

Project 9.2 Identifying unique adaptive responses of red pulp macrophages to iron deficiency (NCN/SONATA)

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WWW: <https://bit.ly/3a304tG>

Background:

Iron deficiency is a global health burden with profound socio-medical impacts, but little is known about how functions of specialized cells are affected by low systemic iron levels. Red pulp macrophages (RPMs) residing in the spleen are responsible for removing aged erythrocytes from the bloodstream. Following erythrocyte lysis, RPMs release iron to the circulation to replenish the pool of serum iron necessary for sustaining erythropoiesis. RPMs are thus critical for maintaining blood and iron homeostasis in the body. Interestingly, it was largely unknown if and how key cellular functions of RPMs are affected by low body iron status. Using a mouse model of nutritional iron deficiency, we uncovered that iron deficiency triggers specific but still elusive signaling mechanisms that modulate RPMs' phagocytic and metabolic functions. We expect that these newly identified responses likely contribute to the adaptation of the whole organism to limited iron supplies. Within our project, we apply both *in vivo* and *in vitro* approaches to decipher the molecular mechanism responsible for the adaptive functional 'rewiring' of RPMs in iron deficiency and determine their physiological role for the whole organism. The new knowledge generated by this research is expected to significantly advance our understanding of an organism's adaptation to iron deficiency.

Aim:

We aim to comprehensively characterize the functional adaptation of RPMs to iron deficiency and identify its molecular triggers. We will explore how the abrogation of this 'adaptation program' affects the organism, including iron and blood homeostasis. To this end, we will create and characterize new conditional knock-out mice characterized by specific suppression of the RPMs' adaptation to low iron conditions.

Requirements:

- Master's degree in biology, biochemistry or related field
- Eligibility for PhD studies in Poland
- Interests in molecular aspects of physiology, motivation for experimental work, passion for science, hands-on experience in laboratory work
- Experience in mouse/rat-based studies or willingness to work with animals
- Written and spoken fluency in English
- Willingness to learn and take new challenges, ability to work independently, analytical thinking
- Good interpersonal skills and a collaborative attitude.
- Research achievements (eg, publications or manuscripts in preparation) and experience abroad will be of advantage

Number of positions available: 1

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