





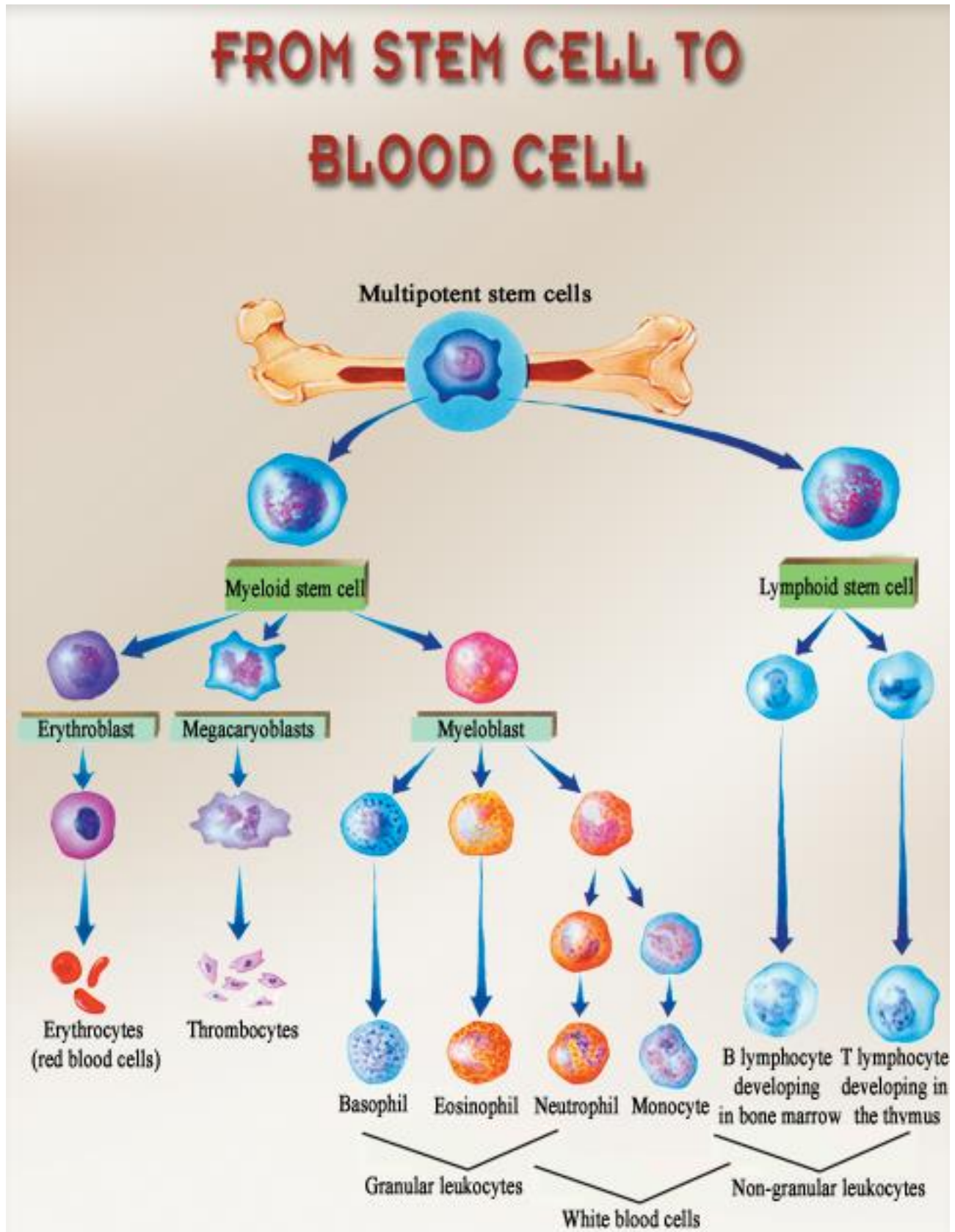




Immune System Charts: White Blood Cells - Function and Lab Analysis

Type	Microscopic Appearance	Approx. % in adults	Main Targets	Lifetime
Neutrophil		62%	<ul style="list-style-type: none"> Bacteria Fungi 	6 hours to a few days (days in spleen and other tissue)
Eosinophil		2.3%	<ul style="list-style-type: none"> Larger parasites Allergens 	8 to 12 days (circulate for 4 to 5 hours)
Basophil		0.4%	<ul style="list-style-type: none"> Release histamine for inflammatory responses 	few hours to a few days
Lymphocyte		30%	<ul style="list-style-type: none"> B cells: Releases antibodies and assists activation of T cells T cells: <ul style="list-style-type: none"> CD4+ Th (T helper) cells: Activate and regulate T and B cells CD8+ cytotoxic T cells: Virus-infected and tumor cells gamma delta T cells: Bridge between innate and adaptive immune responses; phagocytosis Regulatory (suppressor) T cells: Returns functioning of the immune system to normal operation after infection; prevents autoimmunity Natural killer cells: Virus-infected and tumor cells 	years for memory cells, weeks for all else
Monocyte		5.3%	<ul style="list-style-type: none"> Monocytes migrate from the bloodstream to other tissues and differentiate into tissue resident macrophages; kupffer cells in the liver 	hours to days
Macrophage			<ul style="list-style-type: none"> Monocyte derivative: Phagocytosis (engulfment and digestion) of cellular debris and pathogens and stimulation of lymphocytes and other immune cells that respond to the pathogen 	activated: days immune: months to years



White Blood Cell Differential Count Abnormalities		
WBC	Increased	Decreased
Neutrophils	Bacterial infections Trauma Acute or emotional distress Myelocytic Leukemia Metabolic disorders Inflammatory disorders Cushing's Syndrome	Viral infections Protein deficiency Chemo Aplastic anemia Radiation therapy Addison's Disease
Lymphocytes	Infectious hepatitis mononucleosis Acute viral infection Chronic bacterial infection Lymphocytic Leukemia Multiple myeloma Radiation	Immunodeficiency diseases Sepsis Leukemia Lupus Drug therapy: steroids, chemo Radiation therapy
Monocytes	Viral infections Chronic inflammatory disorders Tuberculosis Chronic ulcerative colitis Parasites (e.g. malaria)	Drug therapy (prednisone)
Eosinophils	Leukemia Eczema Allergic reactions Autoimmune Parasitic infections	Increased cortisol
Basophils	Parasites Leukemia	Stress reactions Hyperthyroidism