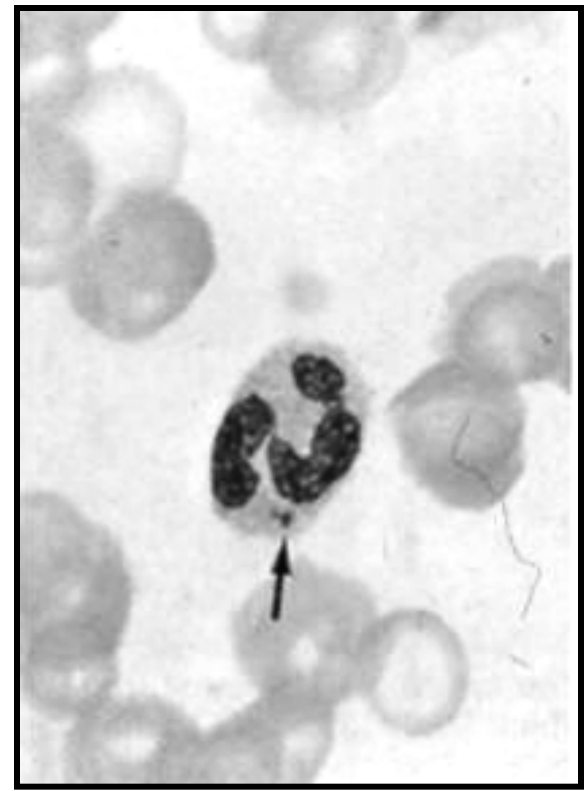
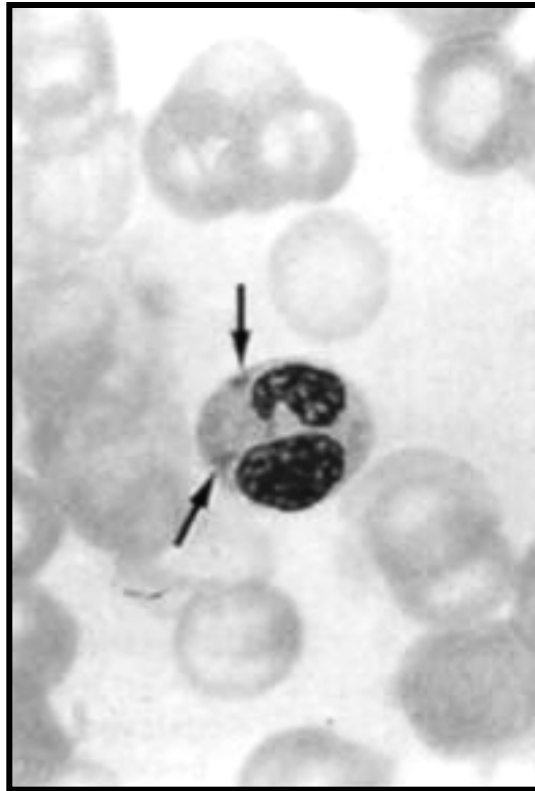
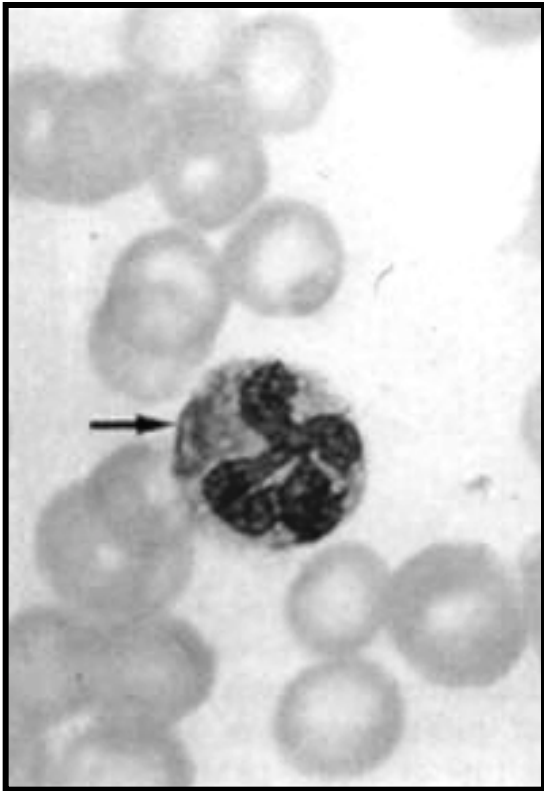
Normal neutrophil
(top left)



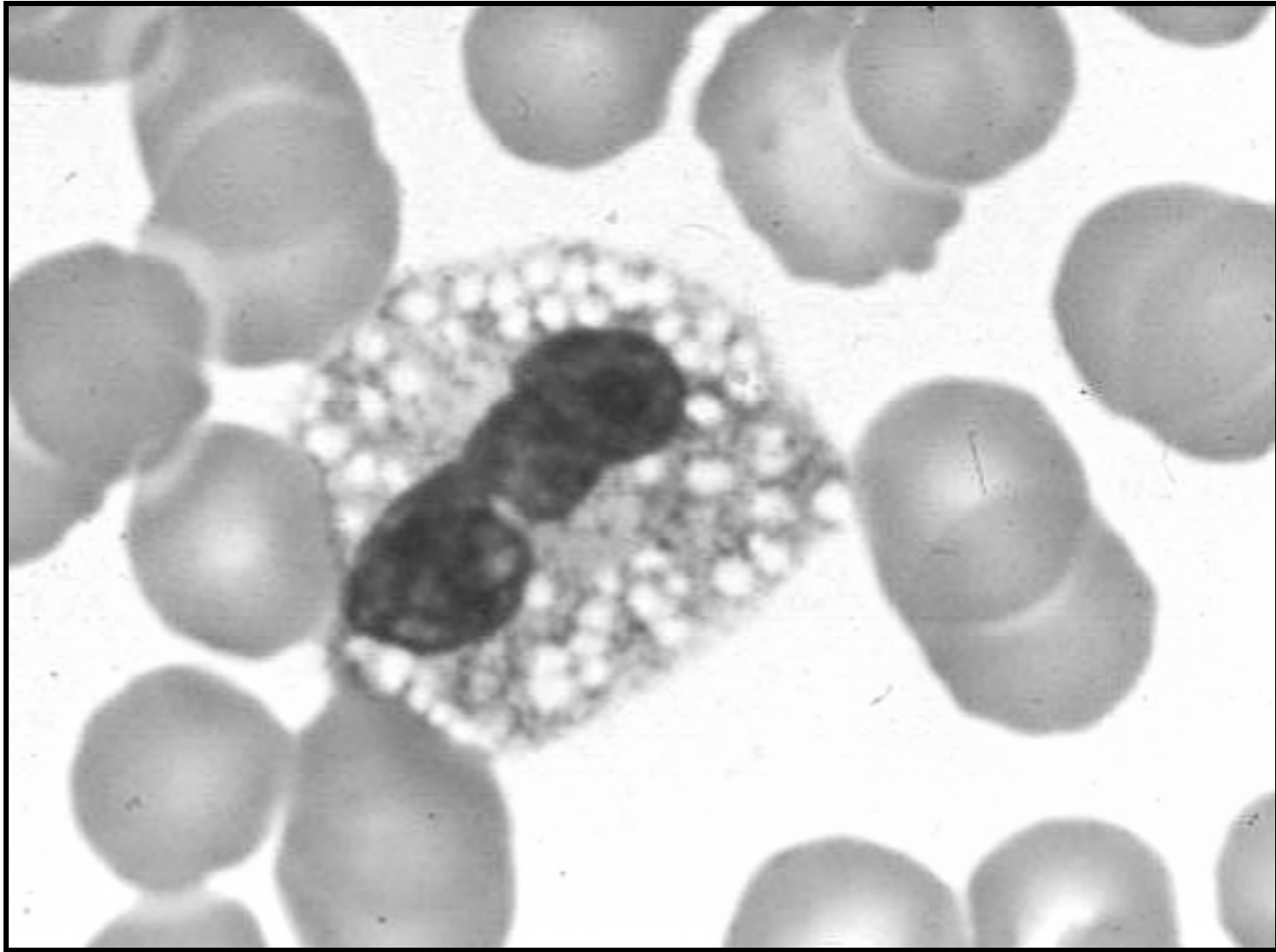
Neutrophil with
toxic granulation



Promyelocyte



Döhle bodies



Cytoplasmic vacuolization

Causes of Immature Neutrophilia

- Infection (bacterial)
- Inflammation
- Severe anemia
- Something filling up the marrow

Three Forms of Immature Neutrophilia

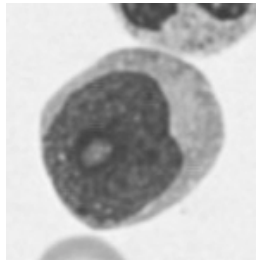
- Left shift



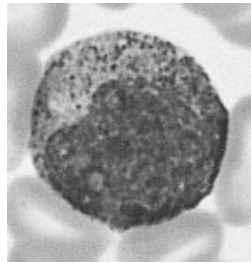
**LEFT
SHIFT**

**Radical Art in
1970s Britain**

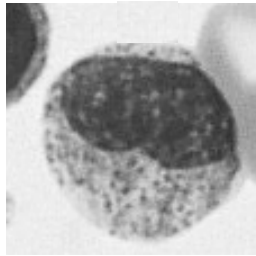
JOHN A. WALKER



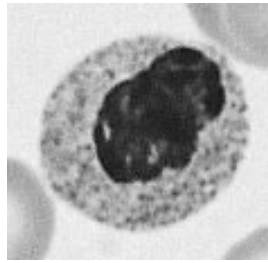
blast



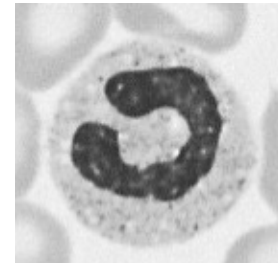
promyelocyte



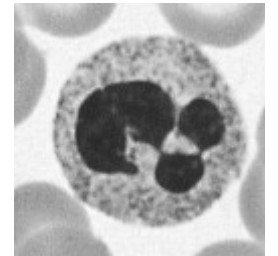
myelocyte



metamyelocyte

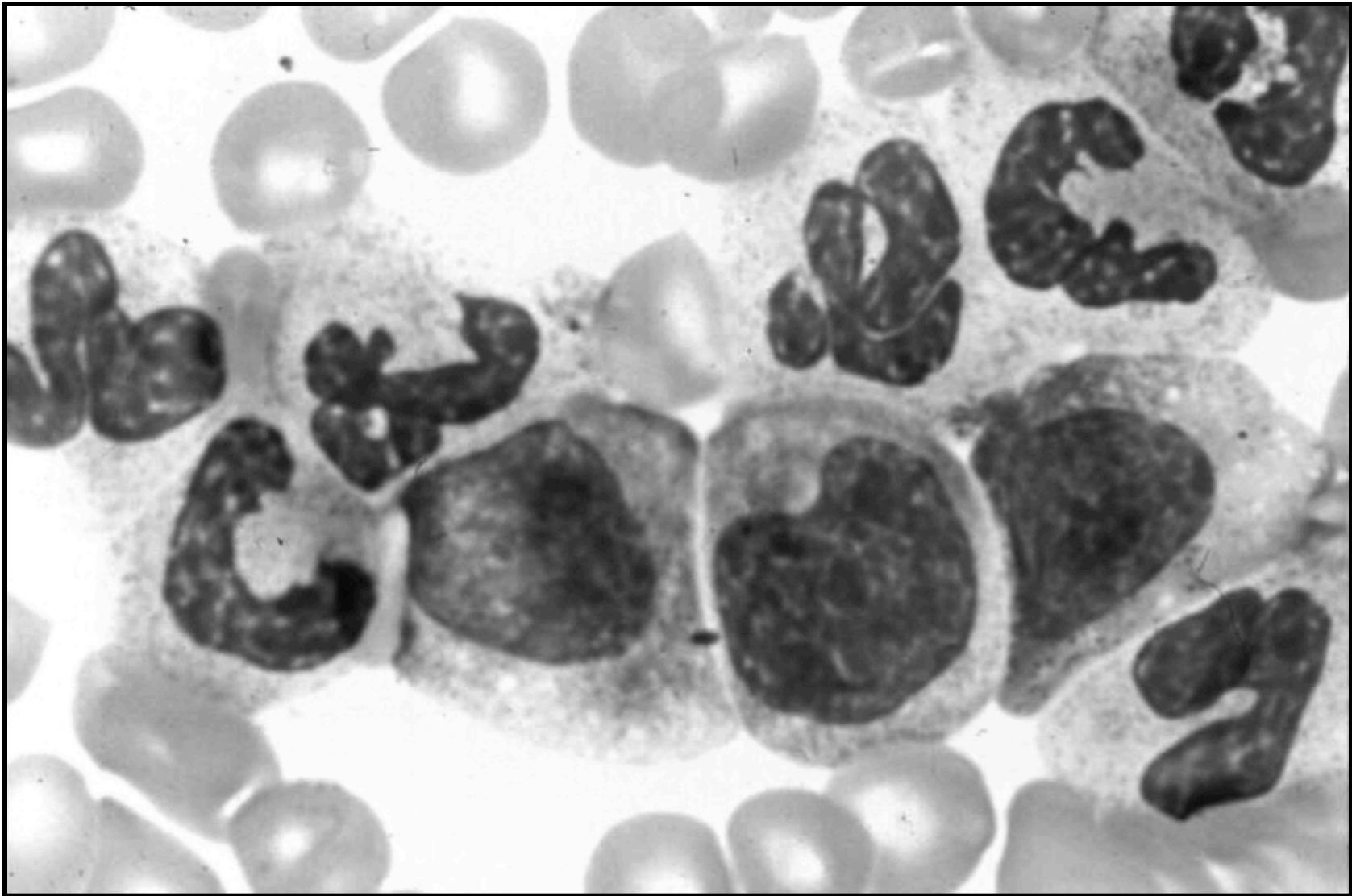


band



segmented
neutrophil

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|



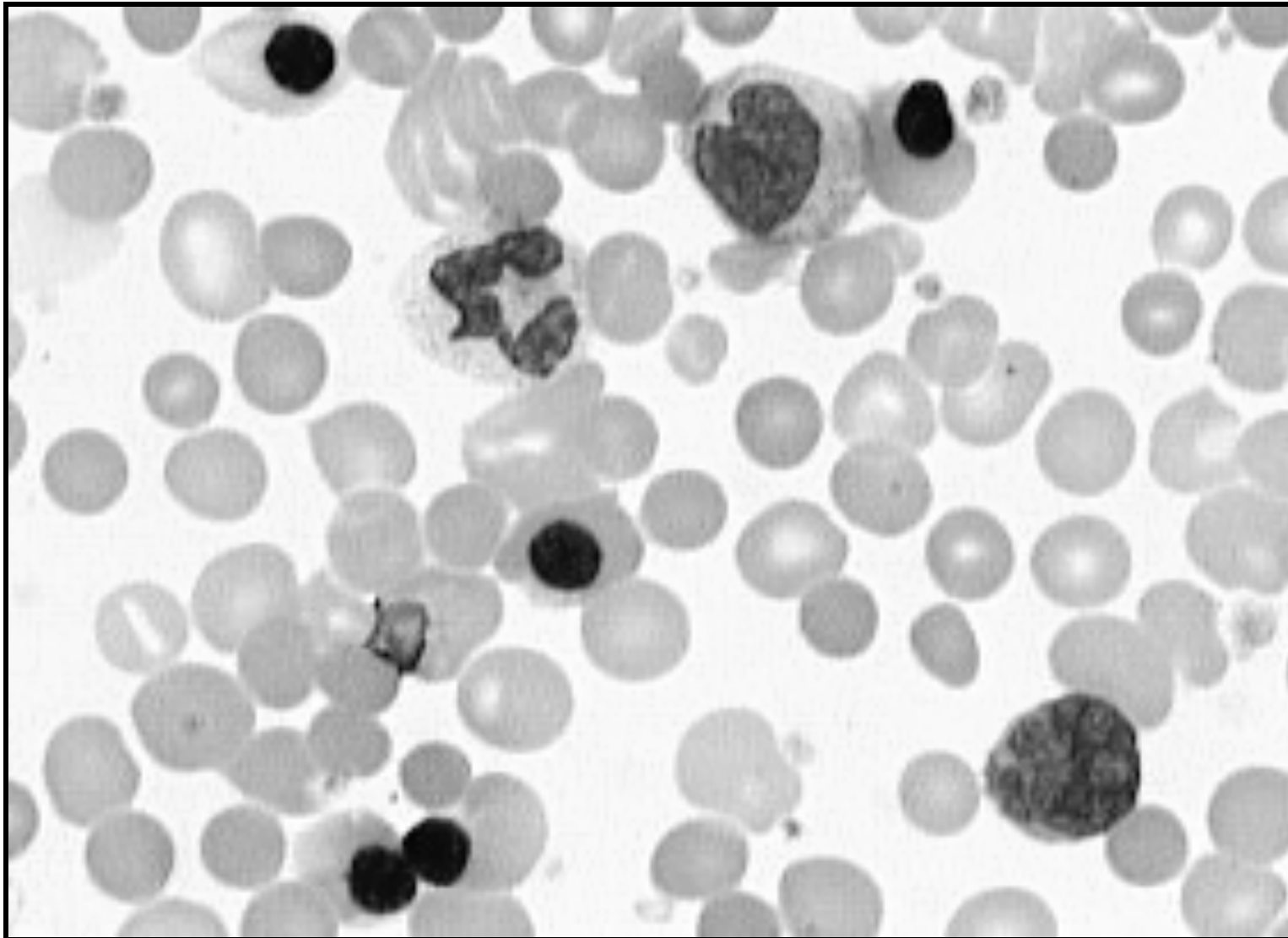
Left shift

Three Forms of Immature Neutrophilia

- Left shift
- Leukemoid reaction

Three Forms of Immature Neutrophilia

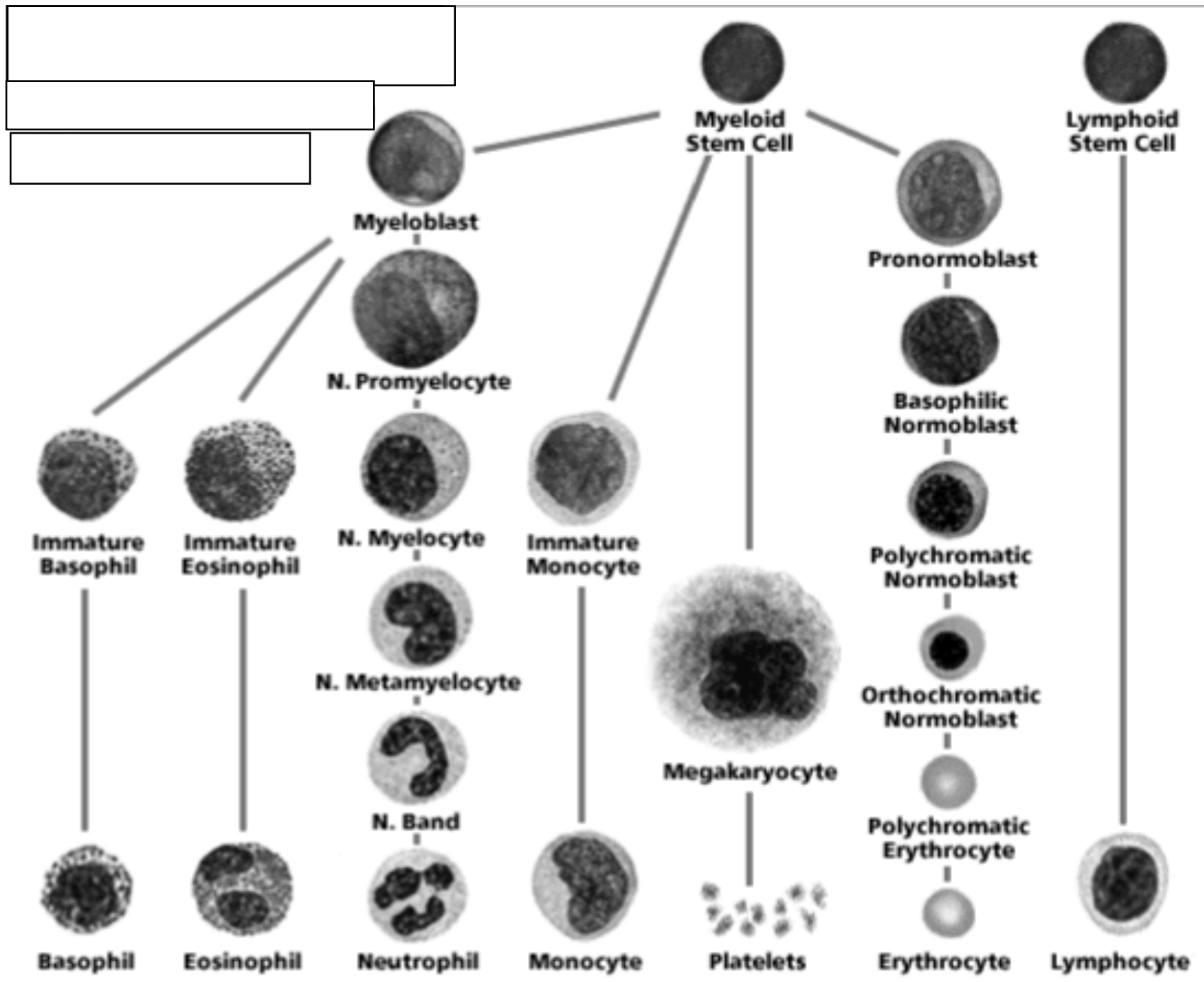
- Left shift
- Leukemoid reaction
- Leukoerythroblastotic reaction



Leukoerythroblastotic reaction

Three Forms of Immature Neutrophilia

- Left shift
- Leukemoid reaction
- Leukoerythroblastotic reaction
 - Due to something malignant
 - Due to something benign

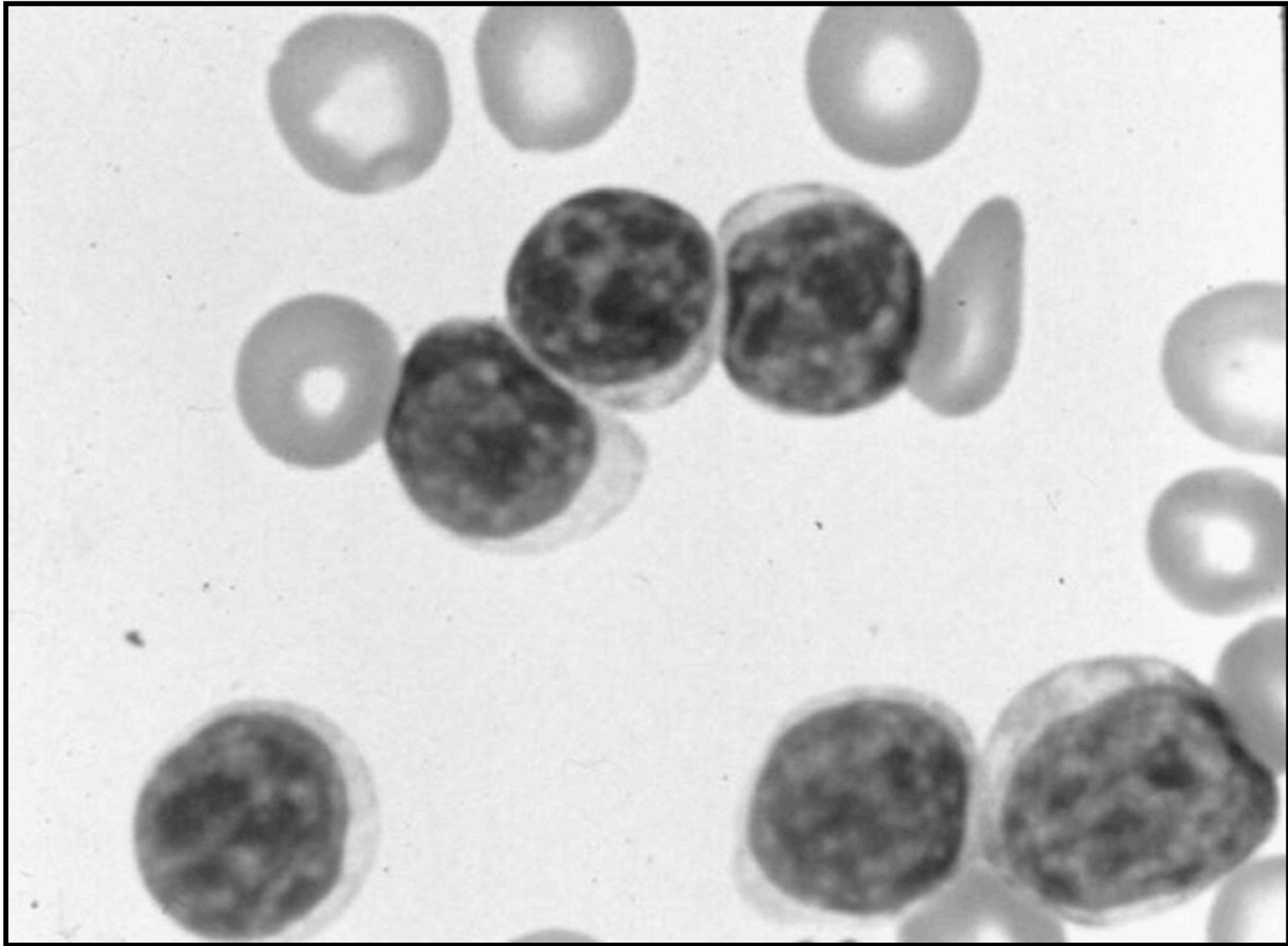


Lymphocytosis

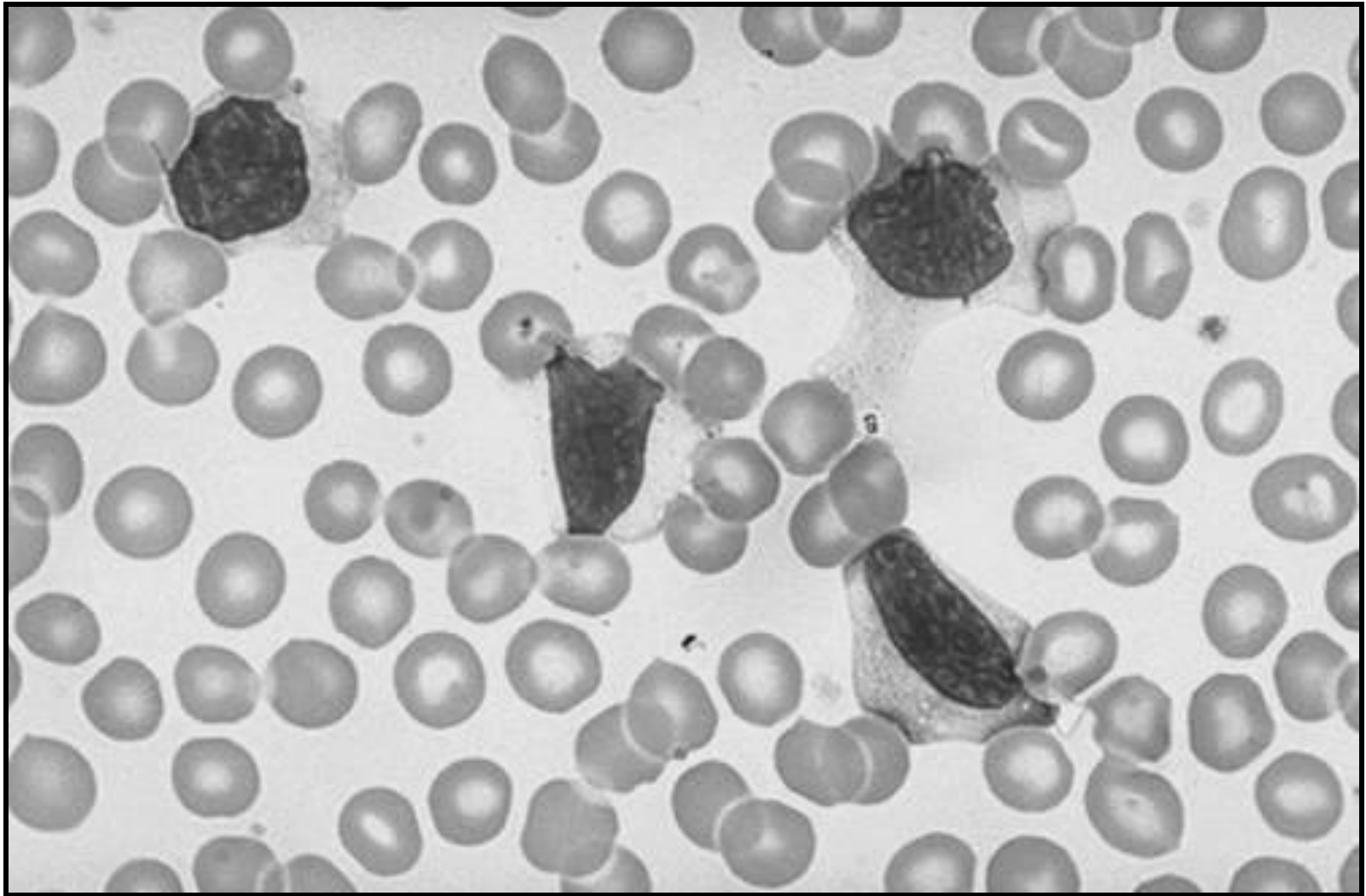
- Lymphocytes fight infection, participate in immunologic responses
- Normal lymphocyte count
 - Varies a lot with age!
 - Bigger normal range in infants
- Normal immunophenotype in blood
 - T cells: 80%
 - B cells: 15%
 - NK cells: 5%

Types of Lymphocytosis

- Mature (lots of mature lymphocytes)
- Reactive (lots of funny-looking lymphocytes)



Mature lymphocytosis



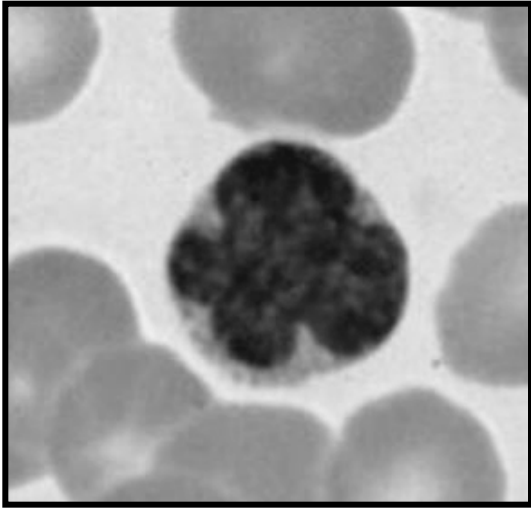
Reactive lymphocytosis

Causes of Mature Lymphocytosis

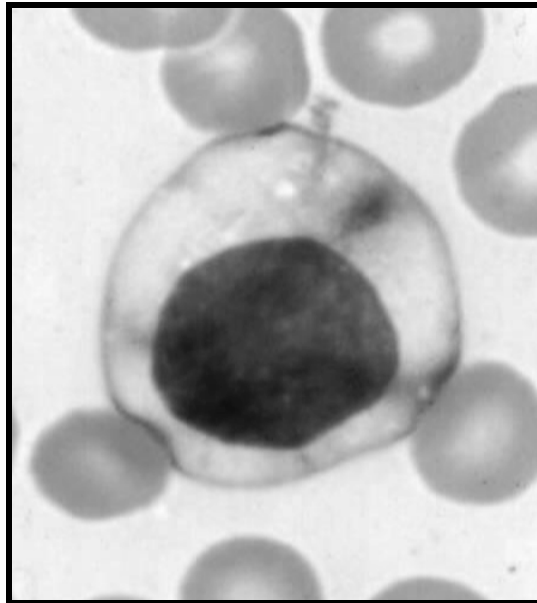
- Infectious lymphocytosis
- Bordetella pertussis
- Transient stress

Causes of Reactive Lymphocytosis

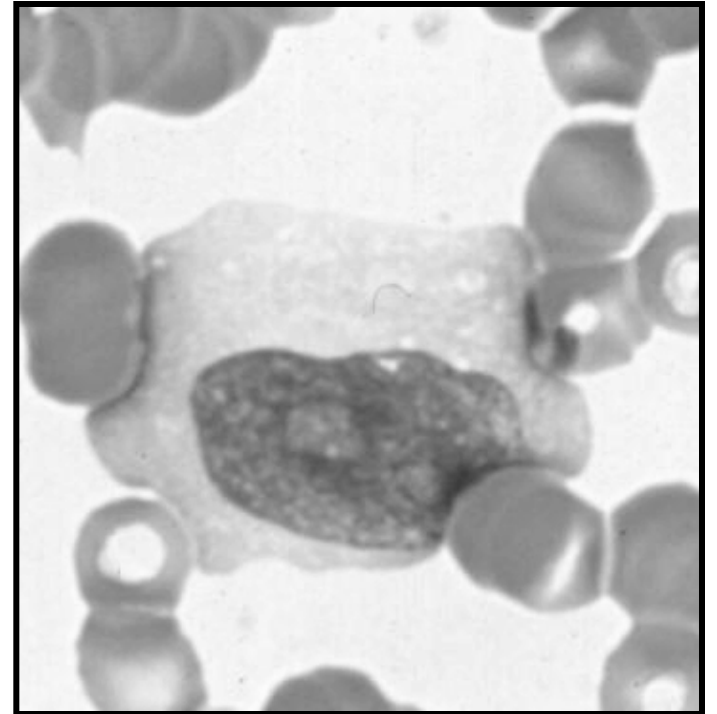
- Infectious mononucleosis
- Pediatric viral infections
- Viral hepatitis
- Immune disorders



I

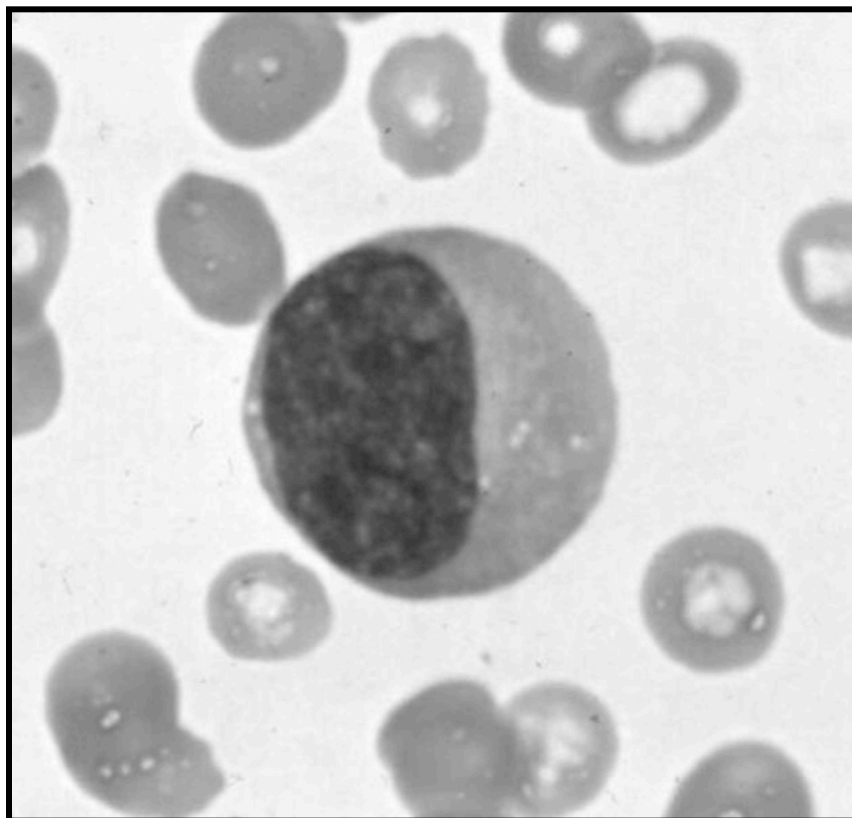


II



III

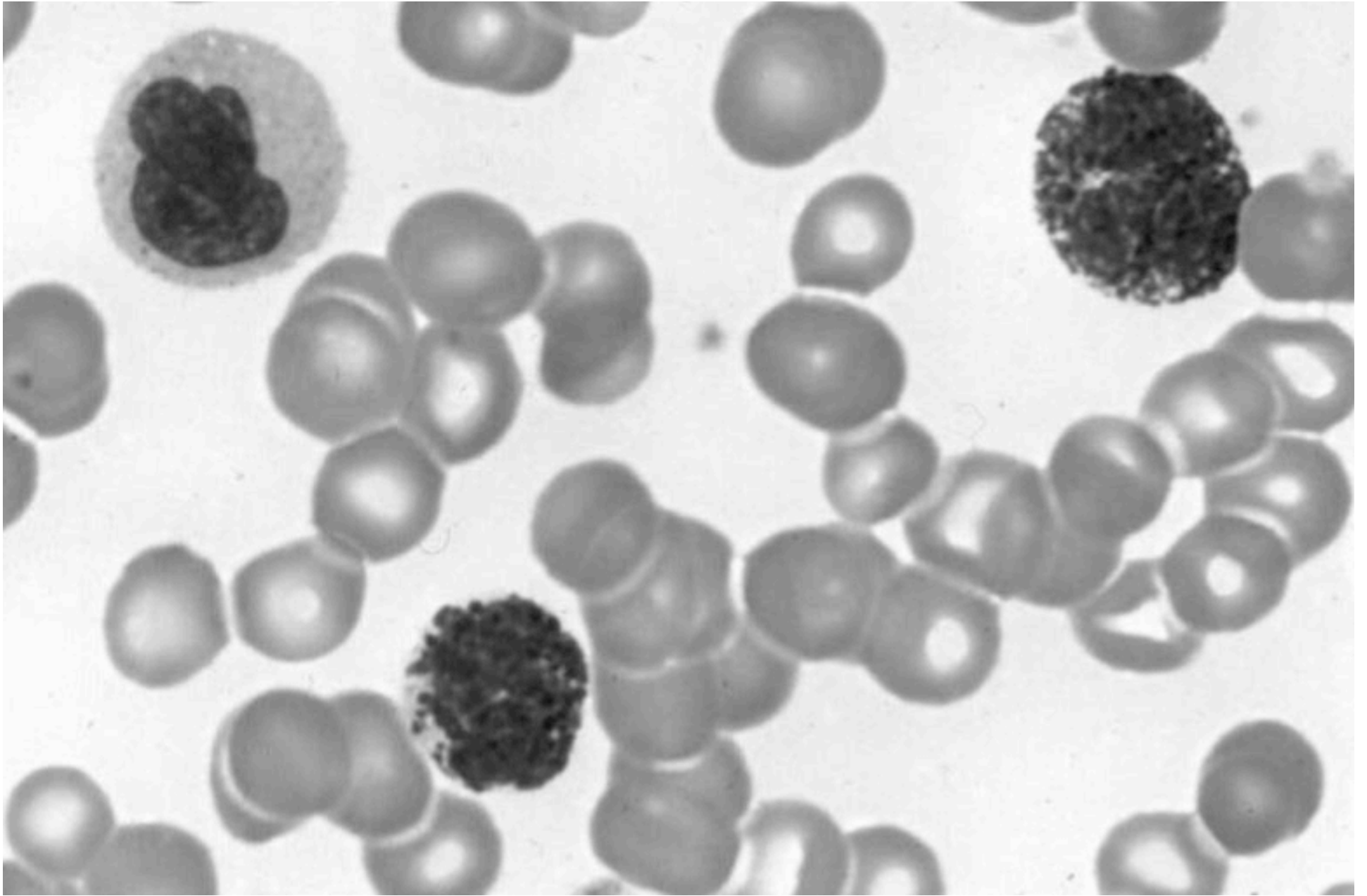
Downey cells



Plasmacytoid lymphocyte

Other Benign Leukocytoses

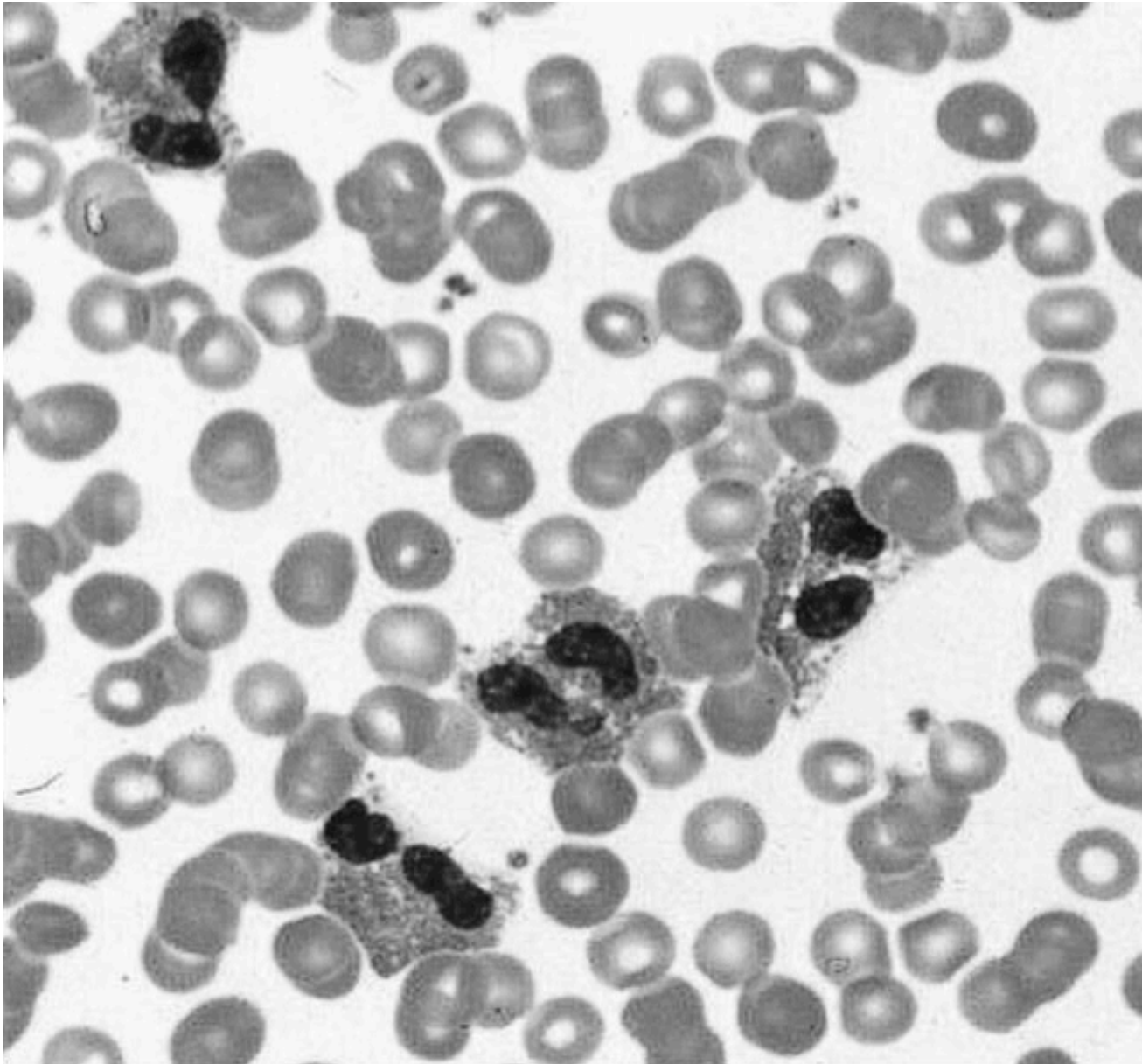
- Basophilia
 - CML
 - CML
 - CML



•Basophilia

Other Benign Leukocytoses

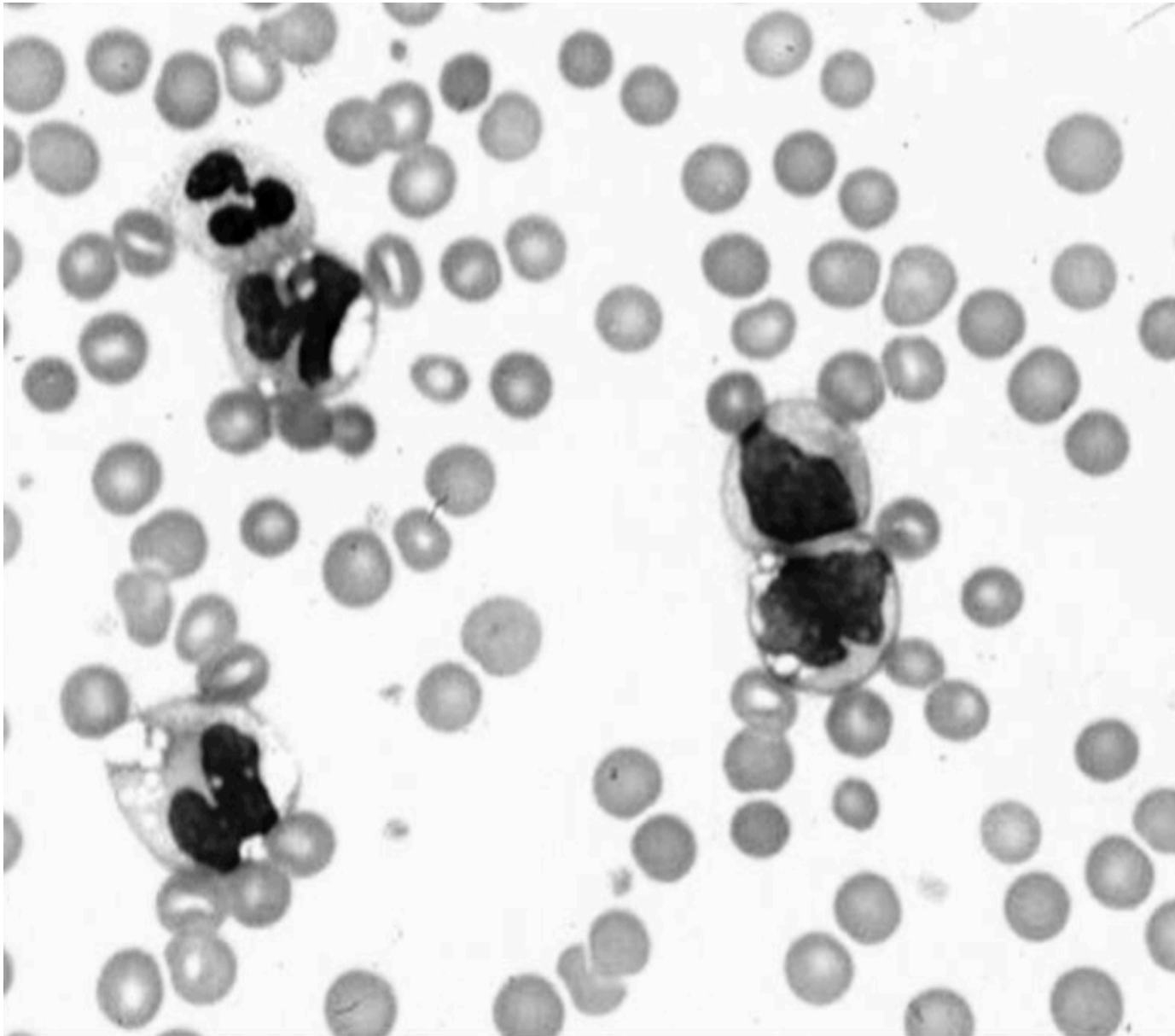
- Basophilia
- Eosinophilia
 - Drugs
 - Asthma
 - Skin diseases
 - Parasites



•Eosinophilia

Other Benign Leukocytoses

- Basophilia
- Eosinophilia
- Monocytosis
 - Infection
 - Autoimmune disease
 - Malignancy



• Monocytosis

Eosinophilia Boards Question

Eosinophils are characteristically found in which of the following conditions?

- A. Bacterial infections
- B. Viral infections
- C. Fungal infections
- D. Parasitic infections

Eosinophilia Boards Question

Eosinophils are characteristically found in which of the following conditions?

- A. Bacterial infections
- B. Viral infections
- C. Fungal infections
- D. Parasitic infections