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LEUKOCYTES AND BONE MARROW

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Objective

- Definition of Leukocytes.
- Types of Leukocytes.
- Definition of bone marrow.
- Structure of bone marrow.
- Types of bone marrow.
- Diseases that related to bone marrow disfunction.
LEUKOCYTES
Leukocytes.

- White blood cells (WBC) are the cellular component of the blood that lacks hemoglobin, has a nucleus, is capable of motility, and defends the body against infection and disease.
➢ Normal human level is 4000 to 11000 cell/mm³.

➢ Total WBC count can be done by manual or by automated cell counter.

➢ Abnormalities of leukocyte level may cause: Leukocytosis or Leukopenia.
TYPES OF LEUKOCYTE OR (WHITE BLOOD CELL)

1-Neutrophils

- Most abundant type of WBC and the first responder to microbial infection.
- They are unable to renew their lysosomes and die after having phagocytosed a few pathogens.
2-Eosinophils

➢ Prominent at the sites of allergic reactions and parasitic infections.

➢ They function as the primary response to large multicellular parasites (e.g. helminth infections).
3-Basophils

➢ Basophils are chiefly responsible for initiating inflammatory responses by releasing the chemicals histamine and heparin.

➢ Functionally they are similar to mast cells, however they circulate in the bloodstream whereas mast cells are localised.
4-Monocytes

- Monocytes are the largest type of leukocyte and share phagocytosis duties with neutrophils.
- They are slower to respond than neutrophils but are longer lasting.
5-Lymphocytes

➢ Lymphocytes are responsible for the production of antibodies which target specific antigens present on pathogens.

➢ They are more common in the lymphatic system than blood and are slowest to respond. They have two types B and T lymphocytes.
Bone marrow
Bone marrow is the soft, flexible connective tissue within bone cavities. A component of the lymphatic system, bone marrow functions primarily to produce blood cells and to store fat. Bone marrow is highly vascular, meaning that it is richly supplied with a large number of blood vessels.
Bone marrow is separated into a vascular section and non-vascular sections. The vascular section contains blood vessels while the non-vascular sections of the bone marrow are where hematopoiesis or blood cell formation occurs.
STRUCTURE

BONE ANATOMY

- Spongy bone
- Blood vessels
- Compact bone
- Endosteum
- Yellow marrow
- Periosteum
- Trabeculae
- Red marrow
- Nerve
TYPES BONE MARROW

➢ Consist bone marrow on two types occurs the lifetime.

➢ Red marrow

➢ yellow marrow
<table>
<thead>
<tr>
<th>Types of bone marrow</th>
<th>Red marrow (hemopoietic)</th>
<th>Yellow marrow (stormal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occurs</strong></td>
<td>inside the spongy bones.</td>
<td>inside the compact bones.</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>Produce the red blood cell, white blood cells, platelets.</td>
<td>produce Fat cell, bone, and cartilage.</td>
</tr>
<tr>
<td><strong>Cells</strong></td>
<td>Cells actively divide to produce blood cells.</td>
<td>Cells store fats and produce blood cells when needed.</td>
</tr>
<tr>
<td><strong>Colour originate</strong></td>
<td>Get its red color due to the hemoglobin present in the red blood cells.</td>
<td>Gets its yellow color due to the carotenoids in the fat droplets.</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Occurs throughout the skeleton during the fetal life.</td>
<td>With age, this replaces the red bone marrow in long bones.</td>
</tr>
<tr>
<td><strong>Blood supply</strong></td>
<td>Rich in blood supply.</td>
<td>Has a poor blood supply</td>
</tr>
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Diseases that related to Bone marrow

Bone marrow disease, there are problems with the stems cells such as:

➢ Leukemia.

➢ Aplastic animia.
SUMMARY

➢ Leukocytes are main part of immune system, there are of five distinct types.

➢ All types of leukocytes are involved in phagocytosis except lymphocyte is immune response.

➢ Bone marrow is the soft spongy tissue that lies within the hollow interior of bones.
SUMMARY

➢ Bone marrow is divided to two types red and yellow marrow.

➢ Red marrow produces red blood cells and platelets.

➢ Yellow marrow produce bone, cartilage, and fat.

➢ Red bone marrow found in all bone types of children while yellow marrow present in adult.
REFERENCE

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THANK YOU