

External examiner's opinion on dissertation of Mgr. Kateřina Faltusová "The role of stem and progenitor cells in regeneration of hematopoietic tissue"

The topic of the dissertation of Mgr. Faltusová was suitably chosen. The issues of mechanisms of regeneration of the hematopoietic tissue are topical from the point of view of both the basic research requirements and the clinical practice. The complex hierarchically ordered hematopoietic system places big demands on a researcher first from the point of view of the necessity to understand the contemporary state of knowledge of the course of its regeneration and, second, from the standpoint of the need to master a wide spectrum of methods for the study of the problems. The author of the dissertation has managed these problems quite well.

Methods used for investigations of the outlined problems have been suitably chosen starting with the selected experimental object (*Mus musculus*) through obtaining data on various levels of the hematopoietic system to the statistical evaluations.

In the frame of her work on the dissertation Mgr. Faltusová has obtained a lot of quality results, which represent new pieces of knowledge. I consider as a key result the finding that in an early time interval following exposure of the experimental animals to a sublethal dose of ionizing radiation, stem cells are not the main carrier of the regeneration potential. Unexpectedly, this role is played by developmentally advanced erythroid and myeloid progenitor cells with modified immunophenotype. Another interesting finding is that of the distinct difference between the regeneration of damaged hematopoiesis in adult mice and the expanding fetal hematopoiesis. The high quality of the results obtained can be also deduced from the enclosed publications of the author and from the list of her publications. Articles in journals as, e.g., *Frontiers in Cell and Developmental Biology* (IF=5.186) or *Biology of Blood and Marrow Transplantation* (IF-3.980) represent a big success of the author.

As concerns its formal aspect, the dissertation is worked out in a high grade. It consists of 86 pages followed by supplements – offprints of selected publications. The Introduction has 17 pages in which the problems of adult, fetal and regenerating hematopoiesis are summarized. Brief chapters Hypothesis and Aims show a thought-out authors' approach to the dissertation. Its part Material and Methods is a proof of the wide methodical spectrum used for the investigation of the problems. Chapter Results is written in detail and intelligibly. The chapter Discussion bears an evidence of the ability of Mgr. Faltusová to present the data obtained in connexions with those in the literature. The list of literature contains 129 items. The dissertation contains 31 figures and 7 tables which contribute to its intelligibility and informative quality.

The dissertation contributes significantly to the advancement in the field of Human Physiology and Pathophysiology. The work is significant both for the advancement of the research of mechanisms of regeneration of damaged hematopoiesis and for the subsequent clinical investigations, namely in the field of the study of the possibilities of stimulation of regeneration of hematopoiesis suppressed by ionizing radiation or cytotoxic chemotherapy.

I have no fundamental comments to the dissertation. A few typing errors do not lower my overall highly positive evaluation of the work.

I have the following question to the author: Is it possible to briefly summarize, on the basis of your own results or the findings in the literature, the contemporary knowledge about the

significance of the role of the hematopoietic stem cells in the regeneration of the hematopoietic tissues after irradiation and in which postirradiation time interval do the stem cells exercise its regenerative potential?

In conclusion, I pronounce that the dissertation of Mgr. Faltusová "The role of stem and progenitor cells in regeneration of hematopoietic tissue" proves unequivocally the requirements of the author for an independent originative scientific work and I suggest to bestow the title Ph.D. after the name.

Brno, July 28, 2021

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