

# Overview of hematology parameters



Parameter	Description	Suggested clinical implication			Swelab <sup>®</sup> Alfa Plus/ Medonic <sup>™</sup> M32		Medonic M51/ Swelab Lumi		Microscopy
		Normal range (adults)	Low	High	CBC + 3 DIFF	CBC	CBC + 5 DIFF	Manual examination	
<b>Thrombocytes</b>	<b>Platelet count (PLT)</b>	The number of cells for determining PLT values is counted from a dilution of whole blood.	~ 166–390 × 10 <sup>9</sup> /L	Thrombocytopenia. Leukemia, infection, chemotherapy? Can be falsely low due to aggregation caused by EDTA.	Thrombocytosis. Medical condition or a side effect from medication? Can be falsely high due to microbubbles or dust or bacteria in reagent.	●	●	●	
	<b>Mean platelet volume (MPV)</b>	Derived from the PLT size distribution curve. PLT counts lower than 30 × 10 <sup>9</sup> /L do not generate an MPV.	~ 9.1–12.1 fL	Marker for PLT production rate and PLT activation. Bleeding disorder or a bone marrow disease? Associated with high-grade inflammation, like rheumatoid arthritis?	Low platelet production, resulting in few, but larger and more active platelets. Associated with high-grade inflammation (e.g., of the appendix)?	●	●	●	
	<b>Platelet distribution width - relative (PDW%)</b>	Calculated from the PLT size distribution curve and only presented if the MPV value is displayed.	~ 35.6%–56.4%			●*			
	<b>Platelet distribution width - absolute (PDW<sub>a</sub>)</b>	Calculated from the PLT size distribution curve and only presented if the MPV value is displayed.	~ 99–16.1 fL			●*	●*	●*	
	<b>Plateletcrit (PCT)</b>	The packed PLT volume in whole blood, measured through integration of the PLT count and the MPV. PLT counts lower than 30 × 10 <sup>9</sup> /L do not generate a PCT value.	~ 0.17%–0.39%	Evaluated together with MPV and PDW.	Evaluated together with MPV and PDW.	●*	●	●*	
	<b>Platelet-large cell concentration (P-LCC)</b>	The concentration of PLTs with large MPV. The parameter is only presented if the MPV value is displayed.	~ 1–11 fL		Indicator of larger circulating platelets. See high MPV results.	●*	●	●*	
	<b>Platelet-large cell ratio (P-LCR)</b>	Calculated from the PLT size distribution curve and expressed as a % to the total PLT count. The parameter is only presented if the MPV value is displayed.	~ 17.5%–42.3%		Indicator of larger circulating platelets. See high MPV results.	●*	●	●*	
<b>Erythrocytes</b>	<b>Red blood cell count (RBC)</b>	The number of RBC counted from a dilution of whole blood.	~ 3.90–5.7 × 10 <sup>12</sup> /L	Erythroblastopenia. Anemia? Can be falsely low due to hemolysis.	Erythrocytosis. Polycythemia vera or heart disease?	●	●	●	
	<b>Nucleated red blood cells (NRBC)</b>	Immature RBC, reported as the proportion of RBC count.			Due to rapid production and release of immature RBCs. A anemia, myelofibrosis, thalassemia, miliary tuberculosis, cancers involving bone marrow (myelomas, leukemias, lymphomas), or chronic hypoxemia?			●*	
	<b>Reticulocyte percentage (RET)</b>	Immature RBC, reported as the proportion of RBC count. Index defined as the product of % RET and RBC count.	~ 0.43%–1.36%		Response of RBC regeneration. Can be falsely high when reported as the proportion of total RBC, as in anemia, the patient's RBCs are depleted.				
	<b>Absolute reticulocyte count (RETA)</b>		~ 170–70.1 × 10 <sup>9</sup> /L						
	<b>Hemoglobin concentration (HGB)</b>	Photometric determination from a dilution of whole blood.	~ 11.9–17.0 g/dL	Anemia?	Polycythemia vera or heart disease? Can be falsely high due to high blood triglyceride levels, causing blood turbidity.	●	●	●	
	<b>Mean corpuscular volume (MCV)</b>	Derived from the RBC size distribution curve. RBC counts lower than around 0.20 × 10 <sup>12</sup> /L do not generate an MCV value.	~ 82.0–98.0 fL	Microcytic anemia. Small hypochromic (pale) RBCs. Associated with low MCHC. Iron deficiency, thalassemia?	Macrocytic anemia (large RBCs). Associated with low number of RBC and low MCH. DNA replication problems, pathologies of the liver or spleen. High alcohol consumption?	●	●	●	
	<b>Mean corpuscular hemoglobin (MCH)</b>	A calculated value and defined as HGB/RBC, giving the mean HGB concentration in the red cells.	~ 27.0–33.0 pg	See suggested clinical implication for MCV.	High MCH is generally an artifact.	●	●	●	
	<b>Mean corpuscular hemoglobin concentration (MCHC)</b>	Calculated value defined as HGB/HCT.	~ 31.8–35.0 g/dL	See suggested clinical implication for MCV.	See suggested clinical implication for MCV. Can be falsely high due to hemolysis.	●	●	●	
	<b>Red blood cell distribution width - relative (RDW%)</b>	Calculated from the RBC size distribution curve, only presented if the MCV value is displayed.	~ 12.0%–14.3%	Evaluated together with RBC count and MCV.	Evaluated together with RBC count and MCV for regeneration and RET.	●	●	●	
	<b>Red blood cell distribution width - absolute (RDW<sub>a</sub>)</b>	Calculated from the RBC size distribution curve, only presented if the MCV value is displayed.	~ 37.1–49.2 fL	Evaluated together with RBC count and MCV.	Evaluated together with RBC count and MCV for regeneration and RET.	●*	●*	●*	
<b>Hematocrit (HCT)</b>	The packed RBC volume in whole blood determined through integration of total RBC count and the MCV. RBC counts lower than 0.20 × 10 <sup>12</sup> /L do not generate an HCT.	~ 36.6%–49.4%	Anemia?	Polycythemia vera or heart disease?	●	●	●		
<b>Leukocytes</b>	<b>White blood cell count (WBC)</b>	The number of WBCs counted from a dilution of whole blood.	~ 3.9–12.7 × 10 <sup>9</sup> /L	Leukopenia. Autoimmune disorder that destroys white blood cells, bone marrow problems, cancer, or certain medications?	Leukocytosis. Infection or inflammation, an immune system disorder, a bone marrow disease, or a reaction to medication?	●	●	●	
	<b>Percentage of granulocytes (GRA%)</b>	Proportion of GRA (mostly NEU but also EOS and BAS) of all WBC.	~ 35%–80%			●			
	<b>Number of granulocytes (GRA#)</b>	The number of GRA (mostly NEU but also EOS and BAS) counted from a dilution of whole blood.	~ 2.1–8.8 × 10 <sup>9</sup> /L	Granulocytopenia or agranulocytosis. See suggested clinical implication for NEUs.	Granulocytosis. See suggested clinical implication for NEUs.	●			
	<b>Percentage of immature granulocytes (IG)</b>	The number of IG counted from a dilution of whole blood	~ 0%–0.6%		Bacterial infection, sepsis?			●*	
	<b>Number of immature granulocytes (IG)</b>	Proportion of IG of all WBC.	~ 0–0.06 × 10 <sup>9</sup> /L					●*	
	<b>Percentage of neutrophils (NEU%)</b>	Proportion of NEU of all WBC.	~ 41.0%–74.3%	Neutropenia. Viral infection?	Neutrophilia. Bacterial infection?			●	
	<b>Number of neutrophils (NEU#)</b>	The number of NEU counted from a dilution of whole blood.	~ 1.8–8.89 × 10 <sup>9</sup> /L					●	
	<b>Segmented (more mature) neutrophils (segs)</b>	The number of segs counted from a dilution of whole blood.			Associated with stress, presence of corticosteroids, complement fragments, or catecholamines?				
	<b>Banded (less mature) neutrophils (stabs)</b>	The number of stabs counted from a dilution of whole blood.			Associated with stress, presence of corticosteroids, complement fragments, or catecholamines?				
	<b>Percentage of eosinophils (EOS%)</b>	Proportion of EOS of all WBC.	~ 0.2%–7.6%	Eosinopenia	Eosinophilia. Asthma, allergic reaction, or certain parasite infections?			●	
	<b>Number of eosinophils (EOS#)</b>	The number of EOS counted from a dilution of whole blood.	~ 0.03–0.59 × 10 <sup>9</sup> /L					●	
	<b>Percentage of basophils (BAS%)</b>	Proportion of BAS of all WBC.	~ 0.1%–1.2%	Basopenia	Asthma, allergy, TBC, certain cancers (leukemia, lymphoma)?			●	
	<b>Number of basophils (BAS#)</b>	The number of BAS counted from a dilution of whole blood.	~ 0.01–0.07 × 10 <sup>9</sup> /L					●	
	<b>Percentage of lymphocytes (LYM%)</b>	Proportion of LYM of all WBC.	~ 18.3%–47.9%	Lymphocytopenia. Immunodeficiency, e.g., HIV?	Lymphocytosis. Viral infection or lymphocytic leukemias?	●		●	
	<b>Number of lymphocytes (LYM#)</b>	The number of LYM counted from a dilution of whole blood.	~ 1.26–3.35 × 10 <sup>9</sup> /L					●	
	<b>Percentage of abnormal lymphocytes (AL%)</b>	Proportion of AL of all WBC.	≤ 12%		Rapid production and release of immature cells due to viral infection, drug hypersensitivity or graft versus host reaction?			●*	
	<b>Number of abnormal lymphocytes (AL#)</b>	The number of AL counted from a dilution of whole blood.						●*	
<b>Percentage of mid-sized cells (MID%)</b>	Proportion of MID (mostly MONO) of all WBC.	~ 2%–15%		See suggested clinical implication for MONs.	●				
<b>Number of mid-sized cells (MID#)</b>	The number of MID (mostly MONO) counted from a dilution of whole blood.	~ 0.1–1.1 × 10 <sup>9</sup> /L			●				
<b>Percentage of monocytes (MON%)</b>	Proportion of MON of all WBC.	~ 4.2%–15.2%	Monocytopenia	Monocytosis chronic inflammatory disease or bacterial infection (tuberculosis, malaria)?			●		
<b>Number of monocytes (MON#)</b>	The number of MON counted from a dilution of whole blood.	~ 0.25–0.95 × 10 <sup>9</sup> /L					●		

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