PT2-3 Immunoinflammatory regulation effects of Korean hot spring water

Jin-Wou KIM
Department of Dermatology, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea

Spa therapy has long been utilized as one of safe, effective and long-term alternative therapies of various dermatologic diseases in Korea. Among them are pruritic, xerotic, immunoinflammatory, infectious, ulcerative skin diseases. There are about 400 spas in South Korea and many of them are recognized as having specific therapeutic effects. But, the beneficial clinical effects of spa therapy as well as their underlying mechanisms are still poorly defined and understood. In Korea, the area of distribution of hot springs coincide with areas of granite and are distant from geothermal heat energy related to volcanos. Natural hot spring water in South Korea can be classified into four main hydrochemical groups, i.e., Ca(Na)-HCO$_3$, Na(Ca)-HCO$_3$, Na(Ca)-Cl, and acidic Ca-HCO$_3$ type. They are mostly alkaline in nature and have low chemical constituents. We performed a series of clinical and laboratory studies to have better understanding of the clinical effects as well as possible mechanisms of their beneficial effects of several hot springs having different locations and mineral concentrations. They are Haeundae(Na-Cl type), Seokmado(Na-Cl, Ca-Cl type), Suanbo(Na-HCO$_3$ type), Baekam(Na-HCO$_3$ type), and Dukku(Na-Cl type) areas. Utilizing human, mice models, and keratinocyte cell lines, we evaluated the effects of each hot spring water on the changes of clinical symptoms of induced dermatitis and their skin barrier functions, skin infiltrating cells and related histologic findings, proinflammatory cytokine production, helper T cell subset differentiation and proliferation. We found that studied hot spring waters, in general, have the capacity to improve skin inflammation of atopic dermatitis and tendencies to downregulate the production of skin inflammatory cytokines and to increase the Foxp3$^+$ Treg cell population while to decrease the Th1, Th2, and Th17 populations.

Keywords: Immunoinflammatory regulation effect, Korean hot spring water, Hot spring water, Inflammatory cytokine