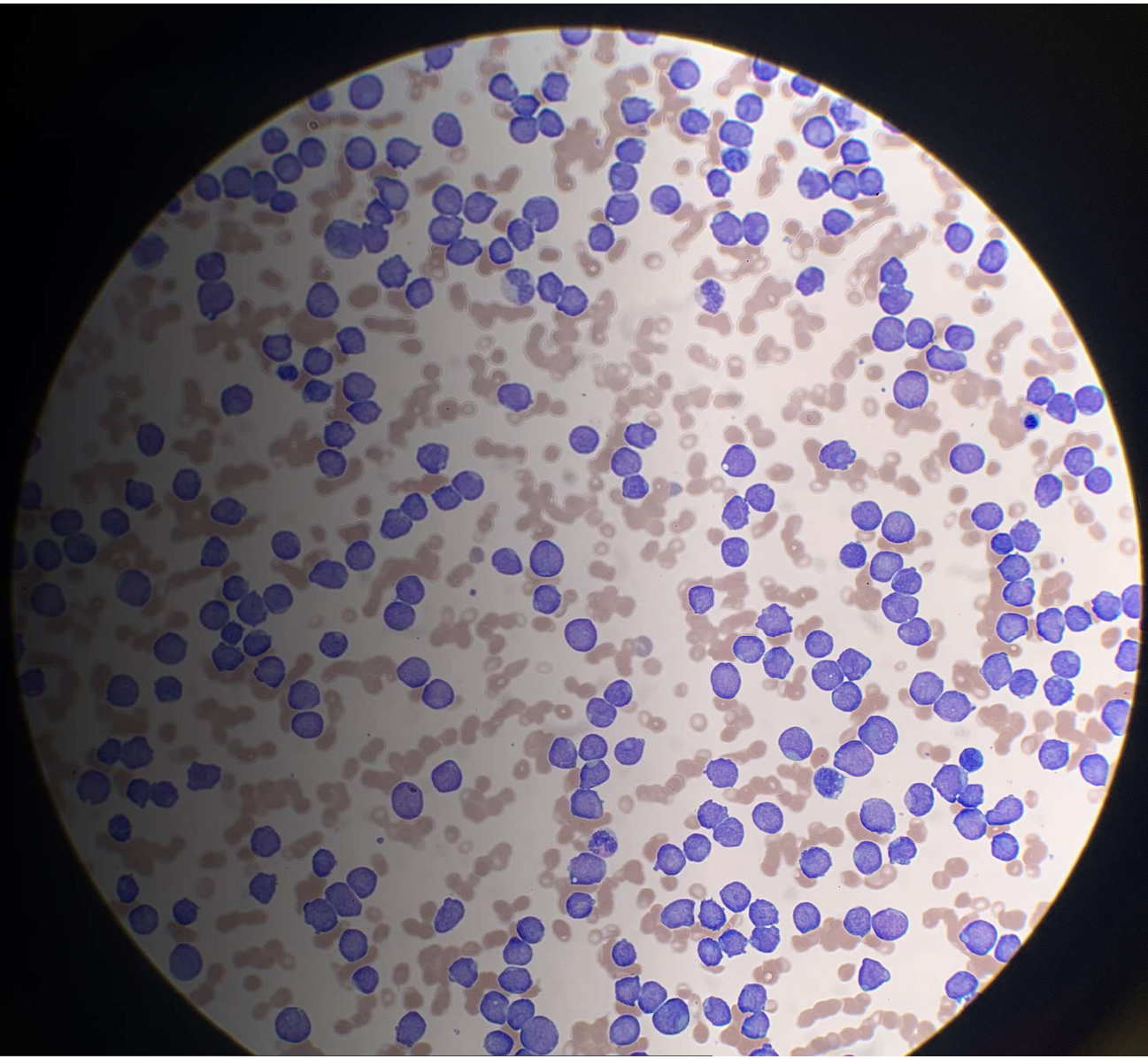
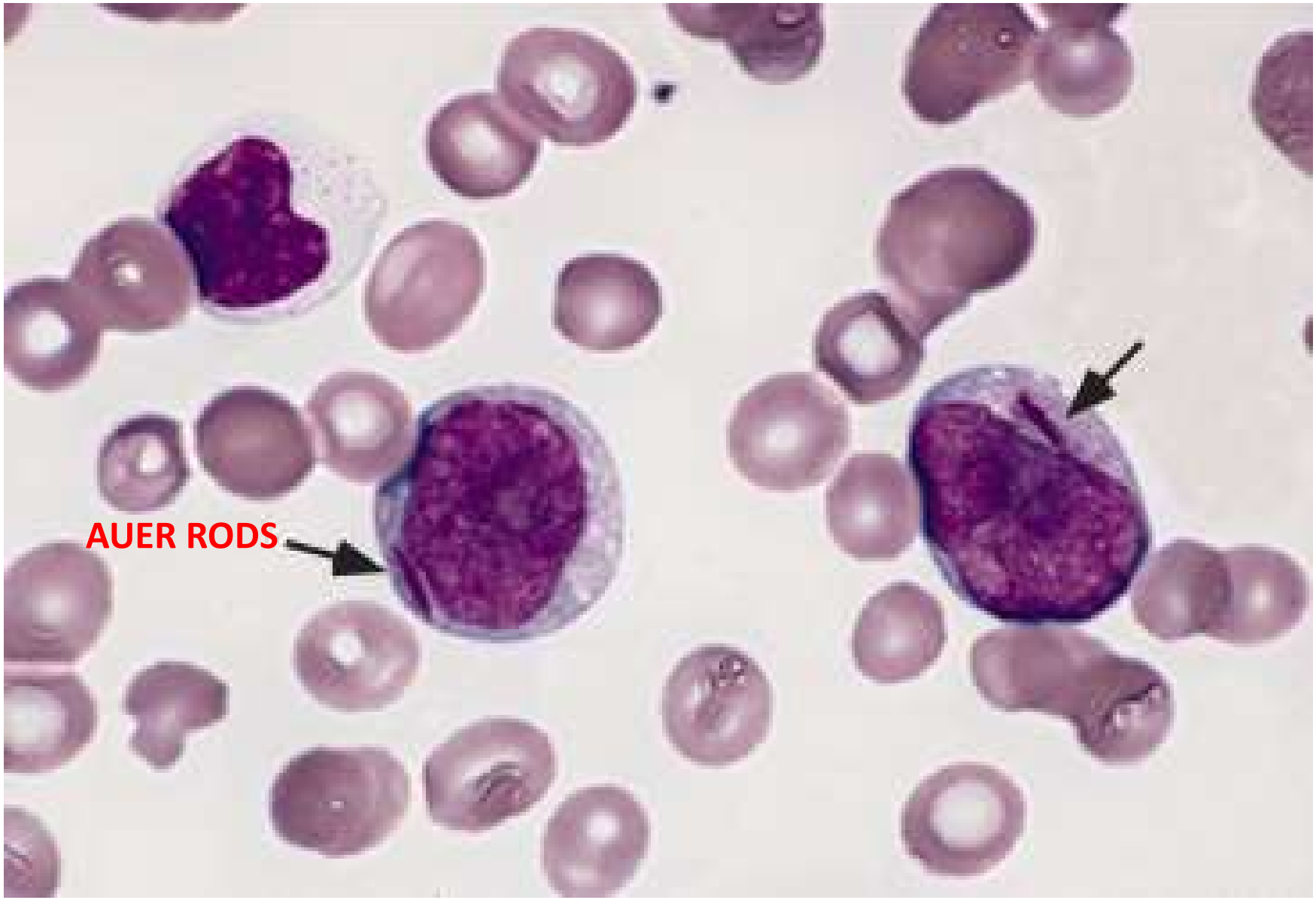
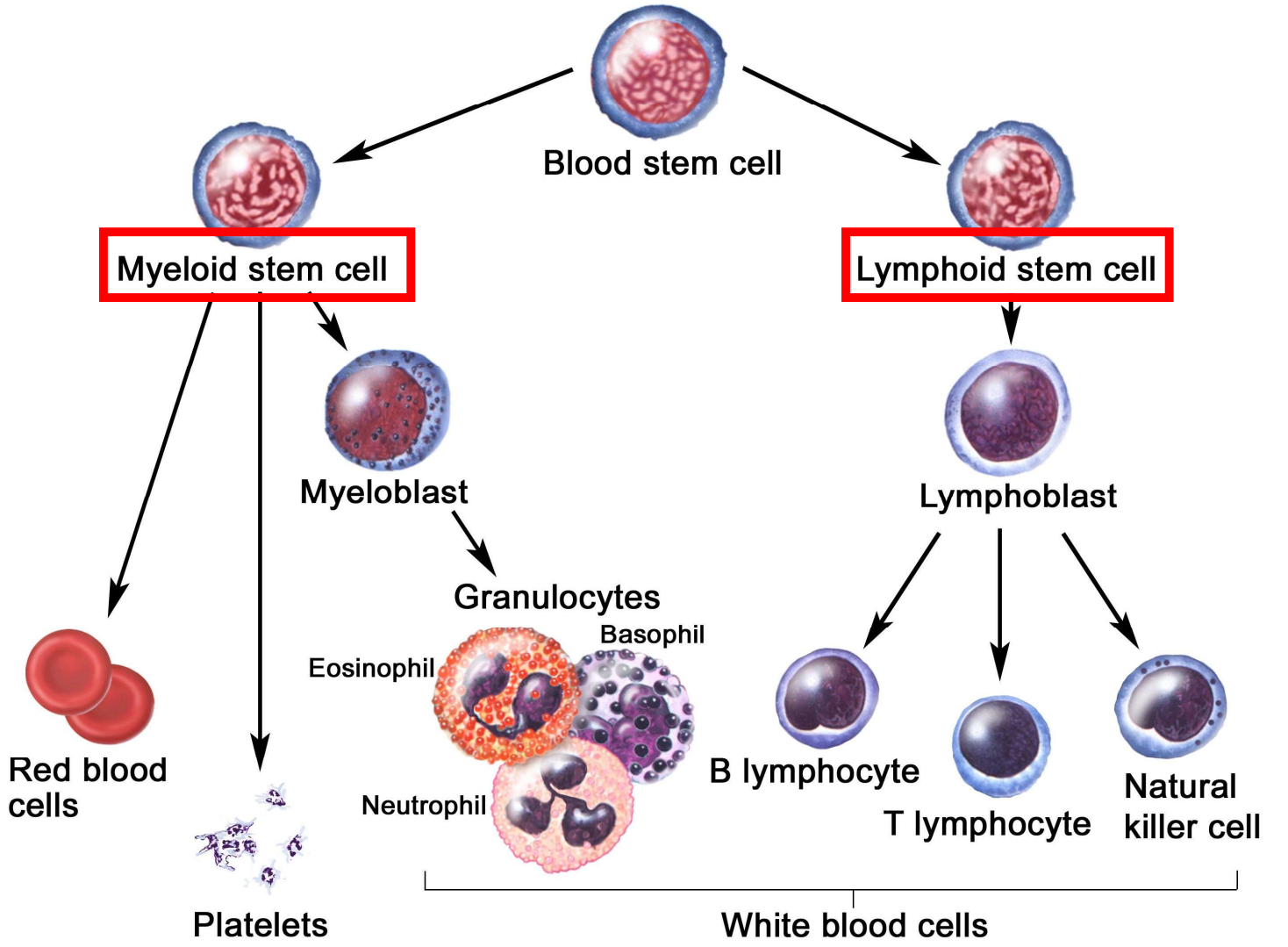
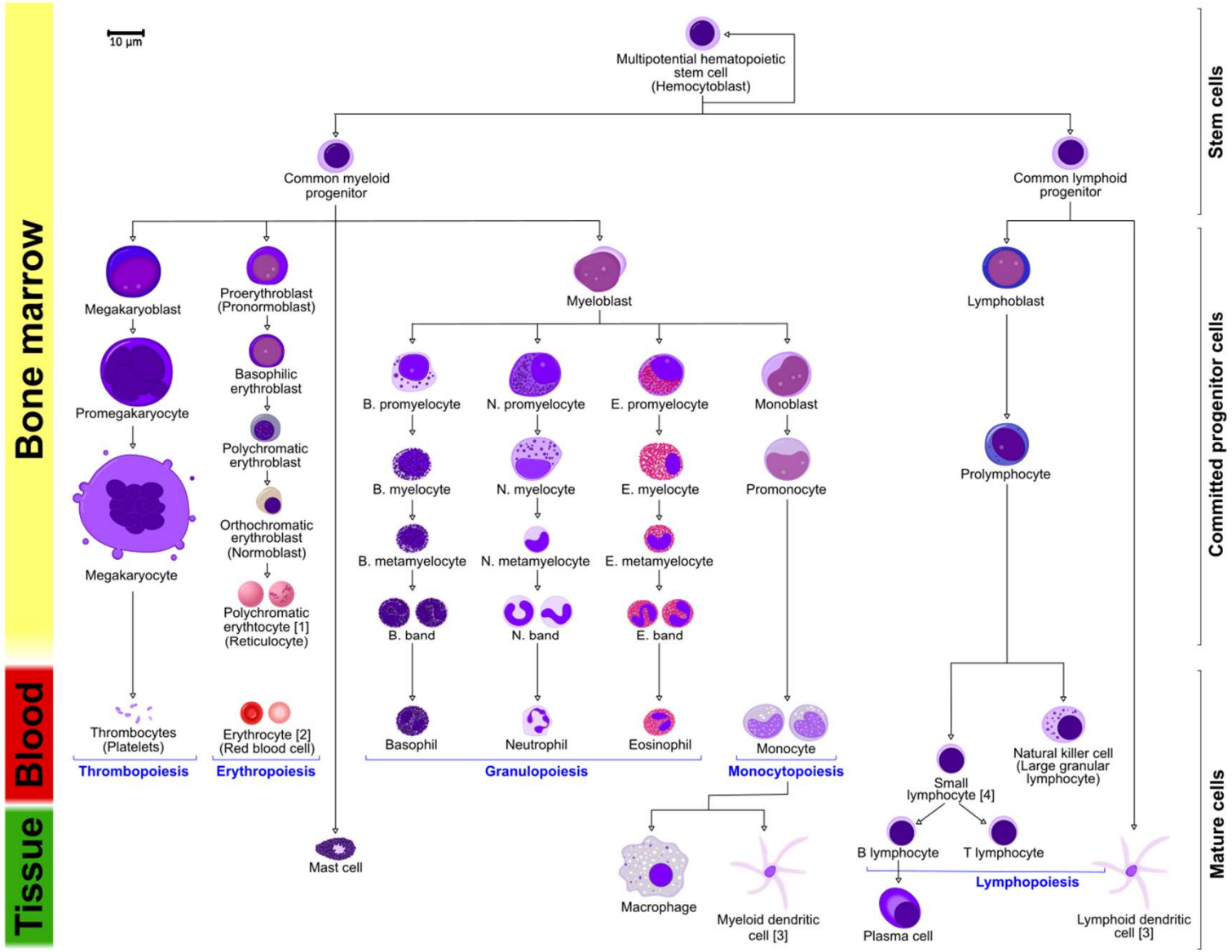
ACUTE MYELOID LEUKEMIA




AUER RODS




Bone marrow
Blood
Tissue
10 µm
Multipotential hematopoietic stem cell (Hemocytoblast)
Common myeloid progenitor
Common lymphoid progenitor
Stem cells
Committed progenitor cells
Mature cells
Megakaryoblast
Promegakaryocyte
Megakaryocyte
Thrombocytes (Platelets)
Thrombopoiesis
Proerythroblast (Pronormoblast)
Basophilic erythroblast
Polychromatic erythroblast
Orthochromatic erythroblast (Normoblast)
Polychromatic erythtocyte [1] (Reticulocyte)
Erythrocyte [2] (Red blood cell)
Erythropoiesis
Mast cell
Myeloblast
B. promyelocyte
B. myelocyte
B. metamyelocyte
B. band
Basophil
N. promyelocyte
N. myelocyte
N. metamyelocyte
N. band
Neutrophil
E. promyelocyte
E. myelocyte
E. metamyelocyte
E. band
Eosinophil
Granulopoiesis
Monoblast
Promonocyte
Monocyte
Monocytopoiesis
Macrophage
Myeloid dendritic cell [3]
Lymphoblast
Prolymphocyte
Small lymphocyte [4]
B lymphocyte
T lymphocyte
Lymphopoiesis
Plasma cell
Natural killer cell (Large granular lymphocyte)
Lymphoid dendritic cell [3]

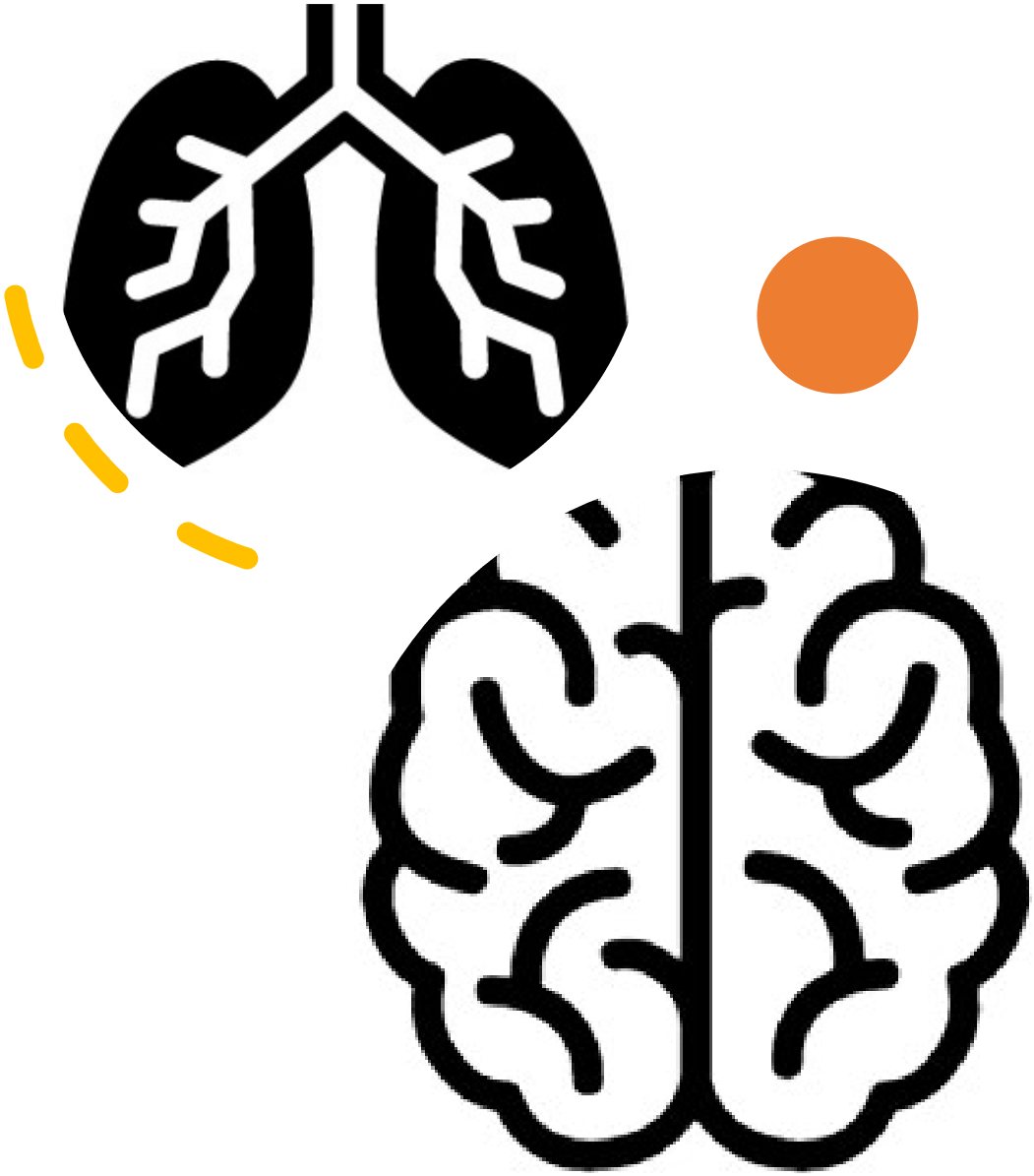
Leukostasis

- Hyperleukocytosis: total WBC > 50k-100k/µl

- Leukostasis = symptomatic hyperleukocytosis
- Lots of blasts → ↑ blood viscosity → blockage/ischemia

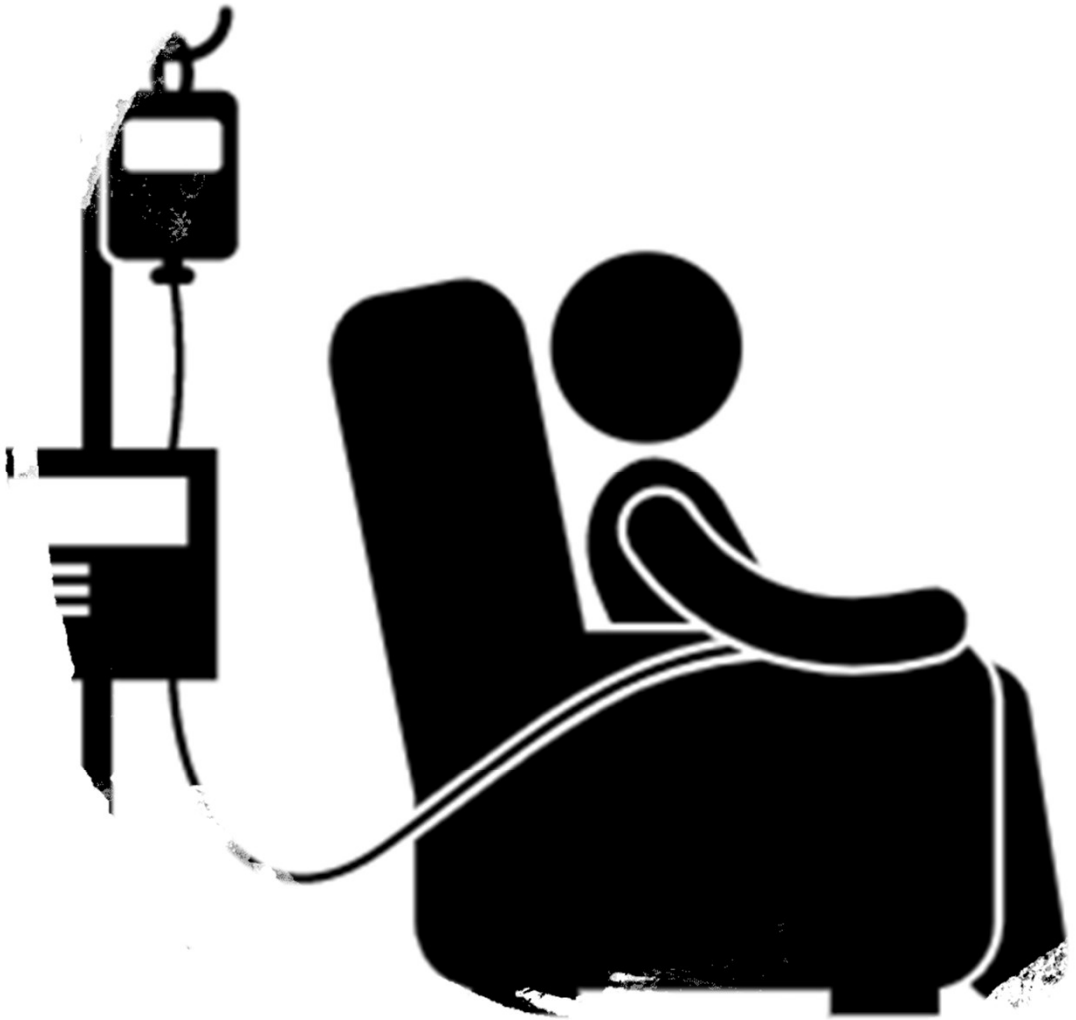
Leukostasis

- Lots of blasts → ↑ blood viscosity → blockage/ischemia
  - MI, PE, Stroke
- **Respiratory distress & neurologic symptoms** are leading causes of early death
  - PaO2 and SpO2 don't always correlate – Why?



Leukostasis Tx

- Cytoreduction
  - Chemotherapy
  - Hydroxyurea
  - Leukapheresis



CC: Failure to thrive, weakness

HPI: 75 y/o man.
Caretaker found pt on the floor, prompting ED visit.

He had collapsed on the floor due to severe weakness and fatigue.

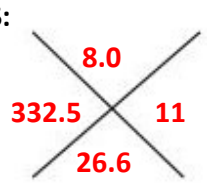
Poor PO intake for about 1 week.

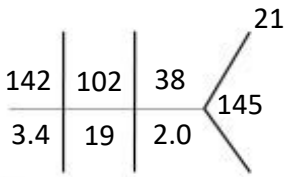
ROS negative.

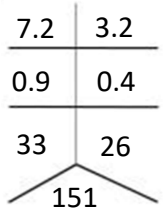
PMH: Denied
SH: Denied current or past use of ETOH, tobacco, or drugs.
FH: Noncontributory
Allergies: NKDA
Meds:
- None

PHYSICAL EXAM:
Tmax: 37.1C, BP: 103/63, HR: 84, RR: 19, SpO2: 94% on RA
General: in NAD, resting in bed
HEENT: PERRL, EOMI, dry mucus membranes, oropharynx clear, neck supple with normal ROM
CV: regular rate and rhythm, no M/R/G
Pulm: unlabored breathing on room air, CTAB
GI: bowel sounds present, nondistended, soft, nontender, no rebound or guarding
MSK: no edema, warm extremities with palpable distal pulses
Skin: mild bruising of RLE, no petechiae or rashes
Neuro: AOx3, answering questions appropriately, following commands, moving all extremities against gravity, CN II-XII intact, Str 5/5 in BUE and BLE, sensation symmetric and intact in BUE and BLE

LABS:







Peripheral Smear:
Neutrophil: 4%
Lymphocytes: 1%
Monocytes: 3.5%
Eosinophils: 0%
Basophils: 0%
Bands: 0.5%
Blasts: 91%

Abs Neutrophils: 13.3k/µl
Abs Lymphocytes: 3.3k/µl
Abs Monocytes: 11.6k/µl
Abs Eosinophils: <0.03k/µl
Abs Basophils: <0.03k/µl
Abs Bands: 1.66k/µl
Abs Blasts: 302.6k/µl
Rare schistocytes

Peripheral Smear comment:
No Auer rods or prominent cytoplasmic granules seen

Flow Cytometry (peripheral blood):
Acute myeloid leukemia, 96% circulating blasts

Uric acid: 10.2 (↑)
Phos: 4.0 (nml)
Calcium: 9.1 (nml)

PT: 20.7 (↑); INR: 1.8 (↑); PTT: 34 (↑)
D-dimer: 3.90 (↑)

LD: 474 (↑)
Haptoglobin: 243 (↑)

Lactic Acid: 5.1
Beta-Hydroxybutyrate: 0.72

BCR/ABL1 & t(9;22): neg
PML-RARA & t(15;17): neg

PROBLEM REPRESENTATION:
Elderly man w/ no known PMH, who presents with acute weakness, fatigue, and decreased oral intake, found to have extremely elevated leukocytosis with >90% blasts concerning for hematologic malignancy.

DIAGNOSIS: AML

LEARNING POINTS:
- **AML:** adults (60s); fatigue (anemia) + bleeding / bruising (thrombocytopenia) + infection (ineffective neutrophils); ≥20% blasts in bone marrow or periph smear, Auer rods
- ALL: children (7-14 y/o); bone pains, CNS disease; immature T or B cells
- CML: adults (50-60s); Chronic phase (insidious), Accelerated phase (B-sx, bone pain, bleeding, infection), Blast crisis (sx like AML); t(9;22) chromosomal rearrangement (Philadelphia chromosome) and/or BCR-ABL1 oncogene
- CLL: elderly (70-80s); Asxs, B-sx, LAD, splenomegaly; Smudge cells; Can transform into DLBCL (Richter transformation)
- CAN'T MISS emergencies
  - TLS
  - DIC / bleeding
  - Febrile neutropenia
  - Leukostasis
    - Hyperleukocytosis: total WBC > 50k-100k/µl
    - Lots of blasts → ↑ blood viscosity → blockage/ischemia
    - Respiratory distress & neuro sx are leading causes of early death
    - Tx: cytoreduction with chemotherapy, hydroxyurea, leukapheresis (controversial)