What is Bone Marrow?

Worksheet

Bone marrow is the soft, vascular tissue inside bone cavities that produces blood cells (hematopoiesis) in its red form and stores fat in its yellow form, with red marrow found mainly in flat bones and the ends of long bones in adults.

Questions

1. What is the main function of red bone marrow?

A) Fat storage
B) Blood cell production
C) Calcium storage
D) Hormone production

2. Where does yellow marrow mainly accumulate in adults?

A) Vertebrae
B) Skull
C) Shafts of long bones
D) Ribs

3. What hormone stimulates red marrow to make more red blood cells?

A) Insulin
B) Erythropoietin
C) Cortisol
D) Thyroxine

4. Which bone is commonly biopsied to sample active red marrow?

A) Femur shaft
B) Iliac crest (hip)
C) Radius
D) Skull

5. Explain why a bone marrow biopsy is usually taken from the hip (iliac crest).

6. A patient with chronic blood loss needs more red blood cells. How does bone marrow respond?

7. Why do infants have almost all red marrow while adults have significant yellow marrow?

8. Define: What is the main function of red bone marrow?

9. Define: What is yellow bone marrow made of?

10. Define: Where is red marrow found in adults?

Answer Key

1. B) Blood cell production - Red marrow is hematopoietic tissue that produces red cells, white cells, and platelets.

2. C) Shafts of long bones - Yellow marrow fills the medullary cavity in the shafts of long bones in adults.

3. B) Erythropoietin - Erythropoietin (EPO), released by the kidneys, stimulates red blood cell production in marrow.

4. B) Iliac crest (hip) - The iliac crest keeps active red marrow throughout adulthood and is a safe, accessible biopsy site.

5. The pelvis is a flat bone that retains active red marrow throughout adult life Red marrow is where blood cell production actually happens, so it reflects marrow health accurately The iliac crest is close to the skin and easily accessible without risking major organs Sampling the femur shaft instead would mostly collect fatty yellow marrow, which is less useful diagnostically

6. Low oxygen delivery triggers the kidneys to release more erythropoietin (EPO) EPO stimulates hematopoietic stem cells in red marrow to produce more red blood cells If red marrow reserves are insufficient, some yellow marrow in the long bones converts back to red marrow This expands the body's blood cell production capacity to compensate for the loss

7. Infants are growing rapidly and need high rates of blood cell production, so red marrow fills nearly every bone cavity As a child grows into adulthood, blood cell demand per unit of marrow decreases relative to skeletal size Red marrow in long bone shafts gradually converts to fat-storing yellow marrow starting in childhood By adulthood, red marrow is mostly confined to flat bones, vertebrae, and the ends of long bones

8. Hematopoiesis - producing red blood cells, white blood cells, and platelets.

9. Mostly fat cells (adipocytes), used for energy storage.

10. In flat bones like the pelvis, sternum, ribs, and skull, and in the epiphyses of long bones.