Seeing Better at the Dead Sea

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Since the days of antiquity the Dead Sea has been famous for its healing properties, and the remains of spas built by the Romans in the area can still be seen today. The Dead Sea region is Israel's major spa site. The advantage of this site over all others that are active throughout Europe stems primarily from its unique geographic location that endows it with special climatic conditions, the composition of the Dead Sea waters and the warm therapeutic springs along its shores, and its mud, which also has therapeutic properties. The unique climatic conditions of the Dead Sea are related, in part, to its location as the lowest place on earth at about 400 meters below sea level. The conditions include the world's highest barometric pressure leading to increased oxygen tension, low relative humidity, high temperatures, low rainfall, clear sunny skies, reduced ultraviolet radiation with a high UVA/UVB ratio, and a low pollen and high bromide atmosphere.

The salinity of the Dead Sea is about ten times stronger than that of any other sea or ocean. The salinity of the therapeutic springs is also very high, although less than that of the Dead Sea itself. The Dead Sea water and the warm springs contain a broad range of salts and trace elements, whose effect on the immune system has not yet been thoroughly investigated. The mud that is mined along the Dead Sea shore is composed mostly of inorganic compounds and a small quantity of organic compounds such as algae and plant residue.

The results of many clinical studies reported in the medical literature over recent decades have shown that both the act of staying at the Dead Sea region per se and balneologic therapy (bathing in the Dead Sea and/or in its springs, and mud packs) are quite effective as alternative therapy for a broad range of diseases, primarily skin diseases (psoriasis, vitiligo, atopic dermatitis), inflammatory arthritides (rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, juvenile rheumatoid arthritis), non-inflammatory arthritides (osteoarthritis, fibromyalgia), pulmonary diseases (chronic obstructive and restrictive lung diseases), cardiovascular diseases (coronary artery disease, congestive heart failure), cystic fibrosis, and Crohn's disease [1–16].

Despite the tens of papers that have been published and the tens of thousands of patients (mostly foreigners) who have been treated successfully, it is astonishing that the region has yet to be recognized by the State of Israel, through the Ministry of Health, as a national health region. Recognition of the Dead Sea region as a national health region, in association with the establishment of mandatory uniform standards of care for all active clinics in the area, would undoubtedly improve the quality of care, which is currently provided without any supervision and thus entails potential danger to patients.

In this issue of *IMAJ*, Yagev and colleagues [17] report the results of a prospective study on the beneficial effects of the Dead Sea region on the course of uveitis in 55 patients. Although previous clinical studies were published in the German literature in 1988 by Manthey and Danielmeyer [18], this is the first study by Israeli investigators, from the Soroka University Medical Center and Ben-Gurion University of the Negev, in this area. This study, like most other clinical studies, had to be based on foreign patients since the vast majority of Israeli patients cannot afford the expense of a 3–4 week stay at the Dead Sea region. The need to rely on foreign patients can lead to limitations that may adversely affect study methodology. For example, patients do not always come with complete medical documentation detailing all their medical problems, their present medical condition, and the medication that they receive. Incomplete documentation can make it difficult to adhere to study inclusion and exclusion criteria and to achieve randomized allocation of patients into study groups. In addition, it is obviously impossible to follow patients, after they leave the Dead Sea region, to assess the duration of the beneficial effect.

Close to 33% of the patients in this study suffered from various types of inflammatory arthritides and up to 9% had thyroid disease (the types are not detailed). The authors do not state whether there was a correlation in those patients in whom the uveitis was most likely part of an autoimmune disorder, between the observed improvement in the uveitis and a corresponding improvement in the arthritis or the thyroid disorder. Neither do they mention the percentage of patients who received balneotherapy, such as application of mud packs and/or bathing in the Dead Sea and its warm springs in addition to just staying in the region, and whether this treatment contributed to the observed improvement in the uveitis.

Approximately 65% of the patients were defined as idiopathic uveitis, but some of these may have been unique cases of autoimmune disease such as TINU syndrome (tubulointerstitial nephritis and uveitis), Sjögren syndrome, multiple sclerosis, inflammatory bowel disease, Behçet's disease, among others. The fact that most of the patients were women also supports the possibility of an autoimmune etiology. In addition, it is known that many drugs that are effective in treating inflammatory arthritides such as salazopyrine, azathioprine (Imuran®), cyclophosphamide,

UV = ultraviolet

methotrexate, mycophenolate mophetil, and of course systemic steroids, are also effective in the treatment of idiopathic uveitis.

In addition to the beneficial effect of UVB light on chronic ocular inflammation, as cited by the authors, it is also possible that other elements of the balneotherapy that the patients may have received (but not reported) could have played an important role in the success of the therapy. These treatments, in addition to UVB rays, affect the immune system. For example, Bellometti et al. [19] showed that the application of heated mud packs significantly reduces the quantity of tumor necrosis factor serum receptors. TNF is a pro-inflammatory cytokine that plays an important role in the pathogenesis of inflammatory joint diseases. In another study, the application of mud packs reduced the quantity of interleukin-1, also a pro-inflammatory cytokine, and increased the level of insulin-like growth factor, which has cartilage-protective properties.

Hyperthermia also has immunosuppressive effects, causing changes in T cell populations, including an increased number of cytotoxic and suppressor T lymphocytes and a decreased CD4/CD8 ratio. Hyperthermia can also enhance granulocyte mobility as well as phagocytic, microbial and enzymatic activities.

Despite the many clinical studies that have been published in recent years, we still lack basic knowledge on the mechanism of action of climatic therapy and balneotherapy in the Dead Sea region. The time has come to conduct more basic science studies with the aim of shedding light on these mechanisms, in addition to the clinical studies being conducted. In order to conduct such studies there is a need to develop the requisite laboratory infrastructure, which unfortunately does not exist, and to allocate the appropriate resources.

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TNF = tumor necrosis factor

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Capsule

Ultrasound for losing weight

UltraShape, an Israeli company active in developing a technology for destroying unwanted human fat with ultrasound, is not the only one in the field. Liposonix, a new American company, is also developing a "fat-busting ultrasound technology." This novel technique, called SonoSculpt, uses high intensity ultrasound waves, beamed a little more than an inch under the skin, to break up fatty tissues without pain, scars, anesthesia or a long recovery time. The American company has succeeded in raising $27 million from venture capital investors, while the Israeli company has raised $2 million and is presently conducting trials in pigs.

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