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Alternative therapy of earth elements increases the chondroprotective effects of chondroitin sulphate in mice

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The administration of mineral sulphur water is an alternative experimental approach for the treatment of rheumatic diseases, such as osteoarthritis (OA), that cause the degeneration of bone and cartilage and sufferance to the patients. Chondroitin sulfate (CS) is a symptomatic slow acting nutropeucital agent currently used in molecular therapy of OA. Therefore, we have studied the role and efficacy of the selective soil paste from the mineral sulphur enriched spring (mud)-therapy alone or in combination with CS in the treatment of OA. The study was performed on 40 C57 Black 6N mice, an experimental model which spontaneously develop an osteoarthritic process. The animals were divided in 4 groups and were treated with the single agents or with the combination. After 30 days of treatment all the mice were sacrificed and right knees and blood were collected. It was found that CS determined a reduction of radiological and histological features of chondrodegeneration and that mud-therapy increased the effects of CS in the animal group treated with the combination. However, the effects of thermal therapy alone were not statistically significant. Since OA is characterized by an increase of the production of nitric oxide (NO) by chondrocytes in extracellular matrix with its consequent elevation in serum and synovial fluid, we have evaluated the effects of the treatments on serum NO levels. CS alone induced a statistically significant reduction of NO serum levels (90+/-13 micromM vs 219+/-60 microM of control group, $P<0.05$) while mud-therapy alone induced a not statistically significant reduction of serum NO (170+/-62 microM, $P>0.05$). However, the latter strongly potentiated the decrease of serum NO induced by CS (31+/-1.5 microM) with a high statistical significance if compared to both the control group ($P<0.01$) and the CS-treated group ($P<0.05$). In conclusion, this study demonstrates that mud-therapy with sulphur mineral water could represent an important phase of the therapeutic strategy of OA. This experimental strategy could integrate and potentiate the standard pharmacological tools. Moreover, we have set a valid experimental in vivo model for the study of the thermal effects on the development of OA.

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