

Effect of the Significant Loss of Salt in Sweat



To the Editor: The review article on the health benefits of sauna bathing in the August 2018 issue¹ appeared comprehensive but failed to mention the effect of the significant loss of salt in sweat that occurs with this clearly beneficial event repeated on a regular basis. Wouldn't most—if not all—of these benefits occur simply as a result of regularly repeated substantial losses of salt from the body? Is this counter-balanced by the consumption of salt-preserved fish in Finland?

I am old enough to remember the recommendation of hot baths for renal failure when dialysis was not available.

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1. Laukkanen JA, Laukkanen T, Kunutsor SK. Cardiovascular and other health benefits of sauna bathing: a review of the evidence. *Mayo Clin Proc.* 2018; 93(8):1111-1121.

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Sauna Bathing and Healthy Sweating: II



To the Editor: In their review on Cardiovascular and Other Benefits of Sauna Bathing, Laukkanen et al¹ observed that, in a previous population cohort study, they detected that frequent use of sauna bathing (4 to 7 times a week), showed a 66% reduction in dementia in Finnish men compared with those who had 1 session per week. Regarding a possible mechanism for such a dramatic effect, toxicologists have shown that sweating is a major means of excreting both

organochlorine pesticides² and a variety of toxic metals including cadmium, lead, and aluminum.³ Surprisingly, substantially more of these toxic substances can be excreted via sweat than by urine, so increasing sweating became an effective means of enhancing excretion of toxic substances. Rea reported that the use of sauna therapy improved the condition of patients with confirmed exposure to mold (including stachybotrys), those who had mycotoxins (including ochratoxin) in their urine, and patients who had impaired neurocognitive testing or autonomic nervous system testing results and whose conditions were refractory to other treatments.⁴ In a review of the high prevalence of fatal dementia in Finland,⁵ I noted that the frequent presence of mold in residential buildings is one of the contributing factors there. Similar problems with moldy environments exist throughout the world and are certainly common in the United States and Canada, 2 other countries with very high rates of dementia. A prospective clinical trial of sauna therapy for patients with early dementia who test positive for mycotoxins, toxic metals, or organic toxins appears warranted and feasible. Although this type of therapy is one of several promising new approaches to preventing or treating dementia, it should not be overlooked simply because it is unconventional.

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2. Genuis SJ, Lane K, Birkholz D. Human elimination of organochlorine pesticides: blood, urine, and sweat

study. *BioMed Res Int.* 2016. <https://doi.org/10.1155/2016/1624643>.

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In reply—Sauna Bathing and Healthy Sweating



To the Editor: We thank Eiser and Brooks for their comments about the health benefits of sauna bathing. Regular sauna bathing has some beneficial effects on blood pressure, cardiometabolic biomarkers, arterial compliance, and cardiovascular function.¹ Our prospective studies have shown that higher frequency and duration of sauna bathing are related to a lower risk of cardiovascular mortality, sudden cardiac death, stroke, hypertension, pulmonary diseases, and dementia.¹⁻³ The feelings of relaxation and promotion of mental health and well-being associated with sauna sessions might be linked to the increased production of circulating levels of hormones such as endorphins.¹ We have also reported an inverse association of frequency of sauna with several inflammatory markers, suggesting that the beneficial effect of sauna bathing on disease outcomes may in part be mediated via reduced inflammation.⁴ The inverse associations between sauna bathing and adverse outcomes have persisted despite adjustments for socioeconomic status and physical activity, which are potential surrogate markers of healthy lifestyles.

In the typical warm and relatively dry Finnish sauna, skin blood flow usually increases from 5% to 10%,

leading to a higher cardiac output, whereas blood flow to internal organs decreases with an increased body temperature. Sweat is secreted at a rate of 0.6 to 1.0 kg per hour at 80°C to 90°C temperature (176°F to 194°F, respectively), with an average total secretion of 0.5 kg, during a warm sauna bathing session.¹ Sweat is known to contain solutes that accumulate in patients with renal failure.⁵ Intensive sweating, induced by heat treatment with saunas (dry heat) or hot baths (wet heat), can increase loss of water, urea, sodium, potassium, chloride, lactate, and possibly other solutes.⁵ However, although possible, it is not known how effective diaphoresis therapy might be in removing uremic toxins and if sauna bathing helps to get rid of toxins, as the liver and kidneys usually remove more toxins than sweat glands. It is also unclear whether the minuscule amount of toxins in sweat actually indicates a health concern. In addition, the concentrations of metals or other toxins detected in sweat are quite low. Whether sauna bathing will be a useful strategy for the elimination of toxins, including organochlorinated pesticides, from the body is a topic for further investigation. Indeed, randomized controlled trials are needed to further explore the potential health effects of sauna bathing.

Sauna is a potential novel tool to promote public health in addition to many other previously known means, being an enjoyable way to take care of general health and well-being among many people; but its effectiveness and safety as an additional diaphoretic or diuretic therapy need to be carefully investigated. Sauna bathing may be a remedy to the call for additional lifestyle

interventions needed to enhance both general health and wellness, possibly in populations that have difficulty exercising, and at least as an adjunct to exercise training. Most people usually tolerate a typical warm dry sauna, which is a pleasurable activity with potential health benefits. Overall, we warmly recommend taking sauna bath as part of a healthy lifestyle for the prevention of chronic diseases.

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1. Laukkanen JA, Laukkanen T, Kunutsor SK. Cardiovascular and other health benefits of sauna bathing: a review of the evidence. *Mayo Clin Proc.* 2018; 93(8):1111-1121.
2. Laukkanen T, Khan H, Zaccardi F, Laukkanen JA. Association between sauna bathing and fatal cardiovascular and all-cause mortality events. *JAMA Intern Med.* 2015;175(4):542-548.
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Low-Sodium Intake: A Risk Factor for Stroke?



To the Editor: The recent findings by Kieneker et al¹ represent the first convincing evidence that a low sodium intake might be linked to an increased cerebrovascular risk. The highly cited papers by a Canadian group² already claimed to show a sort of J-shaped association between sodium intake and cardiovascular events, but there are limitations to these studies, as has been discussed previously.³

Kieneker et al¹ correctly studied the relationship between sodium intake and cerebrovascular events, evaluating multiple 24-hour urinary sodium excretions (UNaV) in a large (N>7000) cohort of Dutch patients. The authors observed an inverse association between sodium excretion and the risk of stroke, even after adjusting for confounders such as age, sex, diet, lifestyle, blood pressure, antihypertensive medications, plasma renin, aldosterone, and so on.

The association of low sodium intake and increased risk of stroke is intriguing, and the authors discuss the possibility that an increase of lipids, renin-angiotensin-aldosterone system (RAAS) activity, or sympathetic discharge may be involved. The contribution of these factors is uncertain at present.³

Kieneker et al correctly noted the limits of the study¹: The mean sodium intake in this population is relatively low, reverse causality cannot be ruled out, and residual confounders are to be taken into account.