A

**Agranulocyte**: A leukocyte without definite cytoplasmic granules.

**Agranulocytosis**: Complete or nearly complete absence of the granular leukocytes from the blood and bone marrow.

**Aleukemic Leukemia**: A fatal condition of the blood-forming tissues, characterized by marked proliferation of immature cells in the bone marrow, without their presence, in any great numbers, in the blood steam.

**Anemia**: A condition in which the blood is deficient in quantity or quality of erythrocytes.

**Anisocytosis**: Variation in size of the erythrocytes.

**Anomaly**: Abnormality.

**Anoxemia**: Lack of normal proportion of oxygen in the blood.

**Antecubital Space**: The area on the forearm frontal to the elbow.

**Anticoagulant**: A substance that prevents the coagulation of blood. Commonly used ones are potassium oxalate, sodium oxalate, sodium citrate, EDTA and heparin.

**Aplasia**: Incomplete or defective blood development; cessation of blood cell formation.

**Aplastic Anemia**: Anemia characterized by incomplete or effective blood development.

**Asynchronous**: Uncoordinated development as in abnormal cell development.

**Azurophilic Granule**: Rounded, discrete, reddish-purple granule, smaller than the granules of neutrophils; 1-10 are common in lymphocytes, and they are very numerous, and smaller, in the cytoplasm of monocytes

B

**Band Form**: In the Schilling classification, a neutrophil with the nucleus unsegmented and ribbonlike; also stab, staff, nonfilamented.

**Basket Cell**: A degenerated primitive cell which has ruptured and in which the cell nucleus appears as a pale staining smear without prescribed form or shape.
**Basopenia**: An abnormal decrease in the number of basophils.

**Basophil**: A granular leukocyte, the granules of which have affinities for the basic dye of Wright stain (methylene blue). The granules are large, irregular and blue-black in color.

**Basophilia**: An abnormal increase in the number of basophils.

**Basophilic**: Staining readily with basic dyes, for example, blue with Ramanovsky type stains.

**Binary Fission**: Simple cell division.

**Bleeding Time**: The time required for a small standardized wound, made in the capillary bed of the finger or ear lobe, to stop bleeding.

**Blood Dyscrasia**: A disease of the blood or blood-forming organs.

**Buffy Coat**: The layer of leukocytes that collects immediately above the erythrocytes in sedimented or centrifuged whole blood.

**Cabot's Rings**: Lines in the form of loops or figures-of-eight seen in erythrocytes in severe anemias.

**Centriole**: A minute cell organoid within the centrosome.

**Centrosome**: An area of condensed cytoplasm active in mitosis.

**Chemotaxis**: The phenomenon of movement of leukocytes caused by a chemical influence.

**Chromatin**: The more stainable portion of the cell nucleus contains genetic materials.

**Clot Retraction**: The rate and degree of contraction of the blood clot.

**Coagulation Time**: The time required for venous blood, in the absence of all tissue factors, to clot in glass tubes under controlled conditions.

**Cocatalyst**: A substance that works in tandem with another group of chemicals to accelerate a reaction velocity without being used up in the reaction.

**Color Index**: The ratio between the amount of hemoglobin and the number of red blood cells.
**Complete Blood Count:** A hematology study which consists of a red cell count, white cell count, hematocrit, hemoglobin, and blood smear study including differential white cell count.

**Congenital:** Born with a person; existing at or before birth.

**Cooley’s Anemia (Mediterranean Disease or Thalassemia):** A chronic progressive anemia commencing early in life and characterized by many normoblasts in the blood, unusual facies, splenomegaly and familial and racial incidence. Target type red blood cells are often present in the peripheral blood.

**Crenation:** The scalloped or notched appearance of the periphery of erythrocytes found when the cells are suspended in a hypertonic solution. Also found in smears, caused by dirty glassware, slow drying, and poor smearing technique.

**Cytoplasm:** Protoplasm of a cell excluding the nucleus.

**DNA:** Deoxyribonucleic acid.

**Differential Count:** An enumeration of the types of white blood cells seen on a stained blood smear.

**Discrete:** Separate.

**Dyscrasia:** Abnormality.

**Ecchymosis:** Subcutaneous extravasation of blood covering a large area.

**Endothelial Leukocyte:** Monocyte.

**Eosinopenia:** An abnormal decrease in eosinophils.

**Eosinophil:** A granular leukocyte, the granules of which have an affinity for the acid dye of Wright’s stain (eosin). The granules are large, round, uniform in size, red-orange in color and are shiny and refractile.

**Eosinophilia:** A relative or absolute leukocytosis in which the main increase is in eosinophils.

**Eosinophilic:** Readily stained with eosin, red-orange stain.

**Epigastric:** Pertaining to the upper middle portion of the abdomen.
Erythremia: A disease marked by persistent polycythemia and increased blood volume also polychthemia vera.

Erythrocyte: Red blood cell.

Erythrocytosis: An increase in the total number of erythrocytes.

Erythrogenic: Producing erythrocytes.

Erythroleukemia: An abnormal condition characterized by proliferation of erythroblastic and myeloblastic cells.

Erythropenia: A decrease in the number of red cells in the blood.

Erythropoiesis: The production of erythrocytes.

Etiology: The theory of the causation of a disease.

Extravascular: Occurring outside the blood vessels.

Extrinsic: Originating outside of the particular area.

F

Fibril: A microscopic filament often composed of fibrin.

Fibrin: The end product of the clotting mechanism that forms a network of fibers that enmesh the formed elements of blood.

Fibrinogen: The precursor of fibrin that is present normally in the plasma and produced by the liver.

Fragility Test (Osmotic): A test devised to measure the resistance of the erythrocytes to break down (hemolyze) when subjected to varying concentrations of hypotonic salt solutions.

Fulminating: Sudden and severe.

G

Golgi Apparatus: A meshwork of lipid containing fibrils within the cytoplasmic portion of a cell.

Granulocyte: A white blood cell that contains specific cytoplasmic granules (neutrophils, eosinophils, and basophils); these granules are peroxidase positive.
Granulocytosis: The presence of increased numbers of granulocytes in the blood.

Granulocytopenia (Granulopenia): A decrease in the number of granulocytes in the blood.

Granulopoiesis: The production of granulocytes.

Hemacytometer: A calibrated chamber in which blood cells are counted.

Hematin: A brown or blue-black amorphous iron substance that unites with globin and forms hemoglobin.

Hematocrit: The packed cell volume (PVC) of red blood cells obtained by globin and forms hemoglobin.

Hematology: The branch of medicine that deals with the study of blood cells, blood producing organs and the manner in which these cells and organs are affected in disease.

Hematoma: Subcutaneous effusion of blood with resulting swelling, pain, and discoloration, forming a tumorlike mass.

Hematopoietic (Hemopoietic): Blood forming.

Hemoglobin: The coloring matter of the red blood cells. A complex iron-bearing pigment that carries oxygen and carbon dioxide.

Hemoglobinuria: The presence of free hemoglobin in the urine.

Hemogram: The blood picture.

Hemolysis: The dissolution or dissolving of the erythrocytes.

Hemolytic Anemia: That type of anemia characterized by excessive intra-vascular destruction of red cells.

Hemophilia: A hereditary disease characterized by a prolonged coagulation time and repeated hemorrhages, occurring only in males and transmitted only by females and affected males. The cause is a deficiency in a plasma factor (antihemophilic globulin or thromboplastinogen) resulting in a defect in thromboplastic activity.

Hemoptysis: The spitting of blood; coughing up blood.

Hemostasis: The checking of the flow of blood, especially from a vessel.

Hepatic: Originating from the liver.
**Heterozygous**: Derived from germ cells unlike in respect to one or more factors.

**Hemeostasis**: Stability in normal body states.

**Homozygous**: Derived from germ cells that are alike.

**Howell-Jolly Bodies**: Small basophilic particles sometimes found in erythrocytes, remnants of nuclear material.

**Hygroscopic**: Readily taking up and retaining water.

**Hyperplasia**: An increase in cell formation.

**Hypertonic**: Greater than isotonic concentration.

**Hypertrophy**: Enlargement of an organ or part due to increase in the size of the constituent cells.

**Hypochromia**: A decrease in color of the erythrocytes, hence a decrease in their hemoglobin content.

**Hypoplasia**: A decrease in cell formation.

**Hypotonic**: Less than isotonic concentration.

**Idiopathic**: Disease of unknown cause.

**Inclusion**: Usually lifeless, an accumulation of fats, proteins, crystals pigments or secretory granules within a cell cytoplasm.

**Inhibitor**: A substance, directed against a coagulation factor or factors, which interferes with the coagulation process.

**Intravascular**: Occurring within the blood vessels.

**Intrinsic**: Situated within the particular part.

**In Vitro**: Within a test tube (glass, etc.).

**In Vivo**: Within the living organism, as in life.

**Isotonic**: Solutions with the same osmotic pressure.
J

Jaundice: Yellow mass of the skin and eyes due to the presence of blood pigments in the blood; follows excessive destruction of the blood, obstruction of the bile passage, diffuse liver disease, certain infections, toxic chemical agents and drugs.

Juvenile Cell: In the Schilling classification, the cell between the myelocyte and band forms; also metamyelocyte.

K

Karyolysis: Apparent destruction of the nucleus of a cell.

Karyorrhexis: Fragmentation of the nucleus; a degenerative process usually followed by karyolysis.

L

L.E. Cell: A large segmented neutrophil or eosinophil that contains ingested autolyzed nuclear fragments in its cytoplasm.

Leukemia: An ultimately fatal disease of the blood-forming organs characterized by increased numbers of leukocytes and associated anemia.

Leukemoid Crisis or Reaction: A temporary appearance of immature leukocytes in the blood stream, with a marked increase in the total white count. In the laboratory sometimes temporarily indistinguishable from leukemia.

Leukocyte: White blood cell.

Leukocytosis: An increase in leukocytes in the blood.

Leukopenia: A reduction in the number of leukocytes in the blood.

Leukopoiesis: Leukocyte formation.

Lymphoblast: The parent cell of the lymphocytic series.

Lymphocyte: A white blood cell having a round or oval nucleus and sky blue cytoplasm. The nuclear chromatin is densely clumped but separated by many clear areas giving a "hill and valley" effect. A few red-purple (azurophilic) granules may be present in the cytoplasm.

Lymphocytosis: A relative or absolute increase in the number of circulating lymphocytes.
Lymphopenia: An abnormal decrease in the number of lymphocytes.

Lysis: Destruction by a specific agent.

M

Macrocyte: An erythrocyte larger than normal.

Macrocytosis: An increase in the number of macrocytes.

Mast Cell: A basophil or a true tissue cell.

Maturation Factor: A substance that will cause cells to ripen and care to maturity.

Mean Corpuscular Hemoglobin (MCH): The average amount of hemoglobin in the red blood cell.

Mean Corpuscular Hemoglobin Concentration (MHC): The average percent hemoglobin saturation in the red blood cell.

Mean Corpuscular Volume (MCV): The volume of the average red blood cell.

Megakaryoblast: The parent cell of the megakaryocytic series.

Megakaryocyte: An extremely large cell with an irregular lobed, ring or doughnut-shaped nucleus that stains blue-purple. The cytoplasm is abundant, light blue and is packed with fine azurophilic granules. This cell gives rise to thrombocytes.

Megaloblast: The type of red cell precursor found in pernicious anemia. This differs from the normal erythrocyte precursor (normoblast) in that the megaloblast is larger and the nuclear chromatin has a fine meshwork or scroll design.

M.E. Ratio: The ratio of myeloid to erythroid cells in the bone marrow.

Mesentery: The fold of peritoneum that attaches the intestine to the posterior abdominal wall.

Metamyelocyte: Juvenile cell of Schilling.

Metarubricyte: An erythrocyte with a pyknotic, contracted nucleus. Also called orthochromatophilic normoblast.

Methemoglobin: A spectroscopically detected compound of hemoglobin found in nitrobenzol, and other poisonings. The blood is a chocolate brown color to the eye.

Microcyte: An erythrocyte smaller than normal.
**Microcytosis**: An increase in the number of microcytes

**Micron**: One-thousandth of a millimeter, the common unit of microscopic measure.

**Mitochondria**: Granular components of a cell cytoplasm active in oxidative processes.

**Mitosis**: A series of changes through which the nucleus passes in indirect cell division. A tissue showing many cells in mitosis indicates rapid growth of that tissue.

**Monoblast**: The parent cell of the monocytic series.

**Monocyte**: A large white blood cell with a pale blue-gray cytoplasm containing fine azurophilic granules. The nucleus is spongy and lobulated.

**Monocytosis**: A relative or absolute increase in the number of circulating monocytes.

**Mucosa**: Mucous membrane.

**Myeloblast**: The parent cell of the granulocytic or myelocytic series.

**Myelocyte**: The stage in development of the granulocytic series that is characterized by the first appearance of specific granules (eosinophilic, neutrophilic or basophilic) and a round nucleus.

**Myeloid Cells**: The granular leukocytes and their stem cells.

**Myelopoiesis**: Formation of bone marrow and the blood cells that originate in the bone marrow.

**Myeloproliferative**: Rapid production of bone marrow constituents.

**Necrosis**: The death of a circumscribed portion of tissue. Simple necrosis is degeneration of the cytoplasm and nucleus without change in the gross appearance of the tissue.

**Neutropenia**: A decrease in the number of neutrophils in the blood.

**Neutrophil (Polymorphonuclear Neutrophil or Segmented Neutrophil)**: A granulocyte having fine neutrophilic (pink-violet) granules in the cytoplasm. The nucleus is divided into two or more lobes; each lobe is usually connected by a filament.

**Neutrophilia**: An increase in neutrophils.

**Normoblast**: The nucleated precursor of the normal red blood cell. Also called a rubriblast.
**Normocyte (Erythrocyte):** A red blood cell of normal size.

**NRBC:** Nucleated red cell, usually a metarubricyte when seen in the peripheral blood smear.

**Nucleolus:** An intranuclear pale blue body, surrounded by a dense condensation of chromatin.

**Occult Blood:** The presence of blood that cannot be detected except by special chemical tests.

**Oligochromemia:** A decrease in hemoglobin.

**Oligocythemia:** A decrease in the number of erythrocytes.

**Organoid:** Structures present in cells resembling organs.

**Ovalocyte:** An elliptical erythrocyte.

**Oxyhemoglobin:** The bright red hemoglobin that is loosely combined with oxygen and found in arterial blood.

**Pancytopenia:** A reduction in all three formed elements of the blood, namely, the erythrocytes, leukocytes and thrombocytes.

**Pathologic Increase (Or Decrease):** Due to abnormal function or disease, as contrasted to physiological (due to normal body function).

**Pernicious Anemia:** A chronic, macrocytic anemia caused by a defect in production of “intrinsic factor” by the stomach. There is accompanying megaloblastic erythropoiesis, poikilocytosis, granulocytic hypersegmentation, achlorhydia, and neurological disturbances.

**Petichiae:** Small spots on the skin formed by subcutaneous effusion of blood (also purpura and ecchymoses).

**Phagocytosis:** The destruction of organisms and extraneous matter by a process of envelopment and absorption.

**Plasma:** The fluid portion of the blood composed of serum and fibrinogen, obtained when an anticoagulant is used.
**Plasma Cell:** A lymphocyte-like cell with an eccentrically placed deep-staining nucleus. The nuclear chromatin is distributed in a "wheel-spoke" fashion. The cytoplasm is deep blue with a lighter halo about the nucleus.

**Platelet:** Thrombocyte.

**Poikilocyte:** A red blood cell having abnormal shape (pear-shape, sickle-shape, etc.).

**Poikilocytosis:** Increased number of abnormally shaped erythrocytes.

**Polychromasia:** Diffuse basophilia of the erythrocytes.

**Polychromatophilia:** The presence in the stained blood smear of immature, nonnucleated, bluish-staining red blood cells.

**Polycythemia:** An increase in the total number of erythrocytes. (See erythremia.).

**Precursor:** A substance from which another substance is formed.

**Promyelocyte:** The precursor of the myelocyte having nonspecific azurophilic (red-purple) cytoplasmic granules.

**Prorubricyte:** The second stage of development of the red cell.

**Prothrombin:** The inactive precursor of thrombin that is formed in the liver and present normally in the plasma. Its formation depends upon adequate vitamin K.

**Punctate Basophilia:** Small basophilic aggregates in the erythrocytes that stain blue with the basic dye of Wright's stain; also basophilic stippling.

**Purpura:** Small spots on the skin formed by subcutaneous effusion of blood.

**Pyknosis:** A condensation and reduction in size of the cell and its nucleus.

**Q-R**

**Reduced Hemoglobin:** A combination of hemoglobin and carbon dioxide that is found in venous blood.

**Reticulocyte:** A red blood cell showing a reticulum or network when stained with vital dyes (for example, brilliant cresyl blue). The stage between the nucleated red cell and the mature erythrocyte.

**Reticulocytosis:** An increase above normal values of reticulocytes in peripheral blood.

**RNA:** Ribonucleic acid.
**Rouleaux Formation:** The arrangement of red cells with their flat surfaces facing, in which they appear as figures resembling stacks of coins.

**Rubricyte:** Polychromatophilic normoblast.

**S**

**Sedimentation Rate, Erythrocyte (ESR):** The rate at which red cells will settle out in their own plasma in a given time under controlled conditions.

**Serum:** The fluid portion of the blood, after clot formation.

**Shift to the Left:** A term used to designate that condition in which the immature forms of the neutrophils are increased above their normal number.

**Shift to the Right:** Increase in mature, pyknotic, and hypersegmented neutrophils.

**Sickle Cell:** A sickle- or crescent-shaped erythrocyte.

**Sickle Cell Anemia:** This is a hereditary and familial form of chronic, hemolytic anemia essentially peculiar to Negroes. It is characterized clinically by symptoms of anemia, joint pains, leg ulcers, acute attacks of abdominal pain and is distinguished hematologically by the presence of distinct hemoglobin, peculiar sickle-shaped and oat-shaped red corpuscles, and signs of excessive blood destruction and active blood formation.

**Smudge Cell:** A ruptured white cell; also basket cell, or degenerated cell.

**Spherocyte:** A red blood cell that is more spherical, smaller, darker, and more fragile than normal.

**Stasis:** A stoppage of blood flow.

**Supravital Stain:** A stain of low toxicity that will not cause death to living cells or tissues.

**Synchronous:** Occurring at the same time and in a regular pattern.

**T**

**Target Cell (Leptocyte):** An abnormal, thin erythrocyte characteristic of Cooley's or Mediterranean anemia.

**Triturate:** To grind together.
**Thrombin**: This is an enzyme formed from prothrombin that converts fibrinogen to fibrin. This is not present in circulating blood.

**Thrombocyte**: A blood platelet.

**Thrombocytopenia**: A decrease in blood platelets; also thrombopenia.

**Thrombocytosis**: An increase in blood platelets.

**Thromboplastin**: The substance that initiates the process of blood clotting. It is released from injured tissue and/or formed by the disintegration of platelets in combination with several plasma factors.

**Thrombopoiesis**: The production of thrombocytes.

**Thrombosis**: Formation of a thrombus, or blood clot.

**U-V**

**Vacuole**: A space or cavity formed in the protoplasm of a cell.

**Venipuncture**: The act of puncturing a vein in order to remove a sample of blood.

**Viscous Metamorphosis**: Friction between molecules resulting in a structural change.

**Vitamin K**: A vitamin constituent of the normal diet requiring bile salts for absorption. The liver in the production of prothrombin utilizes this vitamin.

**W-X-Y-Z**

**Xanthochromia**: A yellowish discoloration, usually associated with spinal fluid.

**End of Appendix**