

Humans unequipped for high-salt diet, food scientist contends

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John Hayes

Humans are physiologically unprepared for the amount of sodium found in manufactured foods in the modern food supply, contributing to the diet-related diseases observed today.

That's the conclusion of an article titled "Successful Sodium Reduction," recently published in *The World of Food Ingredients*. Coauthored by John Hayes, assistant professor of [food science](#) in Penn State's College of [Agricultural Sciences](#), the piece outlines some basic strategies to reduce the sodium content in preprocessed foods.

Sodium is essential for human functioning, and for much of [human history](#) this mineral was relatively scarce, resulting in humans and animals needing to actively seek out appropriate sources, according to Hayes.

But now -- thanks largely to the amount of sodium added to processed foods to make them more tasty and appealing -- most people consume far too much, he noted.

According to the article, which was coauthored by Russell Keast, a food researcher at Deakin University in Australia, it has been theorized that the evolutionary transition from sea to land required body cells to be surrounded by salty solution comparable to [sea water](#). "However, further along in evolution our ancestors subsisted on a predominately herbivorous diet lacking in sodium," the authors stated.

As a result, humans' strong desire for sodium evolved to facilitate the identification and consumption of sodium sources. "[Sodium chloride](#) -- NaCl -- is the prototypical stimulus that elicits salt taste, and saltiness is appetitive at concentrations that are physiologically relevant," Hayes said. "Only sodium is purely salty without other side tastes."

The article pointed out that this reflects the evolutionary importance of identifying foods that are good sources of sodium.

"From an evolution perspective, there were strong pressures to facilitate sodium intake, but little need to down-regulate intake," the article stated. "The genetic traits of humans have not changed significantly from when we were hunter-gatherers, yet the modern Westernized diet is vastly different.

"As a result, humans are physiologically unprepared for the amount of sodium found in manufactured foods in the modern [food supply](#),

contributing to the diet-related diseases observed today. Dietary sodium is readily available and consumed excessively, largely as a result of the sodium added to processed foods. Processed foods provide approximately 75 percent of dietary sodium."

Excessive sodium intake has been strongly linked to hypertension, which is a risk factor for cardiovascular disease. Therefore, scientists believe there is an association between dietary sodium intake, cardiovascular disease and stroke, the article explained. And the authors make some recommendations for sodium-reduction strategies in foods.

"Excessive sodium intake has also been linked to other diseases and adverse health outcomes such as gastric cancer, reduced bone mineral density and obesity, prompting calls for population-wide sodium reductions," they stated, noting that even a modest reduction in population-wide sodium intake would result in huge benefits.

"A 15 percent reduction in population-wide sodium intake could prevent 8.5 million cardiovascular-related deaths worldwide over 10 years," the authors contended.

"Given the cost of health care, there is strong evidence that national sodium-reduction strategies would be cost-effective. For example, cardiovascular diseases are the single most expensive health issue, accounting for 11 percent of total health expenditure around the world.

"In contrast, the average sodium-reduction strategy is expected to cost less than 1 percent of the current expenditure on hypertension-control programs."

Population-wide sodium reductions have lacked success largely due to the dietary reliance on manufactured foods and a lack of knowledge and understanding of the factors contributing to excessive [sodium intake](#), the

article stated. If product developers can maintain perceived saltiness while reducing actual sodium content, the authors suggested, consumer "liking" will be preserved.

Efforts currently are being made to reduce the concentration of sodium in manufactured foods, but this is a difficult task for three reasons, according to the article.

First, humans have a strong desire to consume sodium in foods with a salty taste. Second, there is no ready substitute, as saltiness is elicited only by sodium. Finally, sodium, via NaCl, is an inexpensive, multifunctional ingredient that has important roles beyond taste.

In spite of this, several techniques have been identified that can be used successfully to reduce the sodium content in foods. For example, the Finn's have used Pansalt -- a blend of several different salts -- to reduce [sodium content](#). And these techniques are not limited to the food industry, as some can be used at home.

"In our article, we describe how adding glutamate-containing ingredients, such as yeast extract, vegetable proteins and MSG, can be used to offset lower salt levels," Hayes said. "You can do this at home by adding soy sauce in place of crystalline salt. Of course, soy sauce still contains sodium, but it also adds other things that help round the flavor. Just don't overdo it."

The article, "Successful [Sodium](#) Reduction," can be found online [here](#).

Provided by Pennsylvania State University

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