

1. Research project objectives

Thyroid diseases are the most common endocrine disorders in human population, and the incidence reaches 9-15%, predominantly women. Thyroid disorders can be divided with regard to hormonal state (hyperthyroidism or hypothyroidism) or the reason of the disease (autoimmune – abnormal immune response, genetic or complex). Hyperthyroidism or hypothyroidism leads to a number systemic consequences. One of them is a disturbance of iron distribution and in the consequence - anemia. Hepsidin is one of the proteins engaged in iron distribution, but its role and significance in thyroid disorders is not known. Hence, in this project we aim to estimate **the level of hepcidin concentration in the blood serum of patients with diagnosed thyroid diseases** with particular emphasis on hypothyroidism, hyperthyroidism or subacute thyroiditis and **after treatment** (biochemical equalization – the levels of thyroid hormones are in reference range). **The concentration of hepcidin will be compared with concentration of hepcidin in the control group of healthy people.**

Project's research hypotheses assumes potential changes in the level of hepcidin that depend on functional state of the thyroid gland and etiology of the disease as well as potential role of hepcidin in the pathogenesis of disturbances in iron homeostasis observed in the course of thyroid diseases.

2. Research project methodology

The project will be conducted in the Department of Endocrinology, Metabolism and Internal Medicine of Poznan University of Medical Sciences and will include:

1. Recruitment of patients at the time of diagnosis based on clinical examination, laboratory tests and ultrasound examination of thyroid gland
2. Selection of patients on the basis of the type of thyroid dysfunction (hyperthyroidism, hypothyroidism and subacute thyroiditis group)
3. First assessment of the level of hepcidin in the blood serum at the time of diagnosis
4. Second assessment of hepcidin level in the blood serum of a patient after treatment
5. Comparison of hepcidin level in patients with thyroid disorders with the control group
6. Comparison of hepcidin level at the time of diagnosis of thyroid gland and after biochemical equalization
7. Analysis of correlation between hepcidin concentration and biochemical parameters describing thyroid functional state and haematological status at the time of diagnosis of thyroid disease and after biochemical equalization
8. Analysis of correlation between hepcidin level and haematological parameters
9. Summary and statistical analysis of the collected data

The study will be conducted in accordance with the Declaration of Helsinki and the Bioethical Commission of the Medical University in Poznan, which approved the project.

3. Expected impact of the research project on the development of science, civilization and society

The thyroid disorders are considered populational diseases, due to their high incidence. Hence, there is a need to develop new diagnostic methods and broaden the knowledge about the etiology and the development of the disease.

The results of our project will potentially lead to better understanding of the reasons and changes of haematological and iron regulation which are often associated with thyroid diseases. Undoubtedly, the more thorough exploration of the nature of the iron regulation and hematopoietic changes accompanying thyroid diseases will contribute to the understanding of the regulatory mechanisms in the organism.

So far there was no comprehensive study aiming to determine the level of hepcidin in thyroid diseases, which constitutes the innovative nature of the planned research. In our project we defined strict criteria of inclusion and exclusion of patients from the study. It will enable us to obtain the most uniform groups of patients with thyroid diseases but presenting no other diseases or taking no drugs which may influence iron regulation. Therefore, the results will provide a reliable source of data for further research, seeking the causes and mechanisms which play an important role in the emergence of anemia in thyroid diseases. Moreover, revealed associations will shed new light on the relationship between thyroid gland function and the regulation of iron regulation in the organism.