

Immunological aspect of balneology

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The skin is the biggest immune organ of the human body. On the one hand the different mineral waters have strong influence on the skin during the head out water immersion, on the other hand they can casue a lot of molecular changes in the human body, by the modulation of the immune system. On the basis of the available evidence among the inorganic elements the sulphur(and its derivatives) has one of the most pronounced effect on the skin and human body. The sulphurous water can inhibit the production of cytokines,especially IL-2 and interferon gamma (IFN-c) Hydrogen sulphide(H₂S) decreases IL-1 β -induced activation of fibroblast-like synoviocytes at patients suffering from osteoarthritis, which may have a beneficial effect for its treatment. H₂S partially antagonizes IL-1 β stimulation through selective manipulation of the MAPkinase. Sulphurous thermal water increases the release of the anti-inflammatory cytokine IL-10 and modulates antioxidant enzyme activity. Sulfur bath therapy could reduce the oxidative stress, by alterations of SOD activities.

The radon bath can reduce the activation marker of CD69 on T, B, and NK cells. Radon bath has a beneficial effect on clinical parameters in Rheumatoid arthritis. As account of a new study, it showed for the first time a modulation of the peripheral immune cells following standard radon spa therapy. Mud-bath therapy, can decrease the serum adiponectin and resistin levels at patients after mud bath treatment. Balneotherapy caused statistically significant and long lasting decrease in serum levels of C-reactive protein in patients treated with mineral thermal baths. Long-term bathing in CO₂-enriched water proved a cellular protein response of epithelial cells in the epidermis. The heatwater has a possible immunomodulatory effect on keratinocytes during the progression of IL-17-mediated inflammatory skin diseases. Skin Microbiome can change in Patients with Psoriasis before and after Balneotherapy. Thermal stress has an immunosuppressive effect. There are growing numbers of studies when the balneotherapy was combined with anti- TNF therapy, and the results demonstrated that the combined therapy gave better results that the biological therapy alone.