9. THE HISTOLOGICAL MIRACLE OF THE CIRCULATORY SYSTEM

Author: Ustroi Liudmila

Scientific advisor: Saptefrati Lilian, MD, PhD, Professor, Head of Department of Histology, Cytology and Embryology, *Nicolae Testemitanu* State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. The cardiovascular or circulatory system is designed to ensure the survival of all cells in the body at all times and does this by maintaining the immediate chemical environment of each cell in the body at a composition suitable for that cell's normal function.

Aim of study. This study aims to describe the histological peculiarities of the circulatory system.

Methods and materials. A bibliographic study of scientific literature specialized at histological special features of circulatory systems.

Results. The human cardiovascular system is the product of hundreds of thousands of years of evolution. Throughout its long history, the cardiovascular system has been shaped and reshaped by developing adaptations to the haemodynamic challenges it faced at each step. The analysis of cardiovascular evolution provides a fascinating opportunity to identify the potential weaknesses of our cardiovascular system, to better understand the pathophysiology of disease and to formulate treatment alternatives. Our cardiovascular system is the result of the above-mentioned evolutionary process, and it reenacts this evolutionary history during embryogenesis.The fully developed 4-chambered human heart develops from the successive stages of the single peristaltic tube, the 2-chambered fish heart with a spongy ventricular cavity, the 3-chambered fish heart with a spongy ventricular cavity,more compact amphibian heart, and the three-and-a-half-chambered the three-and-a-half-chamber reptilian heart with a partially divided ventricle. Six pairs of pharyngeal arteries develop and either regress or metamorphose into mature vascular structures as predicted by evolutionary history. The microcirculation deserves special attention, because through the walls of these vessels oxygen is exchanged, among other substances. In addition, arterioles, also known as 'resistance' vessels, are the main site of blood flow control. Thus, the blood vessels of the microcirculation play important roles in both the convective (arterioles) and diffusive (capillaries) transport of oxygen. These blood vessels are classified as arterioles, capillaries and venules and range in diameter from about 100-200 μm for the largest arterioles and venules to about 5 μm for capillaries. In terms of their structure, all these vessels possess an inner layer of endothelial cells.

Conclusion. Every biological system we encounter is so detailed and rational that, far from being created by chance, the slightest deviation would clearly disrupt its functioning.