

Multiple sclerosis (MS) is a chronic disease in which, as a result of the inflammatory process, axonal demyelination and nerve cell death occur. MS is most often multiphase, with periods of exacerbation and remission. There are four clinical forms based on the course of the disease. Now it is difficult to recognize the clinical form of MS at the beginning of the disease, although it has a large impact on diagnosis and prognosis. Multiple sclerosis is one of the most common causes of disability at an early age. An estimated 2.5 million people in the world, 40,000 in Poland, are suffering from MS. The etiology of this disease is not explained.

The goal of this project is to establish a genotype-phenotype correlation in the field of response to oxidative DNA damage and selection determinants of multiple sclerosis. Establishing this correlation will allow to recognize clinical form of MS at an early stage of the disease, which will enable better treatment results. An element of MS pathogenesis that connects the inflammatory process with demyelination is DNA damage cells caused by oxidative stress. Oxygen free radicals released by macrophages and microglia cells damage the oligodendrocytes and neurocytes DNA during inflammatory response. It is suggested that patients with MS with reduced repair ability DNA oxidative damage shows worse disease.

The project involves testing DNA repair mechanisms in patients with sclerosis sclerosis. One of the potential therapeutic goals is to reduce stress oxidative, designed to slow down or inhibit neurodegenerative processes, and consequently disease progression. The first stage of the project will be evaluation of basic DNA damage, hydrogen peroxide induced damage and oxidative endogenous lesions in lymphocytes of patients with diagnosed MS and control group including the repair kinetics. Expression levels and polymorphisms of genes encoding proteins responsible for DNA repair will be examined. In the context of treatment, it seems important to grasp the relationship between the operation of the nitrogen base cutting (BER) repair system and the course of MS, which can help in early clinical prediction. All obtained results will be correlated with the clinical form of MS, the age of onset of the disease, the severity of the symptoms and time their giving way.

Thanks to the implementation of the proposed project, knowledge about the causes and course of multiple sclerosis will be significantly expanded. The results of the work, allowing for better understanding of the molecular basis of the disease, can contribute to early diagnosis of the clinical form of MS and the introduction more effective therapeutic strategies.