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Health & Nutrition News About Soy

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## HEALTHY AGING

- Adapting Diet and Lifestyle to Increase Longevity and Extend Healthy Years
- Soy and Cognitive Function in Aging Adults
- Practical Ways to Include Soy

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# ADAPTING DIET AND LIFESTYLE TO INCREASE LONGEVITY AND EXTEND HEALTHY YEARS

By Taulant Muka, MD, MPH, PhD

Data from the World Health Organization (WHO) show that the average life expectancy on a global level increased by 5.5 years between 2000 and 2016, accounting for the fastest increase since the 1960s. By 2050, one in 4 persons living in Europe and North America could be aged 65 or over based on United Nations' (UN) reports.

As we age, we are more susceptible to developing chronic disease and disability. The trend toward increased longevity has not been followed with an increase in disease-free years which suggests that people live longer but have reduced quality of life, due to more years with illness and disability.<sup>1</sup> Also, living longer but in deteriorated health could result in increased demand on public health resources, and therefore can be a financial burden to societies.<sup>2</sup> Consequently, over the past decade considerable effort was aimed at identifying and understanding lifestyle behaviors associated with a healthier aging process.<sup>3</sup>

## Determinants of Longevity

Our research team at the Institute of Social and Preventive Medicine, University of Bern, categorizes the determinants of human longevity as those attributed to sex (accounting for differences in anatomy, reproductive functions, sex ste-



roid hormones, gene expression) and gender (factors related to health behavior, social participation, and lifestyle).<sup>4</sup> Traditionally it was believed that men live shorter but healthier lives, whereas women live longer but less healthy lives.<sup>5</sup> However, this assumption is not entirely true as the differences observed depend on social circumstances and behaviors that vary among countries.<sup>6</sup>

Recent U.S. research found that adherence to a healthy lifestyle at midlife is associated with increased life expectancy free of major chronic diseases.<sup>7</sup> Another U.S. study estimated that adherence to 5 low-risk, lifestyle-related factors (never smoking, normal body weight, 30 or more min/day of moderate to vigorous physical activity, moderate alcohol intake, and a high diet quality score) could prolong life expectancy at age 50 years by 14.0 and 12.2 years for female and male adults, respectively.<sup>8</sup> Among these 5 physical factors, exercise and healthy dietary patterns appear to be the most effective at promoting health. However, due to physical limitations or other obstacles to exercise,<sup>9</sup> dietary changes may be a more practical target for chronic disease prevention.

## Desirable Dietary Behavior

Nutrition plays an important role in healthy aging. Healthy dietary patterns have been associated with improved cardiometabolic health and decreased risk of cancer and mortality.<sup>10-12</sup> Current U.S. dietary guidelines recommend a diet rich in fruits, vegetables, whole grains, low-fat dairy, poultry, fish, and legumes; yet, a large number of individuals do not adhere to these recommendations.

Evidence indicates that plant-based dietary patterns are associated with reductions in risk of obesity, hypertension, and diabetes.<sup>13,14</sup> Cruciferous vegetables and whole grain cereals are linked with better health outcomes that may be attributed to their high fiber content, such as  $\beta$ -glucan, essential fatty acids, vitamins, and antioxidant phytochemicals, including select phenolic compounds.<sup>15-17</sup>

Popular weight loss strategies include restricting carbohydrate intake in favor of increased protein or fat.<sup>18</sup> However, people on low-carbohydrate diets tend to eat fewer vegetables and fruits—which are rich in micronutrients and fiber—and more animal-derived foods.<sup>18</sup> Furthermore, low carbohydrate dietary patterns favoring animal-derived protein and fat sources (from lamb, beef, pork, and chicken) were associated with higher mortality, while those that favored plant-derived protein and fat intake (from vegetables, nuts, peanut butter, and whole grain breads) were associated with lower mortality,

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P.O. Box 237  
Jefferson City, MO 65102  
[sarah@qinc.co](mailto:sarah@qinc.co)



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suggesting that the source of food notably modifies the association between carbohydrate intake and mortality.<sup>18,19</sup>

Among the various sources of plant protein, soy has become quite popular and has been linked with various health benefits including a lower risk of dying due to all causes, cancer, and cardiovascular disease.<sup>19,20</sup> Soyfoods are an abundant source of phytoestrogens, plant-derived polyphenols with estrogen-like biological activity. Phytoestrogens have been linked with improvement in menopausal symptoms<sup>21</sup> and a decrease in diabetes risk in women.<sup>22</sup>

Evidence has shown that overall “diet quality” may be a more reliable index for healthy nutrition than “nutrient quantity” or the source of individual nutrients.<sup>23</sup> That is, the focus should be on the overall dietary pattern, not on specific sources of macro- or micronutrients. For example, the Dietary Approaches to Stop Hypertension (DASH) diet, which promotes consumption of vegetables, fruits, and low-fat dairy products, as well as moderate sodium intake, has been linked to lower risk of developing chronic diseases.<sup>24</sup> In addition, the 2015–2020 Dietary Guidelines for Americans specifies that consumers can choose among several healthy dietary patterns including Healthy U.S.–Style, Mediterranean–Style, and vegetarian to achieve diet quality.<sup>25</sup>

### Future Perspectives

A group of researchers recently projected global dietary patterns in 2050. They concluded that in comparison to current dietary patterns, our future diets may contain fewer servings of fruits and vegetables, about 60% more empty calories (calories from refined fats, refined sugars, alcohols, and oils), and 25–50% more pork, poultry, beef, dairy, and eggs.<sup>26</sup> According to the study, these dietary trends may contribute to lower global life expectancies. Alternatively, consuming more fruits, vegetables, whole grains, low-fat dairy, poultry, fish, and legumes could help prevent diet-related chronic non-communicable diseases.<sup>26</sup>

Increasing interest in plant-based eating patterns raises the opportunity for developing novel preventive and therapeutic strategies against obesity and related comorbidities. Still, putative effects of plant-based diets on the number of years of life spent free of chronic disease remains largely unexplored. Future research is needed to address their impact. 🍌

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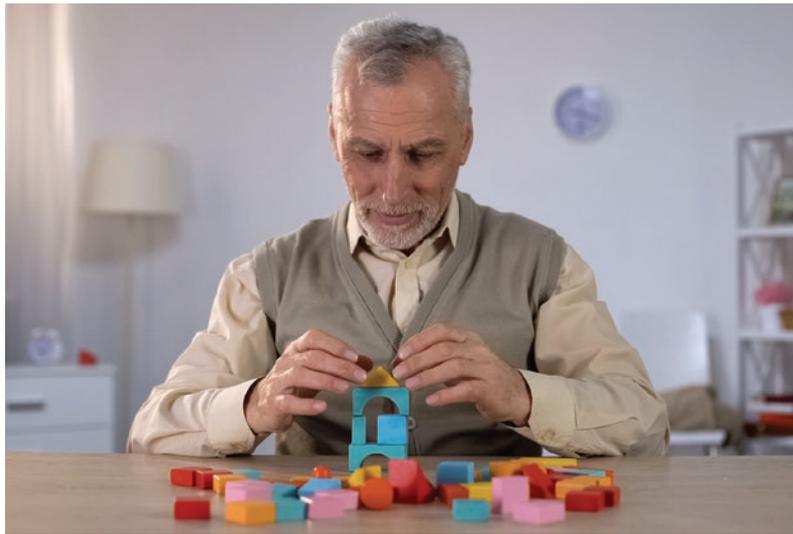
### ABOUT THE AUTHOR

**Taulant Muka, MD, MPH, PhD**, is the research group leader at the University of Bern's Institute of Human and Preventive Medicine. He received his Ph.D. in Epidemiology from the Department of Epidemiology in Erasmus MC, the Netherlands, after 2 research internships at the University of Harvard and Cambridge. He has more than 85 publications and integrates knowledge from different disciplines and approaches that include clinical epidemiology, systematic reviews and meta-analyses, nutrition, epigenetics, sex-differences, reproductive health, cardiometabolic disease, and the pharmaceutical industry.

# SOY AND COGNITIVE FUNCTION IN AGING ADULTS

By Mark Messina, PhD, MS

Life expectancy has risen steadily due to innovations in medicine and improved living standards.<sup>1</sup> With an extended lifespan, it is increasingly important to understand how these additional years of life can be spent in good health. As discussed by Oschwald et al.,<sup>2</sup> cognitive health is of high



importance for aging healthily<sup>3</sup> with a substantial impact on one's ability to complete tasks of independent living<sup>4</sup> such as medication adherence,<sup>5</sup> telephone use, financial management, or nutritional choices.<sup>6</sup>

Cognition is defined as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.<sup>7</sup> There is intriguing but speculative evidence that certain dietary patterns and specific foods and dietary components can slow age-related decline in cognitive function.<sup>8-10</sup> Is soy one of these foods? Increasingly, the evidence suggests that it may be; early on, that conclusion certainly did not appear to be case.

Of the various health outcomes being investigated in relation to soy intake, cognitive function took center stage in the year 2000 with publication of results from the Honolulu-Asia Aging Study (HAAS). This prospective epidemiologic study, which began in 1965, found that higher midlife tofu consumption was independently associated with indicators of cognitive impairment and brain atrophy later in life.<sup>11</sup> The study involved men, but a post-hoc analysis showed that the results also applied to the spouses of the men in this study. The man's tofu intake was used as a surrogate for his wife's intake. The operating hypothesis at the time was that isoflavones in soy were exerting an anti-estrogenic effect in the brain. At the turn of the century, there was growing speculation that estrogen might reduce risk of cognitive impairment in menopausal women.<sup>12</sup>

There are several important limitations to the HAAS. For one, the primary outcome was coronary heart disease; not cognitive function. The latter outcome was added long after the study began. In addition, the food frequency questionnaire (FFQ) included questions about only 26 foods, which pales in comparison to modern FFQs which typically include more than 100 items. Also, questions about tofu intake varied over the course of the study so a new tofu intake category had to be created.

In contrast to the HAAS, several small clinical studies published in the early 2000s suggested soy and soybean isoflavones may have cognitive benefits.<sup>13-16</sup> However, clinical research published over the next several years produced very mixed results. For example, trials involving postmenopausal women published in 2005<sup>14</sup> and 2006<sup>17</sup> showed benefits, but trials published in 2004<sup>18</sup> and 2007<sup>19</sup> did not.

Importantly, also in contrast to the HAAS, a U.S. cross-sectional study involving middle-aged Asian women published in 2006<sup>20</sup> and a cross-sectional study from Hong Kong involving older men and women published that same year<sup>21</sup> found no relationship between isoflavone intake and cognitive function. It is fair to say that except for the results of the HAAS, the observational and clinical evidence suggested soy intake and/or isoflavone exposure had either no effects on, or favorably affected, cognitive function.

However, in 2008, the controversy ignited by the HAAS was refueled by the results of a cross-sectional study from Indonesia involving men and women aged 52–98. This study found high tofu consumption was associated with worse memory, whereas high tempeh consumption was independently related to better memory, particularly among participants over 68 years of age.<sup>22</sup> The authors suggested the contrasting effects between tofu and tempeh might be due to the adverse effects of isoflavones in tofu or the presence of formaldehyde, which is illegally used by some street vendors as a preservative. It was also suggested that the high folate content of tempeh produced as a result of fermentation could have led to the observed beneficial effects.

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## PRACTICAL WAYS TO INCLUDE SOY

Sharon Palmer, MS, RDN

Traditional soyfoods, such as tempeh, tofu, edamame, soynuts, and soymilk are good tasting, nutrient dense foods that may offer health benefits—plus, they are budget-friendly, easy to use, and versatile. With so many reasons to love soy, why not put it into practice by including a taste of soy in your meals every single week? In addition to health bonuses, turning to this healthful, sustainable plant protein more often can help cut your environmental footprint.<sup>1</sup> Get started with these top 5 tips.

### Top 5 Tips for Boosting Soyfoods in Your Diet

**1. Pour on the Soymilk.** Whether it's topping your morning cereal, stirring up a nutritious shake, or mixing up a favorite recipe, turn to soymilk as a nutrient-rich option. Try steel cut oats with berries, walnuts, and soymilk for a fiber-rich start to your day. Mix soymilk into your morning nutrition shake or smoothie for a nutritious supplement to your healthy eating plan. Stir soymilk into recipes such as muffins, pancakes, mashed potatoes, or creamy soups.

**2. Try a Tofu Protein Swap.** Extra firm tofu can replace just about any protein choice in your favorite meals. Plus, it's completely ready to go; just open the package, drain off the liquid, and cube it into recipes. Since tofu has a clean, neutral flavor, use it in recipes that have a flavorful sauce. Here are a few starter ideas: make tofu the star in Asian stir-fry, cacciatore, mushroom stroganoff, masala curry, veggie lasagna, and shepherd's pie. Use cubed extra firm tofu as your sole protein source in these classic recipes for a healthy delicious meal in no time.

**3. Turn to Baked Tofu.** This pre-seasoned tofu is available in most supermarkets, or you can make it easily yourself by marinating tofu with a flavorful sauce (i.e., soy sauce, lemon juice, sesame oil, herbs, seasonings), then baking it in the oven until it's golden brown. Now you're ready to add baked tofu to a number of ready-to-go meals, such as chef's salad, sandwiches, burritos, wraps, and grain bowls. It's even great as a snack with whole grain crackers and pear slices. Keep baked tofu on hand in your fridge and

you'll find a multitude of new ways to include it in your favorite recipes.

**4. Crunch on Edamame.** You might have tried edamame out of the shell (essentially, fresh green soybeans) at a Japanese restaurant, and thoroughly enjoyed the crunchy green beans. You can enjoy this meal easily at home too! Many supermarkets carry fresh edamame. All you have to do is boil the whole edamame in the shell for a few minutes (don't overcook it, as you want those beans to be bright green), and then drizzle with a bit of sesame oil, and sprinkle with a pinch of sea salt. You can also try other toppings, such as chopped seaweed, sesame seeds, and minced garlic. Then just remove the plump green soybeans from the edamame shells and savor the flavors.

**5. Chop up Tempeh.** Increasingly available at many supermarkets, tempeh—an Indonesian fermented soy and grain block—can be chopped up and featured in your next meal as a protein-rich superstar. Just like tofu, tempeh is ready to be chopped into meals—no cooking, trimming, or preparation required. Try tempeh in your next Thai curry dish, veggie pot pie, stuffed peppers, vegetable stew, or noodle soup. It's also delicious sliced into thin strips, drizzled with a flavorful sauce, and grilled until golden and crispy as a faux “bacon” for sandwiches and breakfast dishes. 🍌



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#### ABOUT THE AUTHOR

Sharon Palmer, MS, RDN, is a nationally known expert on plant-based nutrition and sustainability with a master's degree in sustainable food systems. She serves as the nutrition editor for *Today's Dietitian*, nutrition advisor for several organizations, including Oldways, and associate faculty at Prescott University. Sharon is an award-winning journalist, publishing articles in hundreds of publications, in addition to her popular blog and social community.

Those mechanistic explanations did not have much support. Furthermore, in 2011, a follow-up study to the Indonesian cross-sectional study<sup>22</sup> found positive linear associations of weekly tofu and tempeh consumption with immediate recall, which were significant in those with an average age of 67 years.<sup>23</sup> In addition, among those with an average age of 80, the earlier reported negative association of tofu with immediate recall was no longer significant.<sup>23</sup>

In 2014, after comprehensively reviewing the clinical and epidemiologic data, Soni et al.,<sup>24</sup> concluded that “. . . the evidence to date is not sufficient to make any recommendations about the association between dietary intake of soy isoflavones and cognition in older adults.” Given the amount of research upon which this assessment was based, this author’s perspective at that time was that it was unlikely additional research would change the current scientific consensus any time soon. However, research produced in the past 6 years warrants a reevaluation of that perspective.

In 2020, a meta-analysis that included 16 randomized clinical trials involving 1,386 participants, with a mean age of 60, found that soy isoflavones improve overall cognitive function and memory.<sup>25</sup> This conclusion concurs with a meta-analysis published in 2015<sup>26</sup> and a systematic review of the clinical data published in 2017.<sup>27</sup> In addition, a Taiwanese cross-sectional study published in 2018, found soy intake was associated with a decreased risk of cognitive impairment.<sup>28</sup> Finally, Zajac and colleagues<sup>29</sup> found that in contrast to whey protein, soy protein improved reaction time and reasoning speed in postmenopausal women, although no improvement was noted in men.

In summary, the available data still do not allow for definitive conclusions to be made about the cognitive benefits of soy. On the other hand, the evidence points in the direction of benefit. Finally, the initial concern about adverse cognitive effects raised by the publication of the HAAS has not been supported by subsequently published research. 🤔

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## ABOUT THE AUTHOR

Mark Messina, PhD, MS, is the co-owner of Nutrition Matters, Inc., a nutrition consulting company, and is an adjunct professor at Loma Linda University. His research focuses on the health effects of soyfoods and soybean components. He is chairman of *The Soy Connection* Editorial Board and executive director of the Soy Nutrition Institute.

