SCIENTIFIC HERITAGE OF ALEXANDER MAKSIMOV

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We can not go to the future, without looking back to the past …Since only after analyzing and learning experience of previous generations, we can get positive results today. Today we want to draw your attention to the scientific heritage of outstanding Russian histologist Alexander Maksimov, whose works are still relevant and widely discussed among histologists and doctors of various specialties. Alexander Maksimov was born in 1874 in St. Petersburg, where in 1896 he graduated from the Military Medical Academy and then worked there as a professor (1902 -1922). In 1923 A.Maksimov emigrated to the United States (Chicago) where he worked until his death. Since student-time Maksimov was interested in the topic of histogenesis of inflammatory reactions, which he carried through his life and that inspired him to intensive study of histogenesis of blood and connective tissues in normal and pathological conditions. The results of studying of different cellular forms of inflammation prompted him to think about the study of the origin at the body of various blood and connective tissue cells in normal conditions. It was necessary to describe and classify the various connective tissue cells, for many years study embryo development in various cellular elements of the blood, connective tissue and hemopoetic organs By the end of 1910 Maksimov found that lymphocytes play an important role in the development of all formed elements of the blood. So this fundamental discovery became the basis of the monophyletic (unitarian) theory of the hemopoiesis. Blood histogenesis regularities Maksimov extrapolated on connective tissues, for which he suggested the existence of a single source of mesenchymal cell in the adult body, that he called a small lymphocyte. All cells of hemocytopoiesis Maksimov divided into 4 groups: Group 1 - cells with unlimited differentiations, i.e. the progenitor - cells that can grow and differentiate into any blood cells. Group 2 - cells with partially limited ability to differentiation into some formed elements of the blood . Group 3 - cells with severely disabled development. Group 4 - blood cells that can not change (mature cells)/

His main discoveries were:

Hemocytoblast (haemocytoblastus) - a term that was proposed by the author to refer undifferentiated hemopoietic cell, which, in his opinion, is the progenitor element of the cell hemopoiesis. Maksimov`s Unitarian theory – is the concept whereby any blood cell develops from a single source-cells, which he called stem because they are developed from the trunk - basic of hemopoietic tree. He argued that in our body during lifetime there are kept undifferentiated cells that can transform into specialized blood cells and cells of connective tissue. Launched by the author in 1909 theory was experimentally confirmed by the present hematological studies on blood. Important Maksimov`s developments for improving histological technique are also should be noted there. For example, he developed a new method to mount histological preparations, namely sequential series gluing tissue sections on one slide, previously greased with a mixture of proteins with glycerol (Maksimov-Rubashkin method), which today is generally used in histological technique. Even now is widely used a special blend for fixation of histological preparations comprising an aqueous solution of potassium dichromate, mercuric chloride and formalin. This fixing liquid was subsequently called Maksimov`s mixture.

Thus, he has developed and substantiated unitary theory of hemopoiesis, has given morphological description of cell forms of connective tissues and has determined their role in the body.

His works are remained relevant nowadays. Of course, they are supplemented, expanded, but the basic idea is true these days. These knowledge formed the ground for a new direction of research related to the use of stem cells in the treatment of various diseases, including cancer, as well as culturing tissues and transplantations of various organs. Questions that were raised by him more than 100 years ago, and were not perceived then, are important for biologists, doctors and histologists of modernity. Stem cells, which were first discovered by him, are becoming now the object of research in various fields of medicine: oncology, surgery, transplantation and hematology. Today his sights are delving and exploring in a new aspects.

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