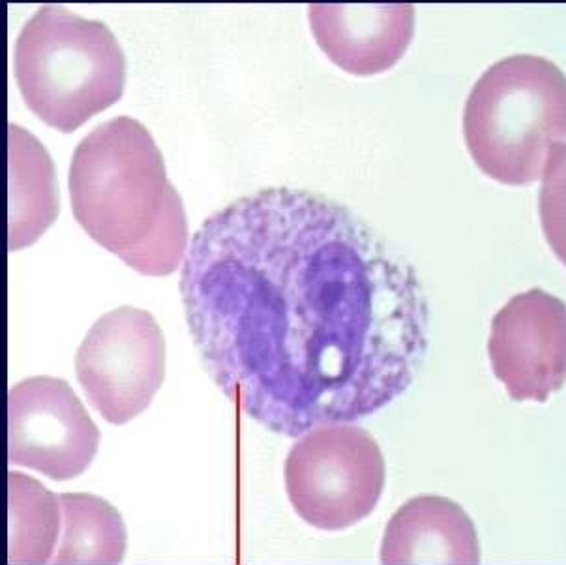# Granulocyte Variations

toxic neutrophil

- Variations in granulocytes appearance may be caused by maturation defects, inflammation, and infections.

- Maturation defects are due to genetic or metabolic disorders.

- Bacterial infections can cause 'toxic' changes to neutrophils.

Granulocyte Variations

WBC - Hyposegmentation

Morphology:
granulocytes with one or two poorly segmented nuclear lobes
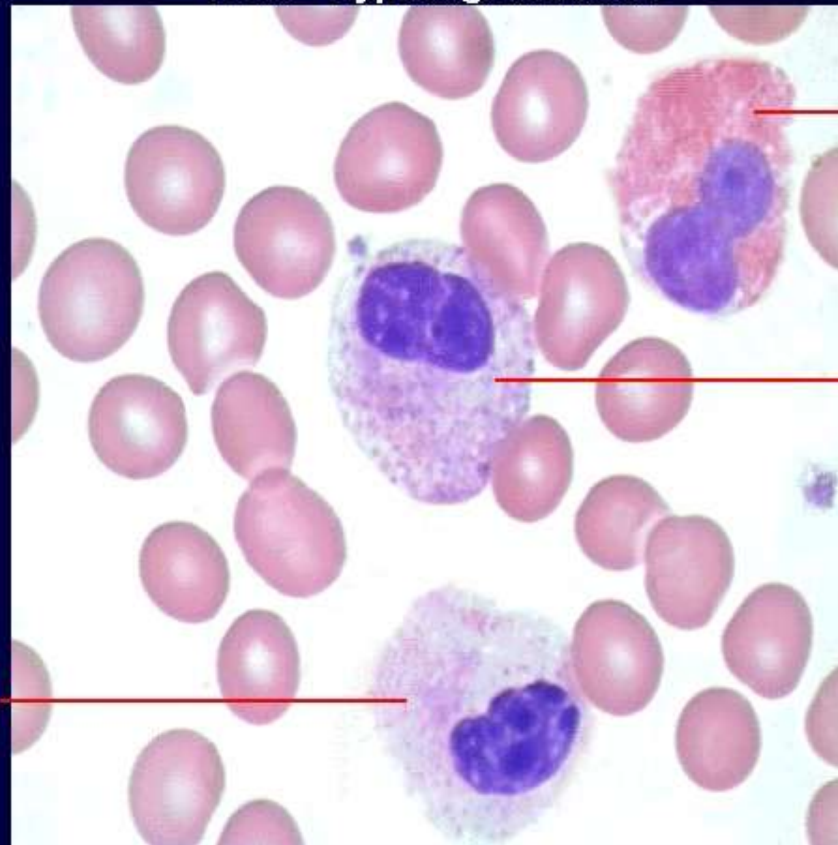
hyposegmented eosinophil

hyposegmented neutrophil

hyposegmented neutrophil

Comment: Hyposegmented neutrophils may be seen in patients with Pelger-Hüet anomaly or myelodysplastic syndrome.
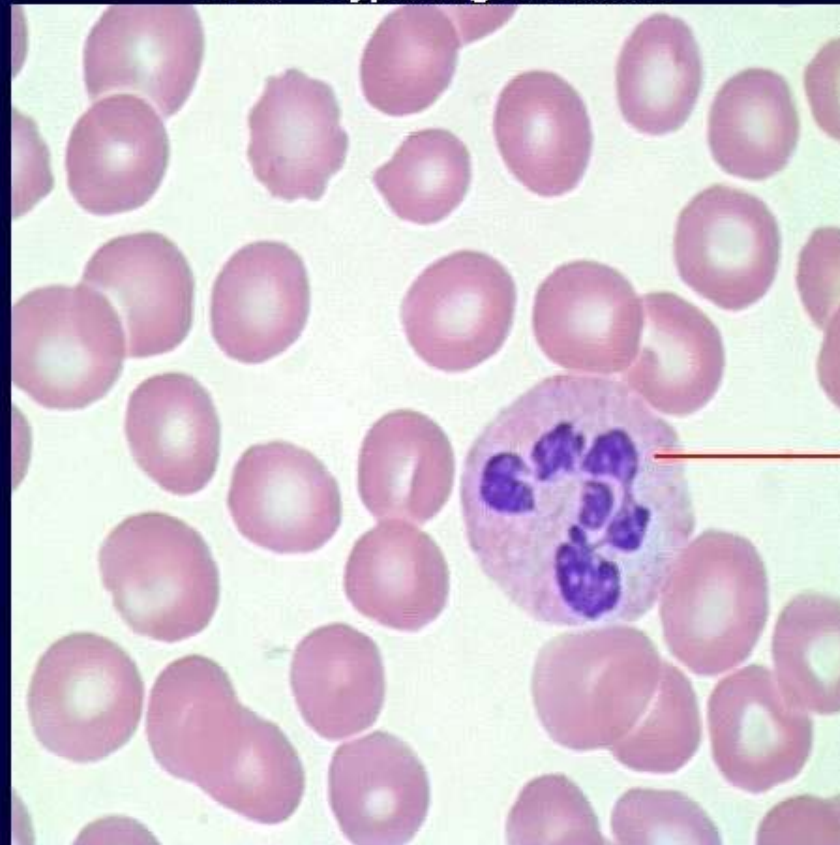
Granulocyte Variations

WBC - Hypersegmentation

Morphology: neutrophil with six or more nuclear segments

hypersegmented neutrophil

Comment: Hypersegmented neutrophils are seen in patients with anemia due to Vitamin B12 or folate deficiency.

Granulocyte Variations
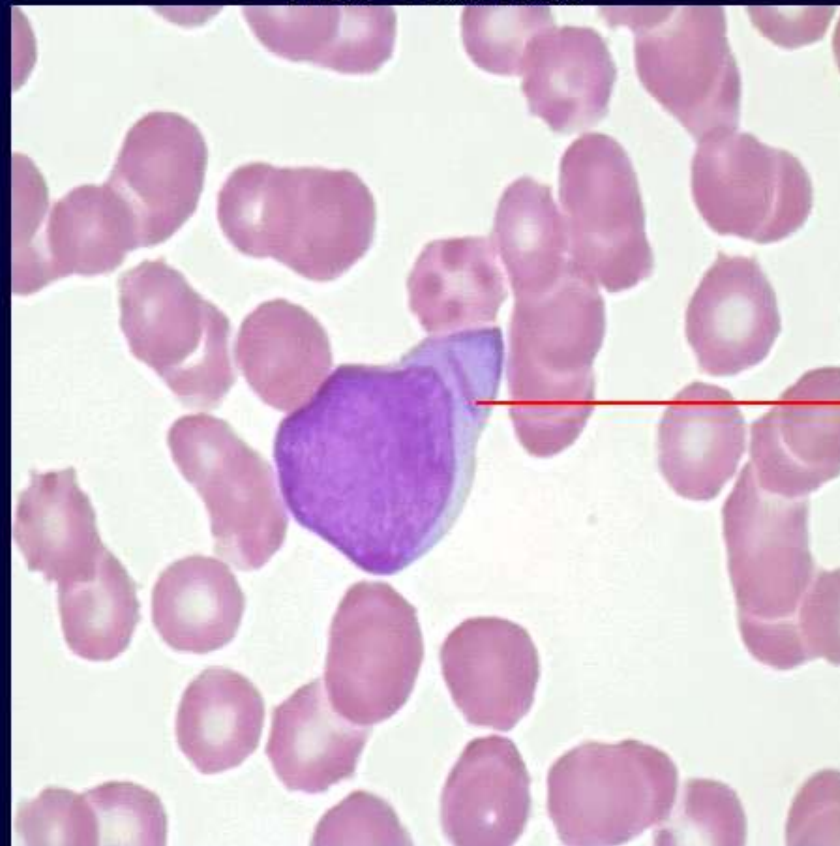
Hyposegmentation	Hypersegmentation	Auer rods
Toxic granulation	Toxic vacuolation	Döhle bodies

WBC - Auer rods

Morphology: pink, rod-shaped inclusions in myeloblast cytoplasm

Auer rod

Comment: Auer rods may be seen in myeloblasts from patients with acute myelogenous leukemia.

Granulocyte Variations
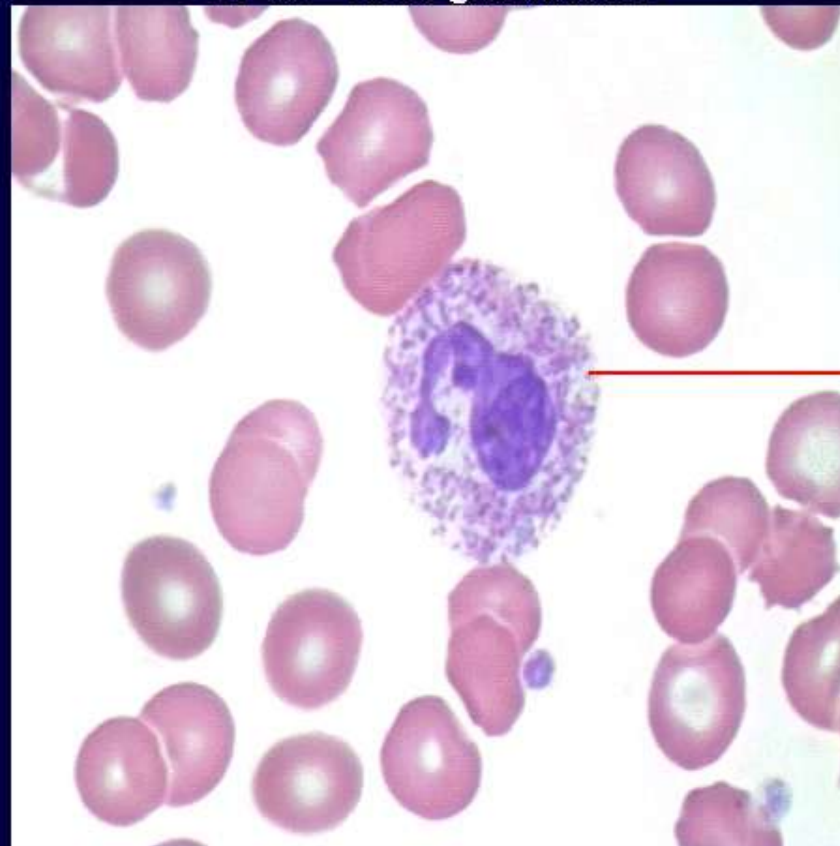
Hyposegmentation	Hypersegmentation	Auer rods
Toxic granulation	Toxic vacuolation	Döhle bodies

WBC - Toxic granulation

Morphology: neutrophil with increased dark granules in its cytoplasm

toxic granulation

Comment: Toxic granulation is seen in patients with severe bacterial infections.

Granulocyte Variations

WBC - Vacuolation

Morphology: round, clear spaces within granulocyte cytoplasm

vacuole

vacuole

vacuole

Comment: Toxic vacuolation may be seen in patients with severe bacterial infections.

Granulocyte Variations

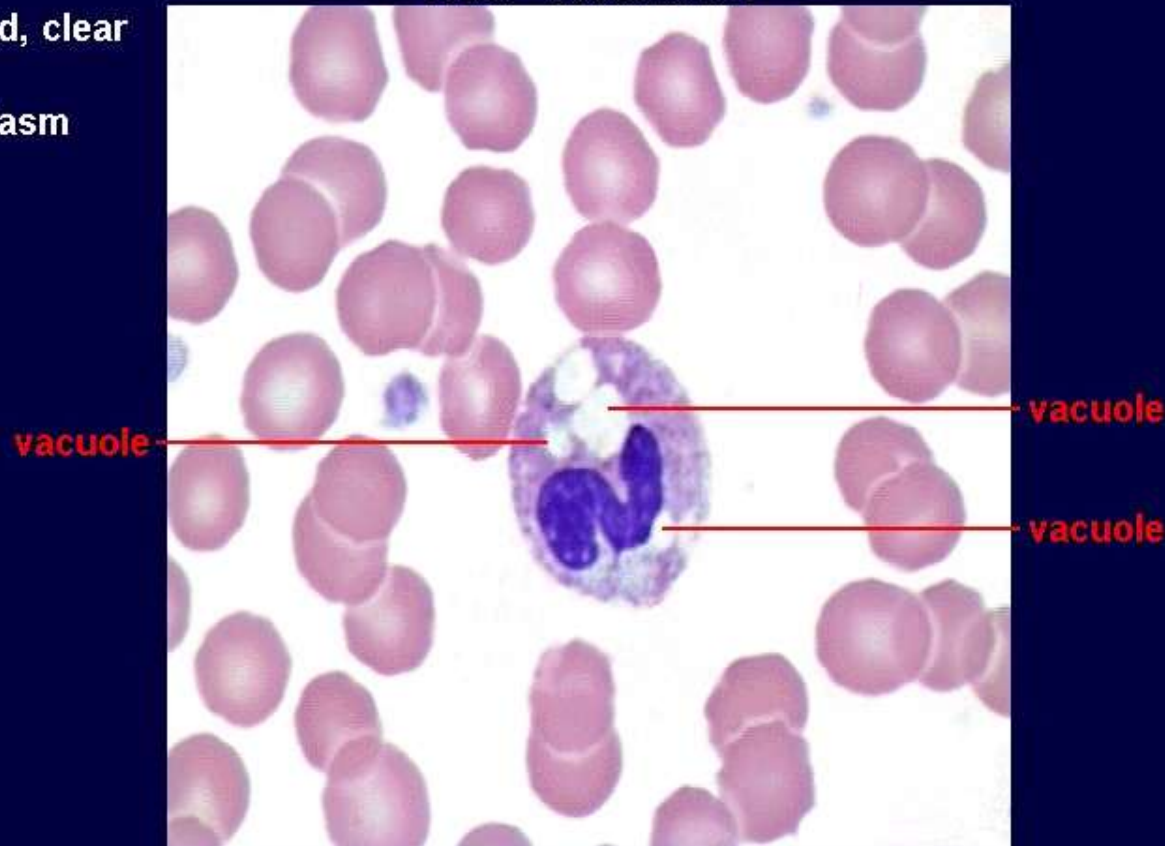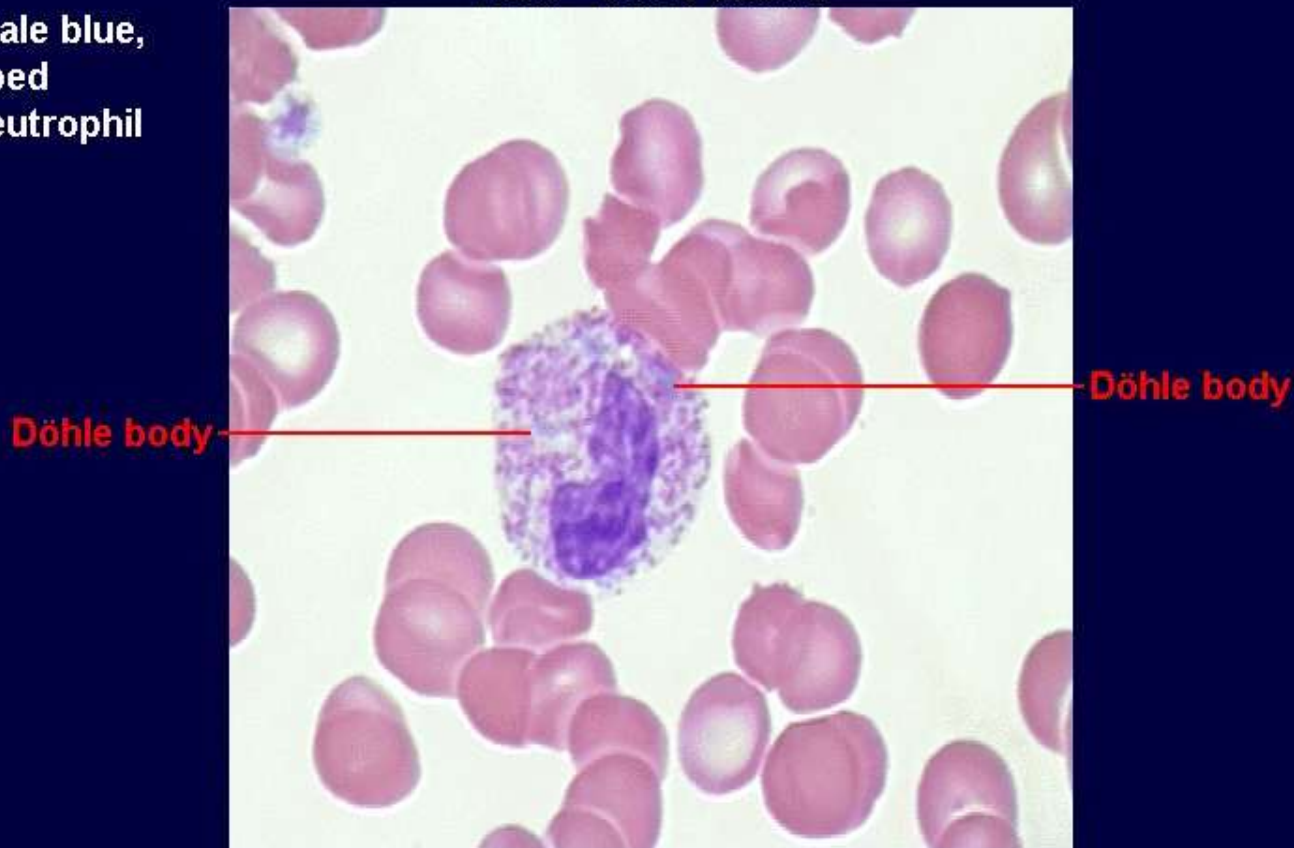| Hyposegmentation	Hypersegmentation	Auer rods
Toxic granulation	Toxic vacuolation	Döhle bodies

WBC - Döhle bodies

Morphology: pale blue, irregularly shaped inclusions in neutrophil cytoplasm

Döhle body

Döhle body

Comment: Döhle bodies consist of ribosomes and/or rough endoplasmic reticulum and are seen in severe bacterial infections.