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Hyperbaric oxygen therapy for a murine model of arthritis

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Reactive oxygen species (ROS) have been considered harmful to tissues and as mediators of inflammation at the injury sites for a long time. However, in recent, many findings about other functions of ROS and oxygen are reported. The effects of ROS such as suppression of autoimmune disease and allergen-induced inflammation have been studied. Moreover, regulatory T cell (Treg) effects to various diseases including autoimmune and inflammatory diseases depending on own activity. There are also many reports on the therapeutic effects of hyperbaric oxygen therapy (HBOT) in chronic inflammatory or autoimmune diseases. We hypothesized that HBOT may improve arthritis symptoms. DBA1/J mice were used for entire experiments. Arthritis was induced by bovine type II collagen. HBOT protocol is 100% O_2 and 3 atm for 90 min after 30 min of compression and then followed by 45 min of decompression daily. We detected paw thickness by macroscopic anatomy and histological score by hematoxylin & eosin staining. Type II collagen antibodies and rheumatoid factors in serum were detected by ELISA. Expressions of some molecules related with Treg and oxygen were detected by immunoblotting. HBOT relieved paw thickness and decreased collagen antibodies and rheumatoid factors in serum. HBOT also reduced inflammation of synovial tissue. HBOT decreased protein expression of p-STAT3 and HIF-1α and increased that of IDO and FoxP3 in paw tissues of murine arthritis model. These data indicate that HBOT attenuated arthritis in DBA1/J mice through activation of Treg and regulation of some molecules related oxygen.

Biography

Hyung-Ran Kim has completed her PhD from Yonsei University and Postdoctoral studies from Ewha Womans University School of Medicine. She is a Research Professor of Department of Microbiology. She has studied regulatory T cells and their own activity for suppression of immune responses.

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