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Effects of oxidative stress, DNA damage, and inflammation in multiple sclerosis: A clinical perspective

Hakan BEYAZTAS,[1] Mustafa UZUN,[2] Selman AKTAS,[3,4] and Eray Metin GULER[*1,5]

[1]*Department of Medical Biochemistry, University of Health Sciences Turkey, Hamidiye Faculty of Medicine, Istanbul, Turkey*
[2]*Department of Neurology, Istanbul Basaksehir Cam and Sakura City Hospital, Basaksehir, Istanbul, Turkey*
[3]*Department of Biostatistics, University of Health Sciences Turkey, Hamidiye Faculty of Medicine, Istanbul, Turkey*
[4]*Department of Biostatistics, Istanbul Cerrahpasa University, Istanbul, Turkey*
[5]*Department of Medical Biochemistry, University of Health Sciences Turkey, Haydarpasa Numune Health Application and Research Center, Istanbul, Turkey*

Abstract. Multiple sclerosis (MS) is a demyelinating nervous system disease known for its lesions and manifests itself with attacks. According to some theories, inflammation and oxidative stress play an important role in MS. With this study, we aimed to examine the levels of oxidative stress, inflammation and DNA damage in MS patients and to get an idea about the course of the disease from these data. The research comprised patients diagnosed with MS between the ages of 18 and 60. Photometric techniques were used to determine serum native thiol (NT), total thiol (TT), total antioxidant status (TAS), and total oxidant status (TOS) levels. The oxidative stress index (OSI), disulfide (DIS) level, and percentages of DIS/TT, DIS/NT, and NT/TT were determined with mathematical calculations. Inflammation biomarkers tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and interleukin-1 beta (IL-1β) were measured by photometric methods with commercially purchased ELISA kits. DNA damage was detected using alkaline single-cell gel electrophoresis. TOS, OSI, and DIS levels, as well as DIS/NT and DIS/TT percentages, IL-1β, IL-6, TNF- α and DNA damage levels were shown to be statistically significantly increased in MS patients than in the healthy control group ($p <$ 0,001), according to the study's findings. Furthermore, TAS, TT, and NT levels were decreased in MS patients. Inflammation occurs as a result of oxidative stress in MS patients and causes DNA damage. Our results show that clinicians should consider oxidative stress, inflammation, and DNA damage when evaluating MS's development.

***Keywords*:** central nervous system; multiple sclerosis; oxidative stress; reactive oxygen species; thiol/disulfide homeostasis.

[*] Corresponding author: *Email address*: eraymetinguler@gmail.com (Eray Metin Guler)