

# Classification of Neutrophilic Granulocytes

## Neutrophilic Granulocytes (May Grünwald-Giemsa stain) Characteristics

Myeloblasts	cell size	nucleus shape	nuclear chromatin	N/C ratio	cytoplasm colour	granules	nucleoli
	~12–18 μm	round or oval	very fine	greater than 0.5 as a rule	strongly basophilic	none or a few azurophilic granules	1 or more

Classification of neoplastic myeloblasts: type I myeloblasts: no granules, type II myeloblasts: less than 20 granules, type III myeloblasts: more than 20 granules



Promyelocytes	cell size	nucleus shape	nuclear chromatin	N/C ratio	cytoplasm colour	granules	nucleoli
	~14–24 μm	round or oval	fine with little or no clumping	less than 0.5 as a rule	less basophilic than myeloblasts	azurophilic granules few = promyelocytes I many = promyelocytes II	1 or more

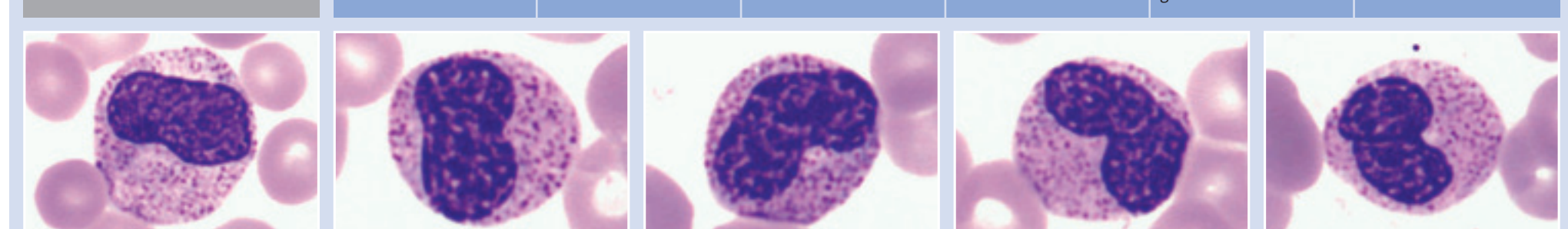


## Neutrophilic Granulocytes (May Grünwald-Giemsa stain) Characteristics

Myelocytes	cell size	nucleus shape	nuclear chromatin	cytoplasm colour	granules (immature)	granules (mature)	nucleoli
	~10–18 μm	oval or slightly indented	variable degree of chromatin clumping	acidophilic	primary (azurophilic) and secondary (neutrophilic) granules	many secondary granules	1 or more



Metamyelocytes	cell size	nucleus shape	nuclear chromatin	cytoplasm colour	granules	nucleoli
	~10–17 μm	thick horseshoe or indented	usually clumped	acidophilic	appearance of many secondary (neutrophilic) granules	none



## Neutrophilic Granulocytes (May Grünwald-Giemsa stain) Characteristics

Band neutrophils	cell size	nucleus shape	nuclear chromatin	cytoplasm colour	granules	nucleoli
	~10–15 μm	band shaped or indented, beginning segmentation	coarse and clumpy	strongly acidophilic	specific (neutrophilic) granules	none



Segmented neutrophils	cell size	nucleus shape	nuclear chromatin	cytoplasm colour	granules	nucleoli
	~10–15 μm	~2–5 distinct lobes connected by thin filaments	clumped	acidophilic	fine, specific granules sometimes giving a ground glass appearance	none



## Classification

### Difference between myeloblasts and promyelocytes

	nuclear chromatin	granules	N/C ratio
Myeloblasts	very fine	none or few	greater than 0.5
Promyelocytes	fine with little or no clumping	primary azurophilic granules present	less than 0.5

Nucleus: oval shape  
Cytoplasm: basophilic  
N/C ratio: > 0.5

azurophilic granules

no: myeloblast  
few: promyelocyte

**Other criteria in determining promyelocytes:**  
1. Chromatin structure becomes more coarse.  
2. Golgi body is more distinct.

### Difference between promyelocytes and myelocytes

	nuclear chromatin	granules	basophilic cytoplasm
Promyelocytes	fine with little or no clumping	few or many primary	distribution over 50% of cytoplasm
Myelocytes	variable degree of chromatin clumping	primary (azurophilic) and secondary (neutrophilic)	distribution in less than 50% of cytoplasm*

\*Note: classify using nuclear chromatin and presence of specific granules.

### Difference between myelocytes and metamyelocytes\* (clumped chromatin)

Nucleus shape	round to oval shape	indented	indented
Myelocytes	$a \geq 1/2b$		$b < 1 \mu m$
Metamyelocytes	$a < 1/2b$	$b \geq 2 \mu m$	$b \geq 1 \mu m$ $a \geq 4 \mu m$

\*Note: classification of nucleus shape

### Difference between metamyelocytes and band neutrophils

Nucleus shape	
Metamyelocytes	$a > 4 \mu m$ $b > 2 \mu m$
Band neutrophils	$2 \leq a \leq 4 \mu m$

### Difference between band neutrophils and segmented neutrophils\*

Nucleus shape	
Band neutrophils	$2 \leq a \leq 4 \mu m$ $a \geq 1/3b$
Segmented neutrophils*	$a < 2 \mu m$ $a < 1/3b$

\*Note: the following nucleus shapes are classified into segmented neutrophils:

