Hematopoiesis

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Note:

The nucleus stains **blue (basophilic)** using H&E

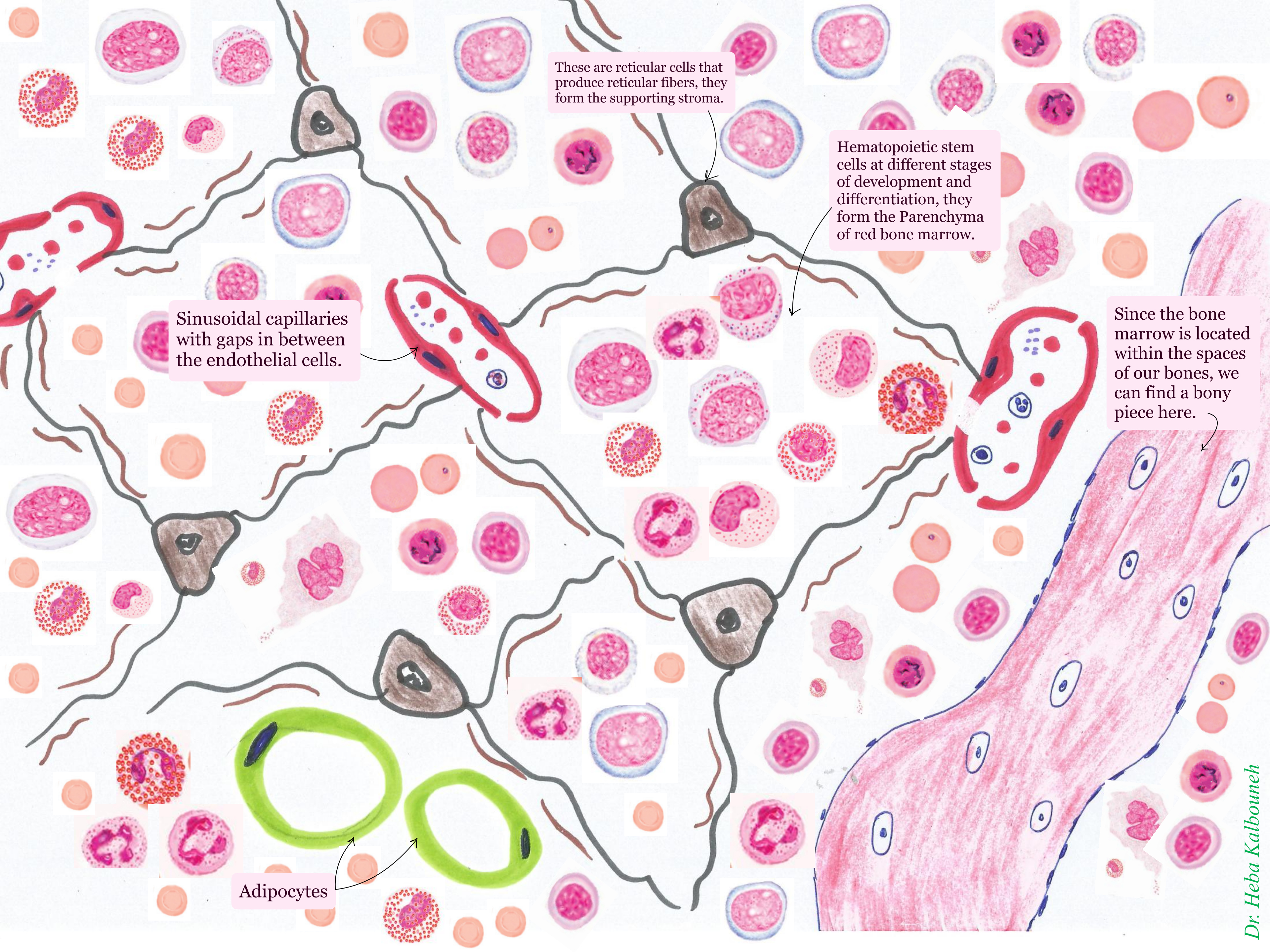
Lightly basophilic: active

Deeply basophilic and small: inactive

Active nucleus (Euchromatin)

Nucleolus

Inactive nuclei (Heterochromatin)



These are reticular cells that produce reticular fibers, they form the supporting stroma.

Hematopoietic stem cells at different stages of development and differentiation, they form the Parenchyma of red bone marrow.

Sinusoidal capillaries with gaps in between the endothelial cells.

Since the bone marrow is located within the spaces of our bones, we can find a bony piece here.

Adipocytes

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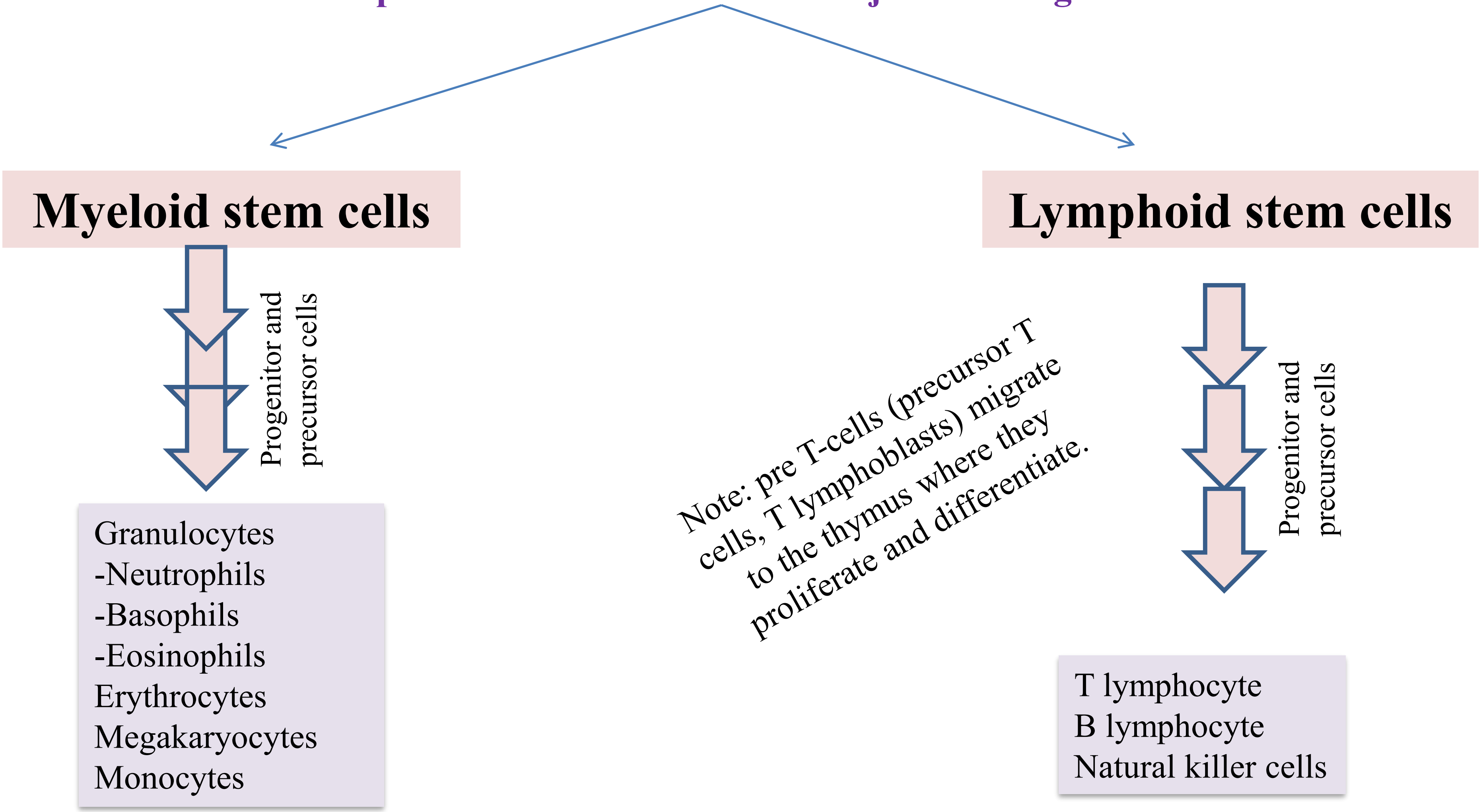
Pluripotent hematopoietic stem cells

All blood cells arise from a single type of stem cell in the bone marrow called pluripotent stem cell
It can produce ALL BLOOD CELL TYPES

It proliferates and forms two major cell linages



Myeloid stem cells

Progenitor and precursor cells

Granulocytes
-Neutrophils
-Basophils
-Eosinophils
Erythrocytes
Megakaryocytes
Monocytes

Lymphoid stem cells

Progenitor and precursor cells

T lymphocyte
B lymphocyte
Natural killer cells

Note: pre T-cells (precursor T cells, T lymphoblasts) migrate to the thymus where they proliferate and differentiate.

Blood Cell Formation (Hematopoiesis)

Throughout childhood and adult life, erythrocytes, granulocytes, monocytes, and platelets continue to form from stem cells located in bone marrow

Important & required

Erythropoiesis: the process which produces erythrocytes
Granulopoiesis: the process which produces granulocytes
Thrombopoiesis: the process which produces thrombocytes
Lymphopoiesis: the process which produces lymphocytes
Monocytopoiesis: the process which produces monocytes

Remember
Lymphopoiesis occurs in the marrow and in the lymphoid organs to which precursor cells migrate from marrow.

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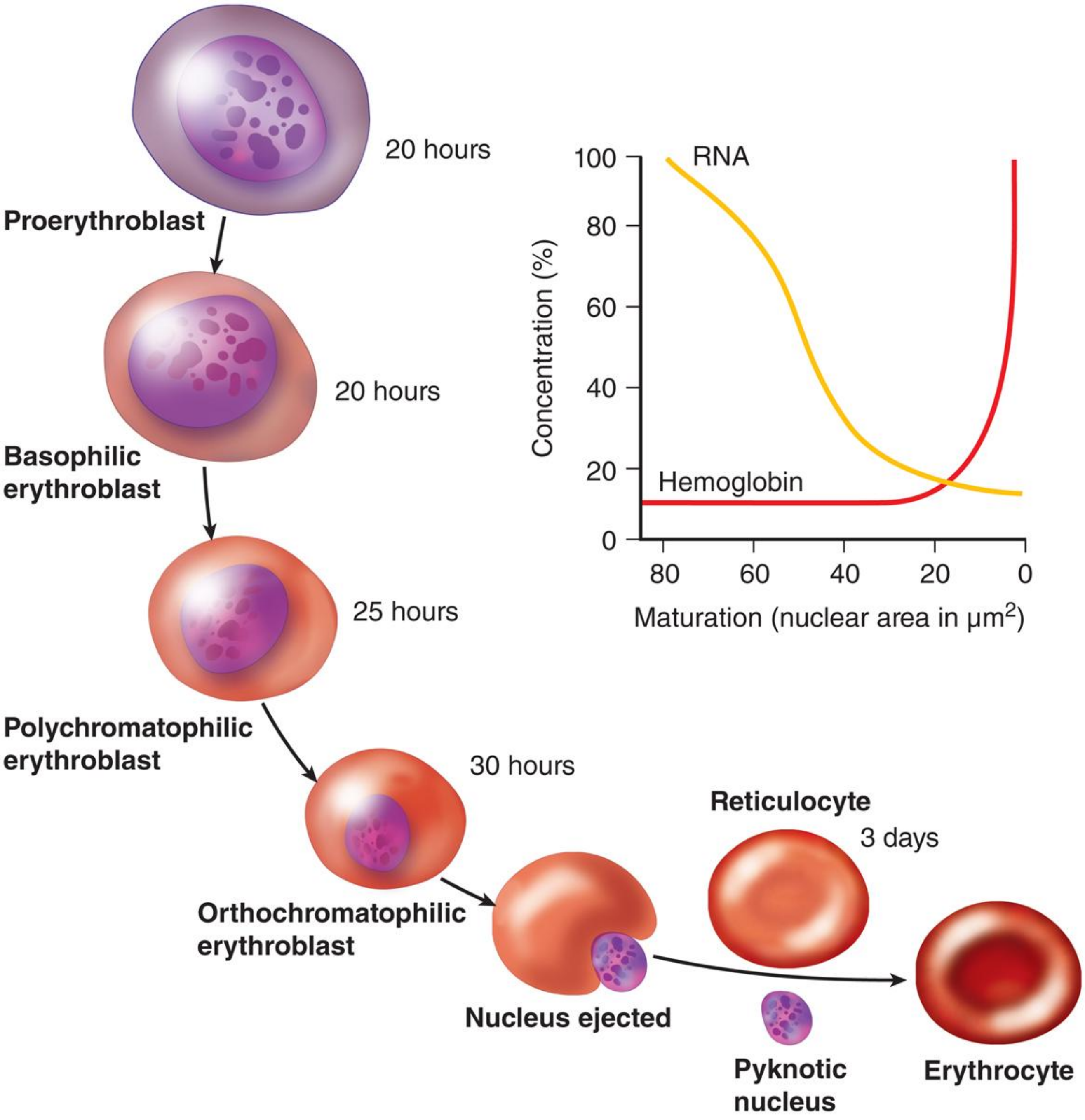
20 hours
Proerythroblast
20 hours
Basophilic erythroblast
25 hours
Polychromatophilic erythroblast
30 hours
Orthochromatophilic erythroblast
Nucleus ejected
Reticulocyte
3 days
Pyknotic nucleus
Erythrocyte
Concentration (%)
100
80
60
40
20
0
RNA
Hemoglobin
80
60
40
20
0
Maturation (nuclear area in μm²)