REVIEWS

Oxidative stress, an essential pathogenic mechanism of osteoarthritis in the elderly

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Abstract

Osteoarthritis is the most common disorder of the musculoskeletal system. Its incidence increases with age, although aging itself is not an etiologic agent. Many studies have demonstrated that both cartilage aging and osteoarthritis are characterized by an increase in oxidative stress in cartilage tissue. Thus, oxidative stress can be considered as a pathogenic mechanism by which aging induces degenerative cartilage lesions.

The increase in oxidative stress in the elderly is due to a reduction in antioxidant defense (glutathione, superoxide dismutase) and an increase in the production of reactive species of oxygen and nitrogern, particularly nitrogen oxide and superoxide.

Under the action of reactive species, the chondrocyte reduces its response to growth factors, matrix protein synthesis, and can release metal proteinases or proinflammatory cytokines. Oxidative stress can also cause DNA damage, the alteration of energy metabolism, and finally, chondrocyte apoptosis.

In conclusion, a decrease in the number and anabolic functions of chondrocytes occurs in the cartilage, along with a degradation of the matrix by its reduced synthesis and increased degradation. Proinflammatory cytokines capable of inducing the synthesis of reactive species and the progression of aging lead to the maintenance and development of osteoarthritis lesions.

Keywords: osteoarthritis, aging, oxidative stress.