HISTOLOGICAL FEATURES OF THE SPLEEN

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Annotation:*This thesis highlights the external and internal morphological structure of the spleen, its importance as a lymphoid organ, its physiological functions, and its role in hematopoiesis.*

Keywords: *Embryonic hematopoiesis, spleen, liver, aorta–gonad–mesonephros, erythro- and granulocytopoiesis, extravascular hematopoiesis, mesenchyme, extramedullary hematopoiesis, hematopoietic progenitor, blood depot, yolk sac.*

RELEVANCE:

Immune cells are formed in the spleen. More precisely, this process represents the formation, growth, maturation, and specialization of blood cells from hematopoietic stem cells through hematopoietic progenitor cells into specific blood cells. This process is strictly regulated by several elements of the bone marrow microenvironment, such as growth factors, transcription factors, and cytokines. During embryonic and fetal development, hematopoiesis occurs in various organs, including the yolk sac, the aorta–gonad–mesonephros region, lymph nodes, fetal liver, and embryonic or fetal spleen.

The spleen plays an important role in metabolism and cell migration, being a key component of the portal circulation that contains reticuloendothelial structures. The liver performs secretory functions, but under certain conditions, it can compensate for bone marrow insufficiency and, together with the spleen, help prevent a deficiency of functional blood cells. The spleen is an organ with high metabolic activity; one of its functions is to recycle blood cells and iron and filter atypical blood cells. It removes aged erythrocytes, damaged platelets, and apoptotic cells through phagocytosis, produces and stores antibodies, and supports the immune system by producing and activating T and B lymphocytes that fight infections.

The spleen bud first appears in the 5th–6th week of embryonic development, arising from a dense aggregation of mesenchymal cells within the developing greater omentum. The vascular system of the spleen differentiates earlier, and reticular cells form between the blood vessels, among which stem cells of the blood are located. By the 7th–8th week, macrophages appear in the spleen; by the 11th–12th week, B lymphocytes develop. Up to the 5th month of embryonic

development, granulocytopoiesis, erythropoiesis, and thrombocytopoiesis actively occur in the spleen. Meanwhile, lymphocytopoiesis gradually intensifies — during the 3rd–5th months, T lymphocytes accumulate around arteries (T-zone or periarteriolar zone), followed later by B lymphocytes, forming the white pulp of the spleen. The reticular tissue between them, together with large sinusoidal blood vessels, forms the red pulp. During the first half of embryonic life, all hematopoietic cells develop in the spleen.

The liver bud appears during the 3rd–4th weeks of embryonic development. From the fifth week onward, the liver becomes the main site of blood formation in the embryo. The formed blood cells develop from stem cells, which transform into primary blood cells and then produce secondary erythrocytes. Alongside mature erythrocytes, mature granulocytes—mainly neutrophils and eosinophils—are also observed in the liver. Hematopoiesis occurs extravascularly along capillaries as mesenchymal tissue grows into hepatic lobules. The source of blood formation is the stem cells derived from the yolk sac, which differentiate into secondary erythrocytes and granulocytes. In addition, megakaryocytes also develop. Unlike in adults, this process bypasses intermediate stages, and mature neutrophils and eosinophils are produced without completing the myeloblast and promyelocyte stages.Schematically, the maturation of granulocytes proceeds as follows: from primary blood cells to mature granulocytes. Furthermore, giant megakaryocyte cells also develop in the liver. All these elements develop outside the blood vessels, i.e., extravascularly. Gradually, hematopoiesis in the liver decreases and completely ceases by the end of embryonic development. Thus, in the post-embryonic period, blood formation no longer occurs in the liver.

CONCLUSION:

Fetal (embryonic) hematopoiesis includes two main stages: primitive and definitive. In this article, we explored in depth the primitive hematopoiesis occurring in the spleen and liver, i.e., the secondary functions of these organs during embryonic development.

REFERENCES:

1.Togaydullaeva, D. D. (2022). The occurrence of comorbidity in patients with arterial hypertension. Online Scientific Journal “Education and Development Analysis,” 2(11), 32–35.

2.Togaydullaeva, D. D. (2022). The effect of metabolic syndrome components on the course of ischemic heart disease in men. Science, Education, Culture and Innovation, 1(4), 29–34.

3.Dilmurodovna, T. D. (2023). Morphological aspects of the thyroid gland in various forms of its pathology. American Journal of Pediatric Medicine and Health Sciences (2993–2149), 1(8), 428–431.

4.Dilmurodovna, T. D. (2023). Morphological signs of the inflammatory process in the pancreas in Type I and II diabetes mellitus. European Journal of Innovation in Nonformal Education, 3(11), 24–27.