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Global Brain Health Initiative
by Social Impact Partners

The Vibrant Mind:

A GUIDE TO NEUROPROTECTIVE NUTRITION

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FOREWORD

Exploring the Impact of Nutrition on Brain Health Can Improve Quality of Life and Health Outcomes

In our rapidly changing world, it's more critical than ever to recognize the power of dietary choices in maintaining cognitive function and supporting brain health. These choices are not just about daily wellness—they play a pivotal role in preventing conditions like age-related cognitive decline and dementia and enhancing overall health outcomes.

This white paper delves into the crucial relationship between nutrition and brain health, highlighting how prudent dietary and lifestyle choices can reduce the risks of neurodegenerative diseases. It draws from the latest scientific research to demonstrate how levels of specific foods and nutrients contribute to cognitive resilience and neuroprotection, underscoring the reality that what we eat and how we live are key drivers of long-term health.

At Sodexo, we are committed to leading our industry with science-based insights, offering nutritious and appealing foods, and making a measurable difference in the well-being and quality of life for our clients and communities.

Be Well,

MARC PLUMART
CHIEF GROWTH & COMMERCIAL OFFICER
SODEXO

Marc Plumart

CHIEF GROWTH AND COMMERCIAL OFFICER SODEXO

Sodexo is the global leader in sustainable food and valued experiences at every moment in life. For Sodexo, growth and social commitment go hand in hand. Our purpose is to create a better everyday for everyone to build a better life for all.

Brain health affects us all and can be positively impacted by what we do every day.

Our organizations and partners have long been committed to combating neurodegenerative conditions and promoting solutions to brain health and longevity. This document represents a culmination of our efforts to synthesize the latest research and provide actionable insights for individuals and healthcare providers alike.

Throughout our careers, we have witnessed firsthand the profound impact of lifestyle factors, particularly dietary habits, on cognitive function and overall brain health. This white paper examines the intricate mechanisms by which various nutrients affect our mental and thinking processes. We review the latest and most impactful neuroprotective dietary patterns, the role of antioxidants and anti-inflammatory compounds, and the impact of specific nutrients on brain function. Additionally, we examine the emerging research on other factors that may alter nutrient delivery to the brain, such as genetics and the gut-brain axis.

Our goal is to present practical and evidence-based recommendations that can be easily incorporated into daily life. By bridging the gap between cutting-edge research, collaborative stakeholders, and real-world applications, we can empower individuals to take control of their brain health through informed nutritional choices every day.

The surge among the older segments of the population globally and the rising rates of neurodegenerative diseases that accompany this phenomenon highlight the importance of preventive measures. This paper aims to serve as a resource to healthcare professionals, policymakers, and individuals alike, guiding us toward a future where delaying age-related cognitive decline through nutrition and lifestyle choices are attainable.

Sarah Hoit

CO-FOUNDER AND CHAIRMAN, SOCIAL IMPACT PARTNERS | GLOBAL BRAIN HEALTH INITIATIVE

Dr. Gene Bowman

DIRECTOR, CLINICAL TRIAL PLATFORM AND BRAIN NUTRITION LABORATORY, MCCANCE CENTER FOR BRAIN HEALTH, AND PROFESSOR OF NEUROLOGY, HARVARD MEDICAL SCHOOL

METHODOLOGY

Sodexo and Social Impact Partners, in collaboration with world-renowned scientists, embarked upon a review of existing literature on diets and nutrients associated with healthy brain aging. In this white paper, we reviewed over 250 research publications, including cell and animal studies on nutrient modes of action on the brain, observational cohort studies, and clinical trials published across an array of journals (i.e., Lancet, JAMA, Neurology, Nature Reviews Neuroscience, American Journal of Clinical Nutrition and the European Journal of Clinical Nutrition). Landmark studies are discussed, including significant clinical trial efforts like the Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND), FINGER, COSMOS, and PUFA trials. This paper cites more than 70 studies that support the conclusions discussed.

We are grateful for the passionate scientists and researchers, past and present, who have dedicated their expertise to advancing the science behind nutrition and brain health. This report honors their work and attempts to carry it forward meaningfully to improve public health. We look forward to collaborating further as the science evolves.

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for the passionate scientists and researchers, past and present, who have dedicated their expertise to advancing the science behind nutrition and brain health.

A SPOTLIGHT ON THE ORGANIZATIONS AND RESEARCHERS WHO HAVE COME BEFORE US.

The original publication of the MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diet was in 2015 in the journal Alzheimer's & Dementia: The Journal of the Alzheimer's Association.[1] The study, led by Professor Martha Clare Morris and colleagues at Rush University Medical Center and Harvard T.H. Chan School of Public Health, was titled "MIND diet slows cognitive decline with aging."

The original publication of the DASH (Dietary Approaches to Stop Hypertension) diet was in the New England Journal of Medicine in 1997. [2] This study was conducted by the DASH Diet Collaborative Research Group, which included researchers from multiple institutions: Pennington Biomedical Research Center: Dr. George Bray, Dr. Donna Ryan, and Dr. Catherine Champagne, Brigham and Women's Hospital, Duke Hypertension Center and the Sarah W. Stedman Nutrition and Metabolism Center, and Johns Hopkins Medical Institutions.

CONT. ▶

The original publication of the Mediterranean diet (MeDi) concept is attributed to Ancel Keys and Margaret Keys in 1975.[3] Ancel Keys, an American scientist from the University of Minnesota first pointed out the correlation between cardiovascular disease and diet.

The original publication of the Modified Mediterranean Ketogenic Diet (MMKD) is found in the study titled "Modified Mediterranean-ketogenic diet modulates gut microbiome and short-chain fatty acids in association with Alzheimer's disease markers in subjects with mild cognitive impairment," published in EBioMedicine in 2019.[4] This research explored the effects of the MMKD on the gut microbiome and its association with biomarkers related to Alzheimer's disease among older adults with mild cognitive impairment (MCI).

The original publication of the Nordic diet can be traced to 2004 when it was developed by a group of nutritionists, scientists and leading Nordic chefs.This "New Nordic Diet" was designed to increase focus on local cuisine and promote Nordic food internationally. The diet was formally published and defined in 2010.[5]

The original publication of the EAT-Lancet diet was authored by Willett et al. and published in The Lancet in 2019. This seminal article, titled "Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems,"[6] was the first study to propose the "EAT-Lancet Diet." The report introduced a comprehensive dietary framework designed to optimize human health while addressing environmental sustainability concerns.

EXECUTIVE SUMMARY

The global burden of cognitive decline and neurodegenerative diseases presents an unprecedented health and economic crisis. By 2030, the projected annual cost of neurodegenerative diseases alone will exceed $6 trillion, while mental health disorders could reach $16 trillion by 2034.[7] With one in four people expected to be 65 or older by 2100,[7] the need for effective interventions has never been more urgent.

Key Findings

- Diet and lifestyle factors may account for up to 80% of health outcomes.[8]
- 45% of dementia cases could potentially be prevented or delayed by targeting modifiable risk factors.[9]
- Emerging research demonstrates that nutrient delivery is critical to maintaining cognitive health, such as memory, attention, and language skills.[10]
- The brain-gut axis plays a crucial role in cognitive health, with microbiome composition significantly influencing brain function and neurodegeneration.[11,12]
- Chronic diseases affecting brain health, including cardiovascular disease, diabetes, and obesity, are largely influenced by dietary habits.[13-15]

Critical Insights

Our comprehensive analysis of leading brain-healthy dietary patterns reveals consistent themes in neuroprotective nutrition:

- High consumption of green leafy vegetables, berries, and whole grains
- Regular intake of fish rich in omega-3 fatty acids
- Emphasis on plant-based proteins and healthy unsaturated fats
- Limited consumption of processed and ultra-processed foods, sodium and added sugars

Brain-Healthy Recommendations

We propose a new dietary plan for neuroprotection that leverages the best ingredients known to support brain health. This approach:

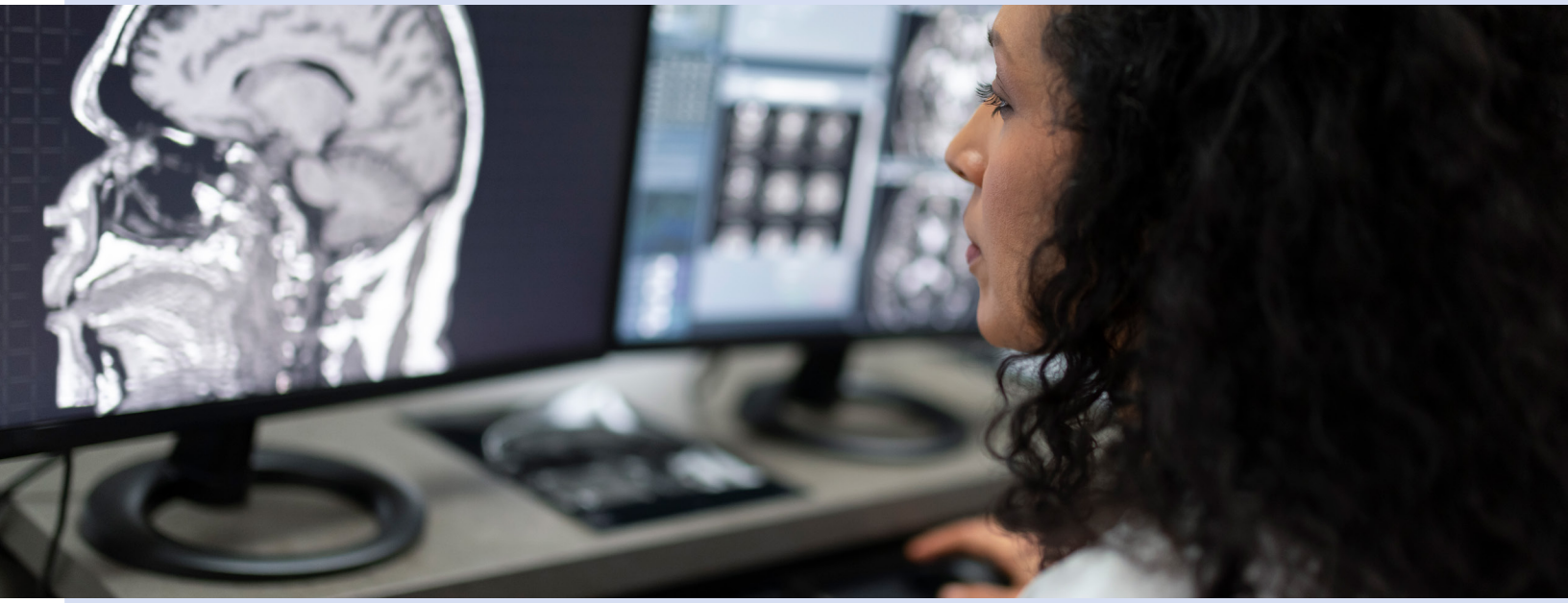
- Encourages consumption of foods abundant in nutrients shown to be neuroprotective to optimize availability of nutrients that the brain demands
- Supports the gut-brain axis through microbiome-friendly foods
- Reduces inflammation, oxidative stress and plaque formation
- Promotes sustainable brain health across the lifespan

Future Directions

We've created this work to advance nutritional guidelines for individuals and communities so they can benefit from the latest science in their health journeys. Through upcoming clinical trials, we will validate the optimal diet for neuroprotection, considering genetic, metabolic and other lifestyle factors. This research represents a crucial step toward developing evidence-based guidelines and interventions to reduce the global burden of cognitive decline and dementing illnesses, such as Alzheimer's disease.

This work presents an unprecedented opportunity to transform global brain health through nutrition. By implementing these dietary guidelines, we can potentially reduce healthcare costs, improve quality of life and address one of the most pressing health challenges of our time.

Brain Health: A Global Health Opportunity



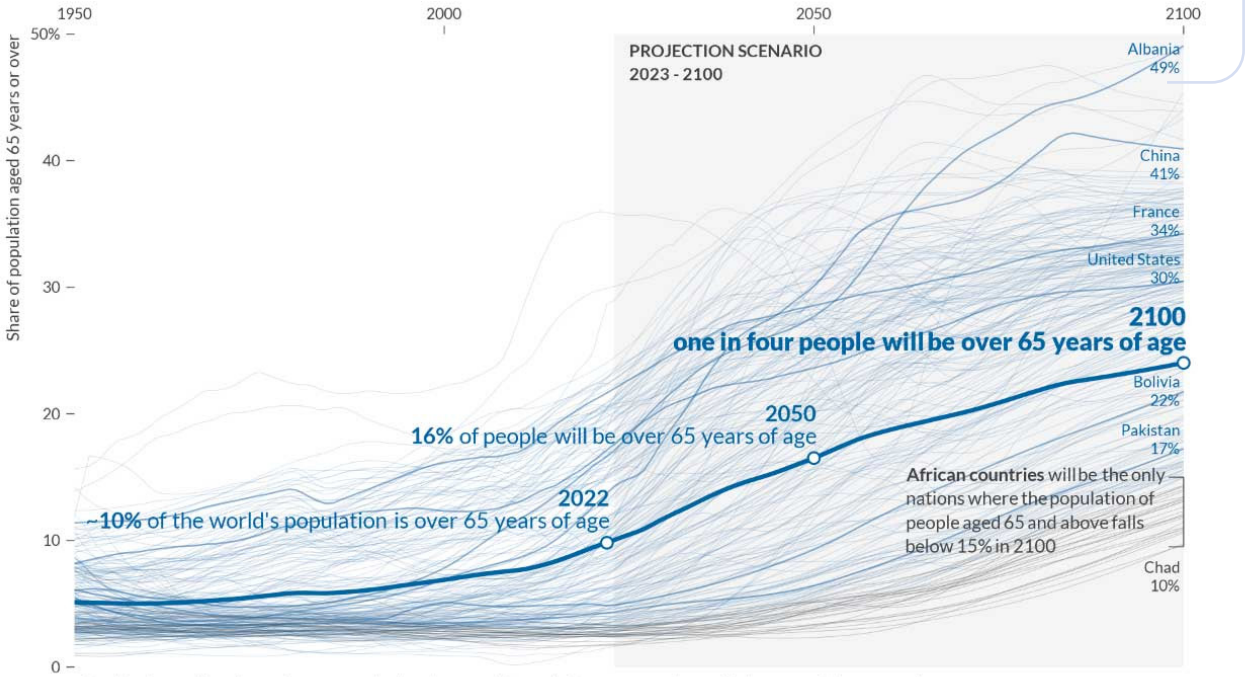
We stand at a pivotal moment in understanding nutrition's impact on brain health and cognitive function across the lifespan. Emerging research in nutritional neuroscience and the social determinants of health estimate that diet and lifestyle factors can explain up to 80% of our overall health outcomes.[16,28,29] This influential information supports the development of a powerful global platform to advance our understanding of the impact of nutrition on the brain and ways to implement dietary guidelines for cognitive health.

The Oncoming Brain Health Crisis and Its Economic Burden

The increasing global impact of neurodegenerative diseases, mental health disorders, and dementia alongside a rapidly aging population threatens to become a cornerstone of a cascading worldwide health and economic crisis.[17]

As the human lifespan extends and the demographic landscape shifts towards an older population, where projections show by 2100 one in four people will be 65 years or older,[7] prioritizing brain health has never been more critical. The overall cost is unsustainable by any government, and each family's human consequences are immeasurable.

1 IN 4 PEOPLE WILL BE 65 YEARS OR OLDER BY 2100.



Visualization: Pablo Alvarez | Source: United Nations World Population Prospects (2022) (via OurWorldInData.org)

- **NEURODEGENERATIVE DISEASES:** The global cost per year is projected to surpass $6 trillion[18] by 2030. If nothing changes, the number of people with neurodegenerative diseases will nearly double by 2050 to more than 150 million people.[7]
- **MENTAL HEALTH:** The global economic impact of mental health disorders is estimated at $5 trillion per year, projected to rise to $16 trillion by 2034.[19]
- **WORKFORCE PERFORMANCE:** The global cost of disengaged employees, driven by caregiving issues and mental health concerns, amounts to $8.8 trillion, equivalent to 9% of the worldwide GDP.[20,21]

Food as Medicine: A Holistic Perspective

Several studies have examined the influence of social factors, like food security and nutrition, on health outcomes. McGinnis et al.'s review estimated that medical care accounted for only 10-15% of preventable mortality in the United States.[22] This suggests that the 85-90% of preventable deaths are attributed to non-medical factors, including social determinants of health and behavioral factors.[7,16,23,24]

By elevating nutrition's role in brain health through food-centered health measures, we have the potential to:

- Improve cognitive function and well-being across all age groups[25]
- Reduce the incidence and progression of neurodegenerative diseases[26]
- Lower healthcare and caregiver expenditures associated with brain diseases[27,28]
- Positively impact the growing mental health issues[29]
- Enhance quality of life and productivity on a global scale[30]

BRAIN BASICS

The brain is the nervous system's central organ and controls all bodily functions, from basic survival tasks to complex cognitive processes like thinking, memory, and decision-making.[33,34] It is composed of several key areas, each with specialized roles that work together to maintain normal functioning:

- **FRONTAL LOBE:** Problem-solving, complex thinking and decision making, impulse control.
- **TEMPORAL LOBE:** Language, hearing, processing sensory information, and consolidation of memory.
- **PARIETAL LOBE:** Integration of sensory information (touch, taste, temperature) and perception, spatial awareness.
- **OCCIPITAL LOBE:** Manages vision, including color and shape recognition.
- **CEREBELLUM:** Regulates balance, coordination, and fine motor skills.
- **BRAINSTEM:** Controls essential functions like breathing, heart rate, and sleep.

Nutrition: The Key to Cognitive Resilience

Diet plays a fundamental role in maintaining health and should be considered a cornerstone of any brain-healthy lifestyle.[29]

A brain-healthy diet provides the necessary nutrients to support brain function, reduce oxidative stress, and prevent neuroinflammation, all of which are crucial for preserving cognitive function as we age.[31] A well-balanced diet is increasingly recognized as a fundamental component of maintaining brain health throughout life. The intricate relationship between nutrition and cognitive function underscores the importance of dietary choices in promoting mental acuity and reducing the risk of neurodegenerative diseases.[32]

Nutritional Levels: Unlocking Winning Combinations for Optimal Brain Health

New, modern methods of blood testing and nutrient biomarker analysis have demonstrated that levels of specific nutrients in combination are associated with distinct brain health features, including memory, attention, and language skills.[35,36] For example, higher levels of certain B vitamins, and vitamins C, D, and E, are associated with superior executive cognitive functions, attention, visuospatial skills, global cognitive function, and ultimately larger brains.[20,37] Higher levels of omega-3 fatty acids are also associated with executive function and the health of the small blood vessels in the brain.[34] Higher lutein and zeaxanthin, two xanthophylls that add color in our food, are linked to better memory performance.[25,37] On the other hand, higher circulating levels of trans fat in the bloodstream appear neurotoxic, placing people at higher risk for global cognitive decline and brain shrinkage.[37,38]

	COGNITIVE FUNCTION							BRAIN MRI	
	EXECUTIVE	MEMORY	ATTENTION	VISUOSPATIAL	LANGUAGE	PROCESSING	GLOBAL	TBV	WMH
NBP1 BCDE	BETTER		BETTER	BETTER			BETTER	MORE	
NBP2 SATURATED FATS									
NBP3 CAROTENOIDS									
NBP4 CHOLESTEROL									
NBP5 OMEGA 3	BETTER								LESS
NBP6 OMEGA 6		WORSE							
NB97 LUTEIN-HDL		BETTER							
NBP8 TRANS-FAT		WORSE	WORSE		WORSE	WORSE	WORSE		LESS
NUTRIENT BIOMARKER PATTERN SCORE (NBP)									

ALL MODELS ADJUSTED FOR AGE, GENDER, EDUCATION, APOE4 GENOTYPE, HTN, DEPRESSION

Certain nutrients positively and negatively impact cognitive function. The chart shows each nutrient combination linked to specific cognitive skills and MRI measures of brain aging. [37]

The emergence of modern methods

for reliable and accurate blood testing of nutrition is enabling our ability to bring personalization to healthcare and directly to the consumer for prevention and treatment around the world. It's a nutritional neurology revolution that promises to be a disruptive paradigm shift in how we assess and target nutrition for healthy brain aging.

Gene Bowman, ND, MPH, Clinical Trials Director at McCance Center for Brain Health at Massachusetts General Hospital; Professor at Harvard Medical School

Body and Brain: The Critical Connection Between Physical Health and Cognitive Function

The brain is not an isolated organ; it is intrinsically linked to the entire body's health.[34] Our daily habits—from what we eat to how we manage stress—play a significant role in maintaining brain health, influencing our cognitive function, mood, and overall well-being. Leveraging the understanding of our behavior and environmental factors, it is estimated that we can potentially impact 80% of our health outcomes. We recognize the profound interconnectedness between the brain, the heart, and the rest of the body. [13,16,39]

The intricate relationship between diet and chronic illnesses such as heart disease, stroke, obesity, and diabetes is well-established, and each of these conditions can significantly impair brain health.[32]

- **OBESITY, DIABETES, AND BRAIN HEALTH:** High blood sugar levels can damage blood vessels in the brain, leading to cognitive decline and an increased risk of dementia by crippling the ability of the brain to meet its nutritional requirements. Keeping blood sugar levels in check through diet and physical activity helps preserve brain function over time.
- **HEART HEALTH AND COGNITIVE FUNCTION:** Cardiovascular health is crucial to maintaining brain health. Conditions like hypertension and hardening of the blood vessels can impair oxygen and essential nutrient delivery to the brain for optimal function.[40,41]
- **INFLAMMATION'S ROLE IN COGNITIVE DECLINE:** Chronic inflammation, whether caused by a poor diet, stress, or lack of exercise, has been strongly linked to neurodegenerative diseases.[42] By adopting anti-inflammatory habits such as consuming plant-based diets high in omega-3 fatty acids,[43] regular physical activity, and stress management techniques,[44] we can significantly reduce the risk of brain inflammation and its associated cognitive decline.

Approximately 85% of Americans 65 years or older have at least one chronic disease, and 60% have at least two.[45] Many of these chronic diseases are known to have a significant impact on brain health and cognitive function, and dietary habits are a major cause of these chronic diseases that increase the risk for dementia.[15]

A heart-healthy diet

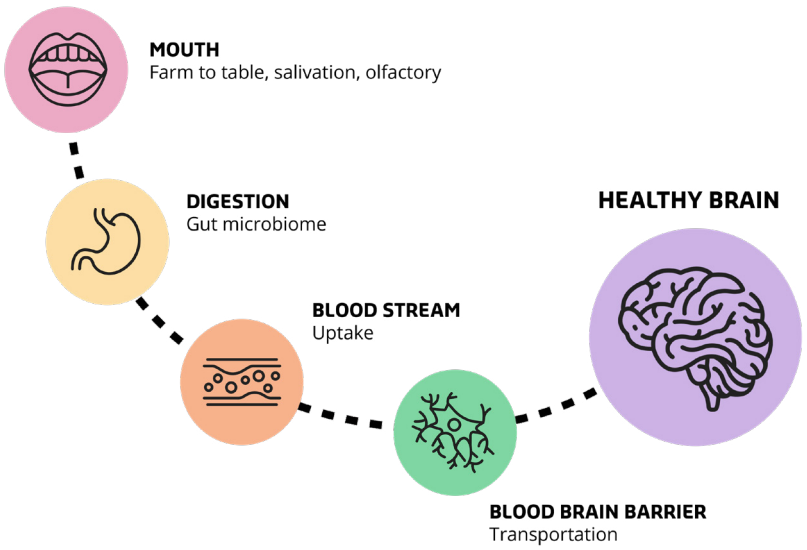
is not just good for your cardiovascular system – it's essential for maintaining optimal brain function and cognitive health throughout life. What's good for the heart is good for the brain."

— Dr. Mitchell Elkind, American Heart Association

Meeting the **Nutritional Demands** of the Brain

The experience of eating is relatively complex: What we eat, when we eat, how we eat, the perception of the food, and the journey the nutrients must take to reach the brain are complex and essential.[46] Any disturbances to the nutrient delivery to the brain could, therefore, interfere with the brain's function.[29]

Failure to provide the brain with the essential nutrients it needs can lead to significant damage, impacting brain health and contributing to neurodegenerative diseases. The brain's complex system relies on consistent nutrient delivery, and when that is compromised, cognitive function suffers.



DEMENTIA IS AN UMBRELLA TERM USED TO DESCRIBE A RANGE OF SYMPTOMS ASSOCIATED WITH COGNITIVE IMPAIRMENT.

ALZHEIMER'S DEMENTIA (AD)

- The brain develops clumps of abnormal proteins, called beta-amyloid plaques and tau protein tangles
- Age of onset is mid-60s or later; early onset is pre-60s
- These brain changes are thought to start up to 20 years before diagnosis
- Individuals may start to have difficulties with short-term memory, may get lost driving, and have trouble handling money and paying bills. This may be similar to other dementias.
- Survival is typically four to eight years from diagnosis, but some longer

VASCULAR DEMENTIA (VD)

- Occurs when the brain does not receive enough blood supply and oxygen; as a result, damage occurs in the brain
- Average age of onset is over 65, significantly higher for people in their 80s and 90s
- Symptoms are similar to Alzheimer's disease
- Factors that increase your risk of heart disease and stroke – including diabetes, high blood pressure, high cholesterol, and smoking – also raise vascular dementia risk

CONT. ▶

LEWY BODY DEMENTIA (LBD)

- Associated with abnormal deposits of a protein called alpha-synuclein in the brain
- Average age of onset is 50 or older
- Symptoms include trouble with attention, problems with visual and spatial abilities, hallucinations, movement changes, and sleep disorders
- Survival is typically five to eight years from diagnosis, but could be as long as 20 years

FRONTOTEMPORAL DEMENTIA (FTD)

- A group of disorders that occur when nerve cells in the frontal and temporal lobes of the brain are lost, causing the brain to shrink.
- Age of onset is 50 to 80 years
- Symptoms include behavior, personality, language, and movement. There may be tremors.
- Survival is typically seven to eight years from diagnosis

OTHER TYPES OF DEMENTIA

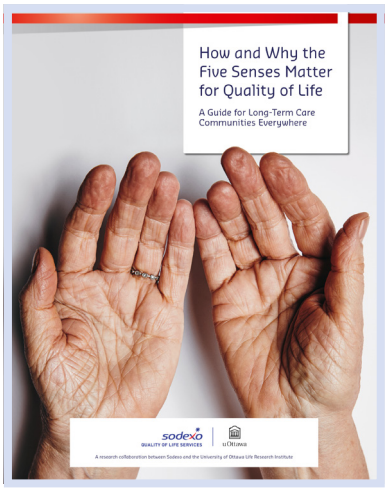
- Creutzfeldt-Jakob Disease
- Huntington's Disease
- Normal Pressure Hydrocephalus
- Posterior Cortical Atrophy
- Parkinson's Disease
- Korsakoff Syndrome
- Mixed Dementia
- Chronic Traumatic Encephalopathy

Engaging the Senses: The Cephalic Phase of Digestion

The journey of nutrition and brain health begins long before food reaches the stomach. The cephalic phase of digestion is a sensory experience—the sight, smell, taste and even the thought of food is powerful.

This cephalic phase is crucial for preparing the body to absorb nutrients efficiently, promoting delivery of nutrients to the brain to support cognitive function.[47] Sensory cues trigger saliva production and the release of digestive juices and enzymes, all of which are essential for nutrient absorption.[48]

In essence, the act of enjoying a meal—encompassing its visual appeal, vibrant colors, and enticing aromas—significantly contributes to our overall brain health.



CLICK HERE TO READ THE STUDY

Optimizing Nutrient Delivery for Peak Brain Performance

Getting nutrients from the plate to the brain involves multiple steps and complex processes. Understanding this path helps explain why what we eat—and how our bodies process it—matters so much for brain health.

- **CONSUMPTION, DIGESTION, AND ABSORPTION:** Once ingested, food is broken down in the gut, where the stomach acid cleaves nutrients from its protein source. Other digestive enzymes and microbiomes facilitate optimal food processing and packaging for the liver and circulation delivery.[49]
- **CIRCULATION:** Some nutrients are then absorbed into the bloodstream as free entities or bound to proteins such as albumin, allowing them to travel throughout the body to their end destination.[50]
- **GATEWAY TO THE BRAIN:** The blood-brain barrier is a restrictive gateway to the brain that nutrients must pass to achieve brain consumption. The barrier's function and integrity are therefore critical in order to meet the brain's nutritional demands.[51]
- **FOOD AS MEDICINE FOR BRAIN HEALTH:** Neuroprotective nutrition may prevent or delay cognitive decline and neurodegenerative diseases.[52]

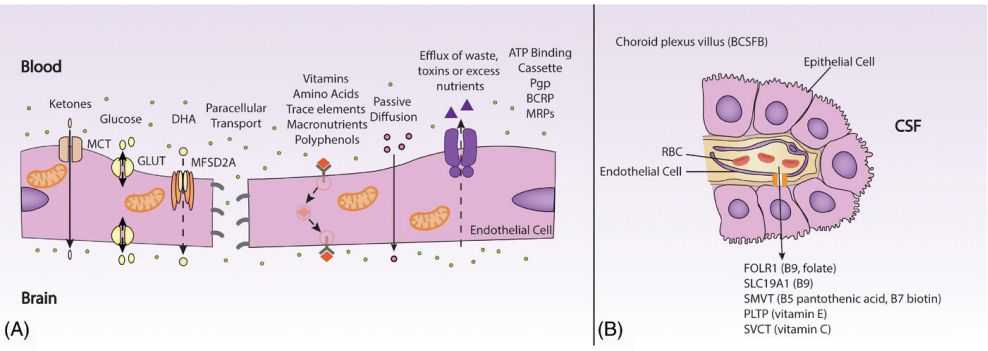
Nutrient Transporters at the Blood-Brain Barrier

The brain is highly active, using about 20% of the body's energy even though it only makes up 2% of our body weight.[53] To support this demand, the brain needs a constant and well-regulated supply of key nutrients, including glucose, fatty acids, amino acids, vitamins, and minerals. Having enough of these nutrients is essential to keep the brain functioning well, especially as we get older, and may help prevent or delay dementia. The blood-brain barrier is a protective shield that controls what can enter and leave the brain, but this barrier also has channels that must be maintained for nutrients to reach the brain.

This barrier is composed of different cell types, including:

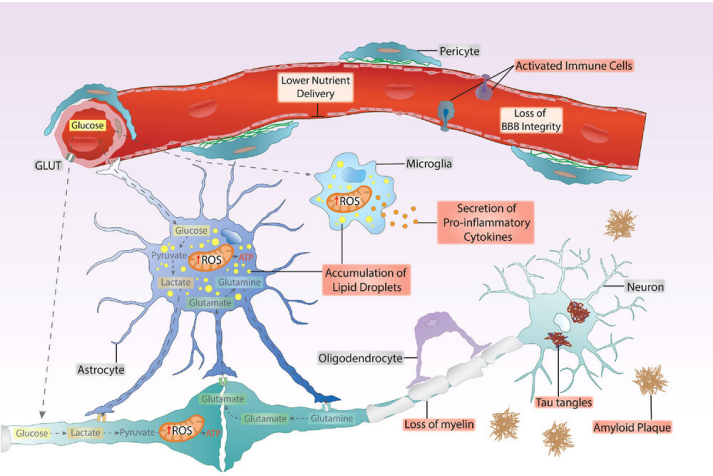
- **Endothelial cells** that line the blood vessels.[10]
- **Astrocytes** that support blood vessels and brain cells.
- **Microglia** that serve as the brain's immune defense.
- **Neurons** that send signals and help regulate blood flow.

Specific transporters at the blood brain barrier wait for nutrients needed to be healthy. If it does not receive them, the transporters are empty, and the brain will be deprived of critical nutrients.



The blood-brain barrier (BBB) is a selective barrier formed by specialized cells lining brain blood vessels. It controls what enters the brain from the bloodstream. It serves as a crucial protective shield, filtering and allowing essential nutrients to pass through while blocking harmful substances. This function is vital, as it ensures the brain receives the nutrients it needs to function while keeping out toxins and other harmful elements.

Source: Yassine HN, Self W, Kerman BE, et al. Nutritional metabolism and cerebral bioenergetics in Alzheimer's disease and related dementias. Alzheimer's Dement. 2023;19:1041–1066. https://doi.org/10.1002/alz.12845



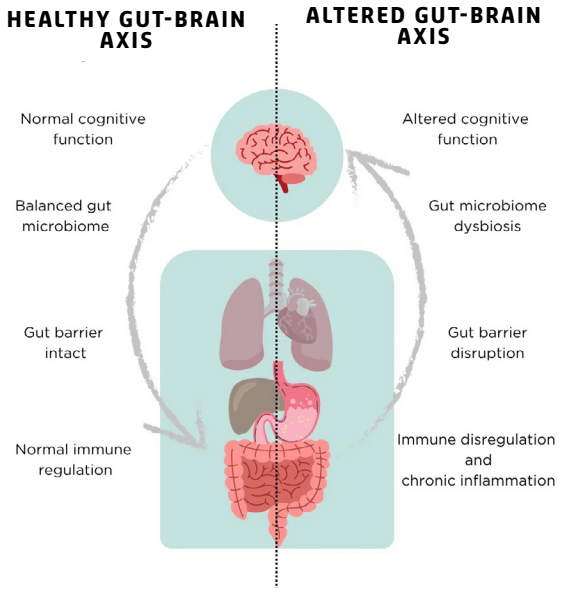
Key Transport Proteins. The image depicts bioenergetic failure and loss of blood-brain barrier integrity associated with chronic inflammation and oxidative stress in various brain cell types. Key features include increased lipid droplets in glial cells, myelin loss, and the appearance of classic AD pathology markers such as amyloid plaques and neurofibrillary tangles.

Source: Yassine HN, Self W, Kerman BE, et al. Nutritional metabolism and cerebral bioenergetics in Alzheimer's disease and related dementias. Alzheimer's Dement. 2023;19:1041–1066. https://doi.org/10.1002/alz.12845

Microbiome: The Gut-Brain Axis

The gut microbiome, consisting of trillions of microorganisms in the gastrointestinal tract, plays a pivotal role in brain health through the gut-brain axis.[32] Emerging research shows that the composition of the gut microbiome can influence cognitive function, mood, and overall brain health.[11]

- **INFLAMMATION LINK:** Chronic inflammation from gut dysbiosis (an imbalance in the microbiome) may contribute to Alzheimer's disease by triggering systemic inflammation and accelerating neurodegeneration.[12]
- **AMYLOID PLAQUE CONNECTION:** Certain gut bacteria influence amyloid-beta plaque buildup, a hallmark cause of Alzheimer's disease.[54] Dysbiosis may increase plaque formation or hinder its clearance from the central nervous system.[12]
- **METABOLITE PRODUCTION:** The gut produces neuroprotective short-chain fatty acids and neurotoxic metabolites, which have the potential to protect against Alzheimer's.[55]
- **GUT INTEGRITY:** An intact and healthy gut barrier and a diverse microbiome promote health, which may ultimately protect against Alzheimer's disease and related dementias.



The process of nutrient delivery to the brain is complex, with many contributing factors—from consumption and digestion to interaction with the microbiome and passage across the gut and blood-brain barrier.[47] Every step in this process plays a vital role in delivering the nutrients a brain needs to thrive and illustrates why proper nutrition is so critical for brain health.

Our brain's ability to think clearly, innovate, and sustain resilience is inextricably tied to our physical health. By understanding and optimizing the connection between what we eat and how our brain performs, we can support and enhance our cognitive function, improve overall well-being, and build resilience against decline through a lifetime of brain-healthy habits. This proactive approach to brain health is key to unlocking our full cognitive potential across the lifespan."

— Jane Wigginton, MD, Medical Science Research Director with Center for BrainHealth at UT Dallas

IV

A Scientific Approach to Diet and Brain Health

Our research takes a comprehensive approach to exploring the link between diet and brain health in developing evidence-based nutritional strategies for cognitive wellness. We examine eating habits from diverse cultures and identify key nutrients that support cognitive function. By combining these insights, we have created new dietary guidelines specifically designed to boost brain health.

Several dietary patterns have been studied for their impact on brain health and cognition. The most widely researched include:

- **DIETARY APPROACHES TO STOP HYPERTENSION (DASH) DIET**[56]
- **MEDITERRANEAN DIET (MEDI)**[57]
- **MEDITERRANEAN-DASH INTERVENTION FOR NEURODEGENERATIVE DELAY (MIND) DIET**[58]
- **MODIFIED MEDITERRANEAN KETOGENIC DIET (MMKD)**[59]
- **NORDIC DIET**[60]
- **EAT-LANCET (EATL) DIET** [61]

These diets have demonstrated how nutrition can support cognitive function and slow cognitive decline by highlighting key nutrients such as omega-3 fatty acids, antioxidants, and vitamins.[25]

Building on this foundation allows us to enhance their impact and take the next step forward in a comprehensive and practical solution for long-term brain health.

Dietary Patterns and Cognitive Health

A dietary pattern outlines what foods to consume and in what portions in a given timeframe. There are hundreds, if not thousands, of dietary patterns that may represent typical ways of eating in a specific geography or culture or have been created for a specific goal, such as weight loss or to lower blood pressure. Our research focuses on identifying brain-healthy foods, which are specific dietary components and eating habits that are consistently linked to better brain function.

Clinical trials have offered valuable insights into dietary patterns' effects on health, focusing on promoting behavioral adherence rather than direct meal interventions. Prominent examples include the DASH diet for hypertension[56] and the MIND diet for cognitive protection.[58] Each of these diets emphasizes unique components while presenting notable gaps that reflect their specific health goals.

These patterns illustrate gaps when considering a comprehensive health approach. For example, while the DASH diet lacks brain-supportive foods, the MIND diet is less stringent on sodium and processed food restrictions. Both diets miss a holistic perspective that includes mental well-being, gut health, and anti-inflammatory effects—all potentially contributing to cognitive resilience.

After reviewing the top diets for successful commonalities and opportunities to bring in new research on neuroprotective nutrients, we identified recommended foods and foods to moderate or limit.

Food & Dietary Component	Serving Size for 1 Portion	MIND	DASH	MeDi	MMKD
ENCOURAGE					
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw	≥ 6/week			Encouraged
GREEN LEAFY VEGETABLES		≥ 2/week			Encouraged
BERRIES		≥ 1/day	≥ 8/day	> 7/day	≥ 4/day
OTHER FRUIT & VEGETABLES					
BEANS/LEGUMES	1/2 cup cooked	> 3/week	≥ 4/week	> 6/week	≥ 2/week
NUTS	1 ounce	≥ 5/week			≥ 1/day
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	≥ 3/day (whole grains)	≥ 7/day (total grains)	>4/day (whole grains)	None
FISH	5 ounces	≥ 1/week		>6/week	≥ 2/week
UNSATURATED FAT/OILS	1 tbsp	Olive oil as primary	≤ 21% of kcals	≥ 1/day (olive oil primary)	≥ 1/day (olive oil primary)
MODERATE					
DAIRY (YOGURT,MILK,CHEESE)	1 cup	< 1/week (cheese)	≥ 2/day (low-fat)	≤ 10/week (full fat)	2/day (full fat)
EGGS	3 ounces				2-4/week
POULTRY	3 ounces	≥ 2/week	≤ 2/day (including fish)	≤ 3/week	2/week
RED MEAT (BEEF, PORK, LAMB)	3 ounces	< 4/week		≤ 1/week	≤ 2/week
POTATOES	1/2 cup			> 2/day	0
WINE/ALCOHOL	4 ounces	1/day		> 0 < 10oz/day	≥ 1/day
LIMIT					
SWEETS	4 ounces	< 5/week (after a meal)	≤ 5/week		0
FAST/FRIED FOODS	N/A	< 1/week			
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A				
SODIUM	N/A		≤ 2.3g/day		
SATURATED FAT/OILS	1 tbsp	< 1/day	≤ 6% of kcals		

Food & Dietary Component	Serving Size for 1 Portion	Nordic	EAT-Lancet	USDA Dietary Guidelines for Americans
ENCOURAGE				
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw		≥ 1/day	1.5/week
GREEN LEAFY VEGETABLES		Encouraged		
BERRIES		≥ 5/day	≥ 4/day	≥ 4.5/day
OTHER FRUIT & VEGETABLES				
BEANS/LEGUMES	1/2 cup cooked		≥1/day	1.5/week
NUTS	1 ounce	≤ 1/day	≥ 1.5/day	5/week
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	≥ 2/day (whole grains)	3/day	6/day (50% whole grain)
FISH	5 ounces	< 5/week	2/week	8/week
UNSATURATED FAT/OILS	1 tbsp	Canola oil as primary	3/day	
MODERATE				
DAIRY (YOGURT,MILK,CHEESE)	1 cup	2/day (low-fat)	1/day	3/ day
EGGS	3 ounces		1/week	
POULTRY	3 ounces	< 6/week (all lean meat)	≤ 2.5/week	5.5 oz/day
RED MEAT (BEEF, PORK, LAMB)	3 ounces	< 4/week	≤ 1/week	
POTATOES	1/2 cup	< 1/day	< 4/week	
WINE/ALCOHOL	4 ounces			≤ 2/day for men, ≤ 1/day for women
LIMIT				
SWEETS	4 ounces		≤ 2 tbsp/day (added sugars)	< 10% of kcals (added sugars)
FAST/FRIED FOODS	N/A			
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A			
SODIUM	N/A	≤ 6g/day		< 2.3g/day
SATURATED FAT/OILS	1 tbsp		< 1/day	< 10% of kcals

Recommended Foods

While these dietary patterns vary in consumption amounts, they share common recommended foods:

- **VEGETABLES:** All patterns advocate increased vegetable intake, with several explicitly emphasizing green leafy vegetables. A 2018 prospective study found that individuals consuming the highest amounts of green leafy vegetables had significantly slower cognitive decline, equating to being eleven years younger in cognitive age.[62]
- **FRUITS AND BERRIES:** Fruits are universally encouraged, with berries specifically highlighted in several diets due to their high antioxidant content from polyphenolic flavonoids like anthocyanins.[31,63] A 2022 systematic review of randomized controlled trials confirmed that berry-based supplements or foods may benefit cognitive function in older adults.[64]
- **BEANS, NUTS, SEEDS, AND WHOLE GRAINS:** Nuts, including tree nuts and peanuts, are rich in healthy mono- and polyunsaturated fats, B vitamins, vitamin E, the minerals calcium, magnesium, and potassium, the trace elements zinc and copper, as well as fiber. They contain high levels of polyphenols, which are powerful antioxidants, and are especially abundant in pistachios, pecans, and walnuts. Whole grains are valued for their fiber and vitamin and mineral content, nutrients often lost in refined grains.[65] Though evidence on their direct impact on brain health remains mixed, studies such as the 2022 Framingham Offspring Cohort suggest a potential link between higher whole grain intake and a reduced risk of dementia and Alzheimer's, underscoring their possible cognitive benefits.[66]

- **FISH:** Fatty fish is the best dietary source for the omega-3 fatty acids, DHA, and EPA, which have been shown to enhance brain functions and blood flow.[43] There is wide variation in the recommended servings of fish in each dietary pattern. For example, the MIND diet suggests one serving weekly, while the Mediterranean diet recommends six.
- **OILS:** Some diets specify olive oil as the primary oil, while others recommend local alternatives or general plant-based oils (canola oil). Olive oil and canola oil are both high in the mono-unsaturated fatty acid, oleic acid, which has been studied for its cardioprotective benefits, and vitamin E, which is an antioxidant.[67] Extra-virgin olive oil and unrefined canola oil have high polyphenol content, which are known for their anti-inflammatory and antioxidant properties. Unfortunately, most canola oil produced is refined, depleting the polyphenolic compounds and thus decreasing its health benefits.

Foods to Moderate or Limit

In addition to recommending certain foods and food groups, these dietary patterns have parameters for limiting or moderating certain foods.

- **LEAN MEATS AND POULTRY:** Lean meat and poultry are recommended in all patterns, though some suggest limiting their intake. Poultry is a good source of protein and B vitamins and is also lower in saturated fat than other meat products. There are few studies that have specifically looked at poultry's impact on brain health and cognition.
- **RED MEAT:** All patterns suggest restricting red meat, including beef, pork, lamb, and processed meats, such as sausages, to two or fewer servings per week on average. Red meat has been associated with several non-communicable diseases, such as cardiovascular disease, type 2 diabetes, obesity, some cancers, and even overall mortality. In addition, red meat consumption negatively impacts the environment and sustainability.[68]
- **ALCOHOL:** Although some diets recommend moderate wine consumption, they also set limits. The MIND and the Modified Ketogenic diet suggest no more than one glass per day, while the Mediterranean diet allows up to 10 ounces daily, but only with meals. Red wine contains the non-flavonoid polyphenol resveratrol, which has been studied for its anti-inflammatory and neuroprotective properties. However, with excessive consumption of red wine, the neuroprotective benefits become toxic.

- **SWEETS:** Four of the diets advise limiting sweets or added sugars. MIND and DASH both recommend fewer than 5 servings of sweets per week, including pastries, desserts, and sweet snacks. EAT-Lancet suggests less than two tablespoons of added sugars daily, while the Modified Ketogenic diet avoids sweets and added sugars entirely. Similar to saturated fat, a diet high in sugar and simple carbohydrates is linked to obesity and type 2 diabetes.[69]
- **SATURATED FATS:** Saturated fats are generally discouraged, though only three diets provide specific guidelines. The MIND diet suggests less than 1 serving of added saturated fat (like butter or margarine) daily. The EAT-Lancet diet allows up to 1 serving per day, while DASH recommends keeping saturated fat under 6% of daily calories. It's worth noting that red meat is a major source of saturated fat in many diets. High saturated fat intake has been linked to obesity, which often leads to hypertension and type 2 diabetes, all of which impact cognition.[69]

Comparing Diets: What's Different? What's the Same?

While many of these diets have shown promise, there is still tremendous opportunity to learn more and add additional recommendations based on available and future research. The MIND diet has demonstrated that even those who followed some of the components had a 35% lower risk of developing Alzheimer's disease, while those who followed it most closely had a 53% lower risk.[1] However, a 2023 randomized-controlled trial found no significant difference in cognition and brain MRI outcomes between those who followed the MIND diet versus a control diet.[58] While results will always vary based on the type of study, participant characteristics, and intervention specifics, we can learn from the results to date and we can identify what may be missing from these studied dietary patterns.

- **PROCESSED FOODS:** In addition to being high in calories, sodium, sugar, and saturated fat, processed and ultra-processed foods have been linked to numerous chronic diseases, including obesity and type 2 diabetes.[32] This knowledge empowers us to make informed choices and limit these foods to support a brain-healthy diet. Rico-Campà et al, in a 2019 prospective cohort study, found that eating four or more servings of ultra-processed foods per day increased the hazard for all-cause mortality by 62%.[70]
- **SODIUM:** According to the World Health Organization, the global average intake of sodium is 4,310mg/day, and it estimates that approximately 1.89 million deaths every year are related to high sodium intake.[71] High sodium consumption can lead to cardiovascular disease and hypertension in some individuals, which is one of the modifiable risk factors for dementia.[9]

- **FISH:** Fish, specifically fatty fish such as salmon and tuna, are the primary natural dietary source of vitamin D and omega-3 fatty acids, two beneficial nutrients to brain health. Thirty-five percent of brain weight is omega-3 fatty acids, of which 40% is DHA. Both omega-3s and vitamin D have anti-inflammatory benefits and prevent neuronal cell death. The MeDi recommends at least 6 servings of fish per week, whereas the DASH diet does not provide a separate recommendation for fish; it lumps it in with meat and poultry. The Nordic diet recommends less than 5 servings of fish per week, and the other three dietary patterns only encourage 1-2 servings per week. With fatty fish being the primary dietary source of vitamin D and omega-3s (especially DHA and EPA), some of these dietary patterns may be lacking.
- **EGGS AND DAIRY:** Egg and dairy recommendations vary across dietary patterns, with MMKD suggesting 2–4 servings of eggs per week and EAT-Lancet recommending 1. All of the other patterns don't specify amounts. Eggs, once limited due to cholesterol concerns, are now recognized for their protein, vitamins (A, D, E, B vitamins), zinc, and anti-inflammatory benefits.[72] Dairy guidelines also differ, especially in fat content, with MIND focusing only on cheese. Dairy provides bioavailable calcium, though the benefits of low-fat versus full-fat remain a debate.[73]
- **GRAINS:** Grain recommendations range widely, with some patterns emphasizing whole grains and others, like MMKD, excluding them entirely. Serving suggestions vary from 2 to 7+ servings daily. Whole grains are valued for their fiber, which aids gut health and lowers cholesterol.[31] A moderate consumption of whole grains appears most beneficial, as high intake may increase health risks in certain conditions, like diabetes.[14] Avoiding refined grains while consuming moderate amounts of whole grains can support brain health.
- **BERRIES AND GREEN LEAFY VEGETABLES:** Berries and leafy greens, noted for their cognitive benefits, are underrepresented across diets.[64] The MIND diet uniquely recommends at least 2 servings of berries and 6 servings of leafy greens weekly, supporting brain function, memory, and cognitive processing. Other dietary patterns lack specific guidance on these nutrient-dense foods despite their proven benefits.

These dietary patterns

have made remarkable strides in showing how nutrition can support cognitive function and slow cognitive decline and have provided us with a strong foundation. We now have the opportunity to enhance their impact and build on their success by addressing nutritional gaps and simplifying the approach, ensuring a more comprehensive and practical solution for long-term brain health."

— Mindi Manuel, MS, RD, CSG, LDN, CDP, Sodexo Senior Area Clinical Support Manager

The Neuroprotective Diet: A Foundation for a Vibrant Mind

By identifying underrepresented but critical nutrients, we move toward a new neuroprotective diet designed to reduce risk of cognitive decline and enhance brain health, laying the foundation for an advanced nutritional model supporting cognitive resilience and overall well-being.

Based on our research and analysis, the recommended hypothesis for brain health is based on the identification of specific dietary patterns and nutrients that are strongly associated with cognitive protection and the prevention of neurodegenerative diseases. Building on this hypothesis, our neuroprotective diet leverages these key dietary elements in a structured, evidence-based approach.

A NEW NEUROPROTECTIVE DIET

We propose a new neuroprotective diet that optimizes the best attributes of existing dietary patterns specifically tailored to meet the brain's nutritional needs. This diet is designed to prevent cognitive decline by focusing on food components that are abundant in the nutrients that the brain demands to perform best.

Food & Dietary Component	Serving Size for 1 Portion	Our Recommended Hypothesis (Servings per Day or Week)
ENCOURAGE		
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw	≥ 5/day*
GREEN LEAFY VEGETABLES		≥ 1/day
BERRIES		≥ 4/week
OTHER FRUIT & VEGETABLES		≥ 4/day
BEANS/LEGUMES	1/2 cup cooked	≥ 3/week
NUTS	1 ounce	≥ 1/day
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	3/day (whole grains)
FISH	5 ounces	3/week (emphasis on fatty fish w/ omega-3 supplement recommended daily)
UNSATURATED FAT/OILS	1 tbsp	3/day (olive oil)
MODERATE		
POULTRY	3 ounces	2-3/week (grass fed. hormone-free)
DAIRY (YOGURT,MILK,CHEESE)	1 cup	1/day low-fat yogurt/milk + low-fat cheese ≤ 1/week
EGGS	3 ounces	2-4/week organic
RED MEAT (BEEF, PORK, LAMB)	3 ounces	1/week (grass fed. hormone-free, not charred)
POTATOES	1/2 cup	≤ 4/week
WINE/ALCOHOL	4 ounces	≤ 2/day for men, ≤ 1/day for women (wine, not alcohol)
LIMIT		
SWEETS	4 ounces	< 3/week (after a meal)
FAST/FRIED FOODS	N/A	< 1/week
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A	0
SODIUM	N/A	≤ 2.3g/day
SATURATED FAT/OILS	1 tbsp	< 10% of kcals

The daily recommendation for our diet is 5 servings per day of vegetables and fruit. That would include: 1 serving of green leafy vegetables, 1 serving of fruit, and the other 3 servings can be any combination of fruits and vegetables.

THIS PROPOSAL INCORPORATES:

- Daily servings of fruits and vegetables, nuts, whole grains, and unsaturated fats/oils, which are rich in antioxidants and fiber, are crucial for reducing brain inflammation and oxidative stress. Berries and beans should be included 3-4 times a week.
- Regular consumption of fatty fish ensures a robust intake of omega-3 fatty acids, which are critical for preserving neuronal structure and function.
- Moderate consumption of poultry, red meat, dairy, and eggs, emphasizing low-fat, hormone-free options to provide the brain with necessary proteins and healthy fats without increasing inflammation.
- Limited consumption of processed foods, sodium, sweets, and saturated fats, which have been linked to neurodegenerative diseases due to their pro-inflammatory effects.

This diet incorporates the latest scientific findings and is also designed to be practical and sustainable for long-term health. By balancing nutrient-rich foods and limiting harmful components, our neuroprotective diet is poised to delay the onset of cognitive decline and enhance brain health across the lifespan.

ALL IN A DAY

Eating for Long-Term Cognitive Vitality

This sample menu represents a balanced and nutritious day that aligns with the neuroprotective diet we've proposed. Each meal is carefully designed to include brain-boosting nutrients while maintaining variety and flavor. This menu incorporates key components like antioxidants, omega-3 fatty acids, fiber, and lean proteins, all of which contribute to cognitive health and overall wellness.

A SAMPLE DAY'S MENU

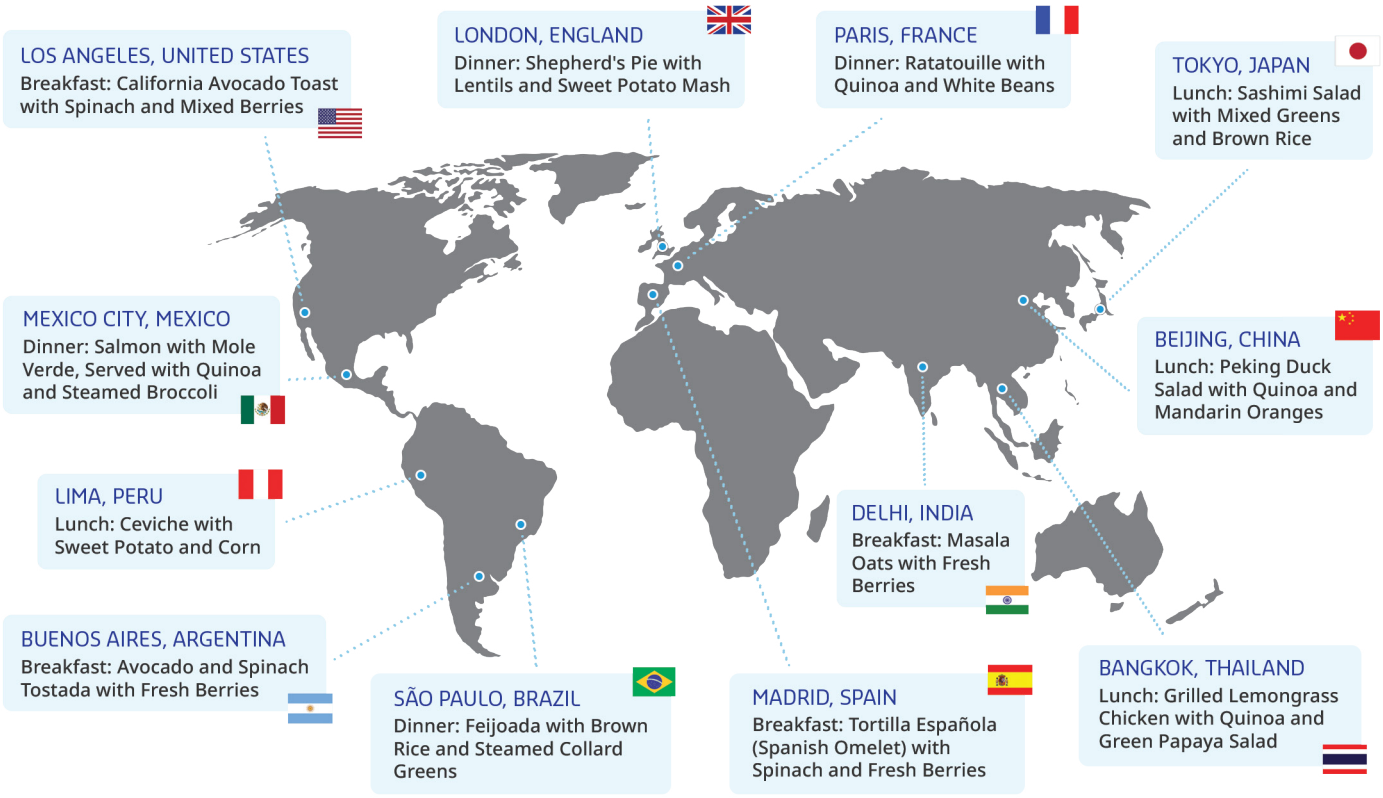
Eating for Long-Term Cognitive Vitality

			
BREAKFAST	**LUNCH**	**DINNER**	**DESSERT**
Spinach omelette with a side of berries	Grilled chicken salad with quinoa, beans, walnuts, and olive oil as dressing	Salmon with broccoli and wild rice pilaf	Low-fat yogurt with fruit parfait
This breakfast provides a rich source of leafy greens and antioxidants. Spinach is high in vitamins and minerals, while the berries deliver powerful antioxidants known to reduce oxidative stress and support brain function.	The midday meal combines leafy greens, lean protein from the chicken, omega-3s from the walnuts, and healthy fats from olive oil. Quinoa and beans offer fiber and plant-based proteins, contributing to overall brain health.	Salmon is a fantastic source of omega-3 fatty acids, known to support brain cell structure and function. Broccoli provides antioxidants and essential vitamins, while wild rice offers complex carbohydrates to stabilize energy levels throughout the evening.	For dessert, low-fat yogurt combined with fruits offers probiotics for gut health and essential nutrients like calcium, which is important for cognitive function. The addition of fresh berries further enhances the antioxidant profile of the meal.

This sample day of meals exemplifies how simple, nutrient-dense choices can make a profound impact on brain health. By incorporating a variety of foods rich in omega-3 fatty acids, antioxidants, fiber, and lean proteins, we can actively support cognitive function and protect against neurodegenerative diseases. Each meal has been crafted to not only meet the body's energy needs but also to provide essential nutrients that target brain health.

Adopting a diet similar to this sample day offers a practical and delicious way to follow the neuroprotective dietary guidelines proposed in this white paper. By prioritizing these foods in daily meals, individuals can promote long-term brain health, enhance cognitive performance, and reduce the risk of cognitive decline as they age.

BRAIN HEALTHY MEALS AROUND THE GLOBE



See a full list of brain healthy meals from around the world on pages **46-49**.

VI

Moving the Science Forward: Clinical Trials in the Real World

As part of our commitment to advancing brain health, pragmatic clinical trials in a real-world setting will be conducted to validate the effectiveness of a neuroprotective diet. Lifestyle factors will also be included, considering that exercise, meditation, and sleep are intrinsically related to brain health.

These trials can be tailored to the individual using modern methods to assess nutrition and metabolism, genetics, and lifestyle factors that can dictate response on cognitive function and overall brain health.

This pioneering trial, led by Social Impact Partners and leaders in the field,, will be divided into two groups—one receiving the neuroprotective diet and lifestyle interventions, and the other following their usual dietary regimen. Trials will assess the differential impact on brain health outcomes over time. Through the trials, we aim to provide evidence of the diet's efficacy, focusing on enhancing cognitive function, reducing neurodegenerative risk factors, and improving the overall quality of life for everyone.

A Global Opportunity for Collaboration and Impact

CHARTING A NEW COURSE FOR BRAIN HEALTH THROUGH NUTRITION

A message from Sarah Hoit

Nutrition has immense potential to revolutionize brain health. Moving forward, we believe the key lies in implementing sustainable, evidence-based dietary practices that support everyone's cognitive well-being.

There is a growing group of global leaders who see the health and economic imperative of addressing brain health nutrition as a cornerstone of our health from before we are born throughout our lives. There is clearly a strong case for integrating nutrition into our strategies for improving brain health, positioning food as a key element in preventing and managing cognitive decline.

Brain health isn't just a clinical concept—it's a deeply personal matter that affects

- *every community*
- *every family*
- *every person of every age*

Our choices today have the power to shape our futures in profound ways. This is our opportunity to take control, educate ourselves, and build habits that nourish our brains and bodies. It's time to pull all these pieces together, to walk this journey as individuals and communities, and to shape a future where brain health is central to how we live, love, and thrive.

Brain health matters to all of us—from birth to the final chapters of life.

Everything we do—every meal, every walk, every quiet moment of reflection—can impact our brain health.

A mindful walk before lunch, taking a moment of meditation after breakfast, or creating a restful environment for a good night's sleep are within everyone's reach. These small, intentional acts are not just fleeting actions but are part of a greater plan for long-term brain health. They form the building blocks of a healthier brain and, in turn, a healthier life.

The journey begins now, with the choices we make at every meal and the commitment to a better, healthier tomorrow.

EVERY DAY MATTERS,

Sarah Hoit

VII Appendix:

ACKNOWLEDGEMENTS

SODEXO

Sodexo is the global leader in sustainable food and valued experiences at every moment in life: learn, work, heal and play. Sodexo meets all the challenges of everyday life with a dual goal: to improve the quality of life of our employees and those we serve, and contribute to the economic, social and environmental progress in the communities where we operate. For Sodexo, growth and social commitment go hand in hand. Our purpose is to create a better everyday for everyone to build a better life for all.

SOCIAL IMPACT PARTNERS

Global Brain Health and Longevity Initiative

Social Impact Partners (SIP) is a nonprofit organization dedicated to advancing global brain health and longevity initiatives through collaboration, innovation, education, and funding. Social Impact Partners regards the Global Brain Health and Longevity Initiative as their 'moon-shot,' believing they have a unique moment in time where the world is focused on brain health. They emphasize the need for collective action, as the solutions will impact the world, organizations, workforce, and families.

Their vision is grounded in the value of collaborative power, innovation, and engaging younger generations to bring about tangible impact affecting every government, business, family, and individual. Social Impact Partners believes that by working together, change can be created through harnessing the boundless reach across private, public, and government sectors.

AUTHORS

SARAH HOIT is a healthcare and technology CEO and entrepreneur focused on the health and longevity marketplace. For 35 years, she has founded, led, and served organizations delivering meaningful social impact in the private and public sectors. Sarah has a deep portfolio of work in healthcare, technology, brain health, and nutrition, working with global organizations to bring significant innovation, collaboration, and investment to brain health and longevity solutions.

Sarah is the Chairman and Co-Founder of Social Impact Partners, bringing together a consortium of public and private leaders committed to combatting dementia and other neurodegenerative conditions and promoting solutions for brain health. She is Co-Founder of VitalityIP, a company with a personalized health engine working to integrate healthy food, personal data, science and the revolutionary power of AI to transform health outcomes globally. She is also co-founder of the Retail Health and Longevity Initiative, focusing on creating innovative health platforms for a healthier world with many of the world's largest food, retail, and technology companies.

Previously, she co-founded and served as CEO and Chairman of Connected Living, Inc. This pioneering technology company enhanced social connectivity for seniors and their families across 2,000 communities in the United States. Before Connected Living, Hoit founded Explore, Inc., an education company that integrated experiential learning, academic support, and community service to elevate elementary and middle school students.

Her public service experience includes roles as the director of business planning in the White House Office of National Service, writing the business plan for AmeriCorps, and then serving as its Deputy Director, from which over 1.5 million youth have served our country. Hoit's academic background includes a BA from Dartmouth College and an MBA from Harvard Business School, where she received a public service fellowship.

GENE BOWMAN, ND, MPH, is a pioneering force in nutritional neuroscience and brain health. With 20 years of experience across academic medicine, industry, and healthcare organizations, he has established himself as a visionary leader in understanding the intricate relationship between nutrition and cognitive function. As a faculty in neurology at Harvard Medical School and the Director of Clinical Trials and Brain Nutrition Laboratory at the Harvard-Mass General Hospital-McCance Center for Brain Health, Dr. Bowman is at the forefront of cutting-edge research in cognitive aging and Alzheimer's disease prevention.

Dr. Bowman's innovative approach to brain health research exemplifies his groundbreaking use of molecular biomarkers to study the effects of nutrition on brain aging. This novel methodology has opened new dimensions for understanding how dietary factors and nutrient delivery to the brain influence cognitive performance and neurological health over time. His discoveries have advanced scientific understanding and attracted significant attention from the National Institutes of Health and industry partners. These collaborations have led to numerous sponsored projects to develop strategies to enhance cognitive performance and promote healthy brain aging. With his unique blend of expertise, combining a Naturopathic Doctorate (ND) with a Master's in Public Health (MPH), Dr. Bowman brings a holistic perspective to his research. He is the first board-certified Naturopathic Physician faculty member at Harvard University, where he bridges the gap between conventional, complementary, and integrative medicine, resulting in more comprehensive and innovative strategies for brain health.

MINDI MANUEL, MS, RD, CSG, LDN, CDP, is a dynamic healthcare professional who brings a unique blend of business acumen and nutritional expertise to her role as Senior Manager of Area Clinical Support at Sodexo. Her journey in the healthcare field is as inspiring as it is unconventional. Mindi earned a bachelor's degree in finance from Butler University, but after more than a decade in corporate finance, Mindi's career took an unexpected turn following a personal battle with cancer. This life-changing experience ignited a passion for nutrition and its role in health and healing. It prompted her to pursue a master's degree in nutrition from the University of Illinois at Chicago.

As a Registered Dietitian, Mindi has found her calling in caring for older adults. Her specialized knowledge as a Certified Dementia Practitioner and her board certification in gerontological nutrition show her dedication to furthering these goals. These credentials underscore her deep commitment to improving the lives of older adults through targeted nutritional interventions. At Sodexo, Mindi leverages her diverse background to provide comprehensive support for resident care. She excels in delivering training programs, offering regulatory guidance, and implementing nutritional strategies that meet and exceed industry standards.

Her approach combines scientific rigor with practical application, ensuring that care facilities can effectively integrate cutting-edge nutritional practices into their daily operations. Mindi's expertise extends beyond essential nutrition. She is particularly adept at using dietary interventions to treat and prevent various health conditions, a skill that has become increasingly valuable in the face of complex health challenges in the aging population. Her career trajectory —from finance to nutrition—showcases her adaptability and resilience. It also gives her a unique perspective in healthcare management, allowing her to bridge the gap between clinical needs and operational realities.

Through her work, Mindi Manuel continues to demonstrate that nutrition is not just about food— it's a powerful tool for enhancing quality of life, particularly for older adults. Her dedication to this field makes her a valuable asset to Sodexo and a respected voice in geriatric nutrition.

DR. SASHA MUKHIJA is a rising star in neurology and neuroscience. She combines clinical expertise with cutting-edge research to advance our understanding and treatment of neurodegenerative disorders. As a Neurology Resident at the prestigious University Hospital of Zurich, she is honing her clinical skills while pursuing groundbreaking research as a Fulbright Postdoctoral Fellow at Harvard Medical School and Massachusetts General Hospital.

Dr. Mukhija's academic journey reflects her global perspective and commitment to excellence. After earning her MD from the University of Basel in Switzerland, she broadened her horizons through valuable experiences at KU Leuven in Belgium and the renowned Oxford University. This international exposure has equipped her with unique insights and approaches to neurological care and research.

Her current research focus demonstrates her scientific insight and responsiveness to pressing global health challenges. By investigating the effects of COVID-19 on Alzheimer's, Dr. Mukhija is at the forefront of understanding the complex interplay between infectious diseases and neurodegenerative processes. Additionally, her work on identifying biomarkers in neurodegenerative diseases holds the promise of earlier diagnosis and more targeted treatments for conditions that affect millions worldwide.

Dr. Sasha Mukhija's work represents the future of neurology—a future where deep scientific understanding informs compassionate and effective patient care. As she continues to develop her expertise and contribute to the field, she is poised to significantly impact our approach to neurodegenerative disorders, potentially improving the lives of countless patients in the years to come.

GLOSSARY AND ABBREVIATIONS

- **Alzheimer's disease and related disorders (ADRD):** Alzheimer's disease and related disorders (ADRD) are a group of conditions characterized by progressive cognitive decline that significantly impacts daily functioning. These disorders primarily affect older adults and involve:
    - + Memory loss
    - + Impaired reasoning and problem-solving skills
    - + Difficulty performing simple tasks
    - + Changes in behavior and personality
    - + Gradual worsening of symptoms over time'

  Alzheimer's disease is the most common form of ADRD, accounting for 60-80% of cases. Other related disorders include vascular dementia, Lewy body dementia, and frontotemporal disorders. ADRD is currently irreversible and has no cure, although some treatments may temporarily slow symptom progression
- **Epigenetics:** The study of heritable changes in gene function that occur without alterations in the DNA sequence. These changes can be influenced by environmental factors and may affect gene expression and cellular function.
- **Mild Cognitive Impairment (MCI):** Mild cognitive impairment is a condition characterized by a noticeable decline in memory or thinking skills that is greater than expected for a person's age, but not severe enough to significantly interfere with daily activities. It often involves problems with memory, language, thinking, or judgment that are more pronounced than normal age-related changes but do not meet the criteria for dementia. People with MCI are generally aware of their cognitive changes and can still perform most everyday tasks independently
- **Blood biomarkers:** Measurable biological substances found in the blood that provide information about a person's health status, physiological processes, or response to treatment. These can include proteins, enzymes, hormones, antibodies, and genetic material.
- **Blood-brain barrier (BBB):** A highly selective semipermeable border of endothelial cells that regulates the transfer of solutes and chemicals between the circulatory system and the central nervous system. It protects the brain from harmful substances while allowing the passage of essential nutrients.
- **Oxidative Stress**: An imbalance between free radicals and antioxidants in the body, where there are too many free radicals and not enough antioxidants to neutralize them. This imbalance can cause damage to cells, tissues, proteins, lipids, and DNA, potentially leading to various chronic diseases such as cancer, diabetes, heart disease, and neurodegenerative conditions

CONT. ▶

- **Plaques**: Refer to abnormal clumps of beta-amyloid protein that accumulate between nerve cells (neurons) in the brain. These amyloid plaques disrupt cell communication, cause inflammation, and contribute to neuronal damage and death. They are one of the hallmark features of Alzheimer's disease and play a critical role in the progression of cognitive impairment and dementia.

  Tangles: Tangles, or neurofibrillary tangles (NFTs), are abnormal accumulations of hyperphosphorylated tau protein inside neurons, particularly in regions associated with memory function. They disrupt the neuron's internal transport system, impair synaptic communication, and are closely associated with cognitive decline in Alzheimer's disease and other neurodegenerative disorders.

- **Neuroinflammation**: Neuroinflammation is an inflammatory response within the central nervous system (brain and spinal cord) characterized by activation of glial cells, production of inflammatory mediators, and potential disruption of the blood-brain barrier. While acute neuroinflammation can be protective, chronic neuroinflammation is associated with various neurodegenerative diseases and can lead to progressive neural damage.

- **Myelin sheath degeneration**: Myelin sheath degeneration refers to the progressive loss or damage of the myelin sheath, the protective covering surrounding nerve fibers, which impairs the conduction of electrical impulses along the nerves. This degeneration can result from various factors, including autoimmune diseases, genetic disorders, inflammation, or toxic exposure, leading to neurological symptoms and dysfunction.

- **Neurotransmitter**: A neurotransmitter is a chemical messenger released by neurons to transmit signals across synapses to other neurons, muscle cells, or gland cells, influencing various physiological functions and behaviors in the body.

- **Cephalic phase**: The initial stage of digestion that occurs in response to the sight, smell, taste, or thought of food. This phase triggers neurological signals that prepare the gastrointestinal tract for food processing, resulting in increased salivation and gastric secretions even before food enters the stomach.

- **Microbiome**: The microbiome is the community of microorganisms, including bacteria, fungi, viruses, and archaea, that inhabit a specific environment, such as the human body. These microbial communities play essential roles in various biological processes, influencing health and disease through interactions with the host and the environment.

- **Amyloid plaque**: Amyloid plaques are extracellular deposits of amyloid beta (Aβ) protein that accumulate in the brain's gray matter, particularly in individuals with Alzheimer's disease. These plaques disrupt cell communication and are associated with neurodegenerative processes, including inflammation and neuronal damage.

- **DASH (Dietary Approaches to Stop Hypertension):** A dietary pattern designed to prevent and treat high blood pressure, emphasizing the consumption of fruits, vegetables, whole grains, lean proteins, and low-fat dairy, while reducing sodium, saturated fats, and added sugars.

- **MEDI (Mediterranean Diet):** A diet inspired by traditional eating habits of countries bordering the Mediterranean Sea. It focuses on high consumption of fruits, vegetables, whole grains, nuts, seeds, olive oil, and moderate intake of fish, dairy, and red wine, while limiting red meat and processed foods.

CONT. ▶

- **MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay):** A hybrid diet combining aspects of the Mediterranean and DASH diets to promote brain health. It emphasizes leafy greens, nuts, berries, beans, whole grains, fish, poultry, and olive oil, specifically targeting cognitive decline and Alzheimer's prevention.
- **MMKD (Modified Mediterranean-Ketogenic Diet):** A dietary approach combining Mediterranean principles with a ketogenic framework, prioritizing healthy fats (e.g., olive oil, fish) while minimizing carbohydrates to achieve ketosis, potentially benefiting metabolic and neurological health.

  NORDIC (Nordic Diet): A diet based on traditional foods from Nordic countries (e.g., Denmark, Sweden, Norway), emphasizing seasonal, locally sourced ingredients such as whole grains, fatty fish, root vegetables, and berries, while promoting sustainability.
- **EATL (EAT-Lancet Diet):** A diet proposed by the EAT-Lancet Commission to promote planetary and human health. It prioritizes plant-based foods with modest amounts of animal-sourced protein, and focuses on sustainability and reducing environmental impact.
- **Anthocyanins:** A type of flavonoid pigment found in red, blue, and purple fruits and vegetables (e.g., berries, red cabbage, grapes). They have antioxidant and anti-inflammatory properties, contributing to cardiovascular and brain health.
- **DHA (Docosahexaenoic Acid):** An omega-3 fatty acid found in fish, algae, and breast milk, critical for brain development, cognitive function, and eye health. It plays a key role in reducing inflammation and supporting neurological processes.
- **EPA (Eicosapentaenoic Acid):** An omega-3 fatty acid commonly found in fish oil, known for its anti-inflammatory effects and benefits for heart health, brain function, and reducing symptoms of depression.
- **Pragmatic clinical trial:** A type of clinical trial designed to evaluate the effectiveness of interventions in real-world settings. It emphasizes practicality and generalizability, often focusing on diverse populations and routine healthcare conditions.
- **Processed Foods:** Foods altered from their original state for preservation or flavor enhancement (e.g., canned vegetables, bread, cheese).
- **Ultra-Processed foods:** Highly industrially manufactured foods containing additives, preservatives, and artificial ingredients (e.g., soft drinks, packaged snacks, frozen meals), often low in nutritional value and linked to health risks.

MEALS AROUND THE GLOBE

The following are examples of meals using the neuroprotective guidelines. Each country has its own unique cuisine and traditional ways to prepare locally sourced proteins, grains, fruits, and vegetables.

BUENOS AIRES, ARGENTINA	
Breakfast: Avocado and Spinach Tostada with Fresh Berries	
Spinach:	Rich in vitamins and minerals, supports cognitive function and reduces oxidative stress.
Whole Grain Tostada:	Offers fiber and complex carbohydrates for sustained energy.
Fresh berries:	Blueberries or strawberries for antioxidants and polyphenols to support brain health.
Lunch: Grilled Chicken Salad with Quinoa, Tomatoes, and Olive Oil	
Grilled Chicken:	Lean protein source, hormone-free, supports muscle and brain health.
Quinoa:	Provides fiber and plant-based protein, beneficial for gut and brain health.
Tomatoes:	Rich in antioxidants like lycopene, supports overall health and reduces inflammation.
Olive Oil:	Contains healthy fats, promotes cardiovascular and brain health.
Dinner: Grilled Sea Bream with Chimichurri, Roasted Vegetables, and Wild Rice	
Grilled Sea Bream:	Rich in omega-3 fatty acids, supports brain cell structure and function.
	Made with parsley, garlic, and olive oil, provides antioxidants and flavor
Roasted	Includes bell peppers and zucchini, provides fiber and essential vitamins.
Wild Rice:	Offers complex carbohydrates, stabilizes energy levels and supports brain function.

SÃO PAULO, BRAZIL	
Breakfast: Açaí Bowl with Granola and Fresh Berries	
Açaí:	A traditional Brazilian fruit rich in antioxidants and polyphenols, supporting brain health.
Granola:	Provides whole grains and fiber, aiding in digestion and cognitive function.
Fresh berries:	Blueberries and strawberries for additional antioxidants and vitamins.
Lunch: Grilled Fish with Quinoa Salad and Mixed Greens	
Grilled Fish:	Local fish such as pacu are rich in unsaturated fatty acids for brain support.
Quinoa Salad:	Includes tomatoes, cucumbers, and olive oil, providing fiber, vitamins, and healthy fats.
Mixed Greens:	A variety of local leafy greens like kale or spinach for antioxidants and minerals.
Dinner: Feijoada with Brown Rice and Steamed Collard Greens	
Feijoada:	A traditional Brazilian stew with black beans, prepared with lean cuts of meat to reduce saturated fat.
Brown Rice:	Provides whole grains and complex carbohydrates for sustained energy.
Steamed Collard Greens	Rich in fiber, essential vitamins, and antioxidants supporting both gut and brain health.

BEIJING, CHINA	
Breakfast: Steamed Vegetable Baozi with Fresh Berries	
Baozi (Steamed Bun):	Filled with a variety of vegetables like bok choy and mushrooms, providing fiber and essential nutrients.
Fresh berries	Blueberries or strawberries for antioxidants and polyphenols to support brain health.
Lunch: Peking Duck Salad with Quinoa and Mandarin Oranges	
Peking Duck:	Peking Duck: Lean slices of duck breast, offering a source of protein.
Quinoa:	A whole grain high in fiber and plant-based protein, supporting overall brain health.
Mandarin Oranges:	Provides vitamin C and natural sweetness without added sugar.
Mixed Greens:	Incorporates greens like spinach and lettuce for additional antioxidants.
Dinner: Steamed Fish with Ginger and Scallions, Served with Brown Rice, and Broccoli	
Steamed Fish:	Fatty fish, like salmon, rich in omega-3 fatty acids for brain health.
Ginger and Scallions:	Adds flavor and provides anti-inflammatory benefits.
Brown Rice:	A whole grain providing sustained energy and fiber.
Broccoli:	Rich in antioxidants and vitamins, supporting cognitive function.

PARIS, FRANCE	
Breakfast: Whole Grain Baguette with Avocado Spread and Fresh Berries	
Whole Grain Baguette:	Provides fiber and nutrients from whole grains, supporting brain health.
Avocado Spread:	Rich in healthy monounsaturated fats, supporting brain function.
Fresh Berries:	Blueberries or strawberries, providing antioxidants and polyphenols.
Lunch: Nicoise Salad with Grilled Salmon	
Grilled Salmon:	Rich in omega-3 fatty acids, supporting neuronal structure and function.
Mixed Greens:	Provides fiber and antioxidants, reducing brain inflammation.
Olives:	Source of healthy fats and antioxidants.
Green Beans:	Rich in fiber and vitamins, promoting overall health.
New Potatoes:	Used in moderation, provide carbohydrates for energy and vitamins and minerals for brain health.
Dinner: Ratatouille with Quinoa and White Beans	
	A medley of eggplant, zucchini, bell peppers, and tomatoes, rich in vitamins and antioxidants.
Quinoa:	Provides complete proteins and fiber, supporting brain health.
White Beans:	Rich in fiber and plant-based protein, supporting gut and brain health.

DELHI, INDIA	
Breakfast: Masala Oats with Fresh Berries	
Masala Oats:	Oats cooked with turmeric, cumin, and vegetables like carrots and peas, providing fiber and antioxidants.
Fresh Berries:	Blueberries or strawberries for antioxidants and polyphenols.
Almonds:	Rich in healthy fats and vitamin E, supporting brain health.
Lunch: Grilled Paneer Tikka with Quinoa Salad	
Grilled Chicken:	Paneer cubes marinated in spices and grilled, offering lean protein and calcium.
Quinoa Salad:	Quinoa mixed with cucumbers, tomatoes, and mint, providing fiber and antioxidants.
Mint Chutney:	Made with fresh mint, coriander, and lemon juice, adding flavor without added sugars.
Dinner: Tandoori Salmon with Broccoli and Brown Rice	
Tandoori Salmon:	Salmon marinated in yogurt and spices, rich in omega-3 fatty acids.
Broccoli:	Steamed broccoli for antioxidants and essential vitamins.
Brown Rice:	Provides complex carbohydrates and fiber for sustained energy.

TOKYO, JAPAN	
Breakfast: Miso Soup with Seaweed and Tofu, Served with a Side of Fresh Berries	
Miso:	Fermented soybean paste rich in probiotics, supporting gut health.
Seaweed:	Provides iodine and antioxidants, beneficial for cognitive function.
Tofu:	Source of plant-based protein and isoflavones, promoting brain health.
Fresh Berries:	Blueberries or strawberries for antioxidants and polyphenols.
Lunch: Sashimi Salad with Mixed Greens and Brown Rice	
Sashimi:	Lean protein source, hormone-free, supports muscle and brain health.
Mixed Greens:	Provides fiber and plant-based protein, beneficial for gut and brain health.
Brown Rice:	Rich in antioxidants like lycopene, supports overall health and reduces inflammation.
Dinner: Grilled Tofu with Steamed Broccoli and Quinoa	
Tofu:	Rich in omega-3 fatty acids, supports brain cell structure and function.
Broccoli:	Made with parsley, garlic, and olive oil, provides antioxidants and flavor
Quinoa:	Includes bell peppers and zucchini, provides fiber and essential vitamins.

MEXICO CITY, MEXICO	
Breakfast: Nopal and Avocado Omelet with Salsa Verde, Served with Fresh Berries	
Nopal (cactus):	Rich in fiber and antioxidants, nopal contributes to gut and brain health.
Avocado:	Provides healthy monounsaturated fats and tocopherols.
Eggs:	A good source of protein, and vitamins that provide anti-inflammatory benefits.
Salsa Verde:	Contains tomatillo, coriander, and green chili peppers, offering vitamins and natural flavor enhancers without added sugars.
Fresh Berries:	Blueberries or strawberries for antioxidants and polyphenols.
Lunch: Grilled Chicken Tacos with Corn Tortillas, Black Beans, and Avocado	
Grilled Chicken:	Lean protein source, grilled to minimize added fats.
Corn Tortillas:	Whole grain option, providing fiber and energy.
Black Beans:	Rich in fiber and plant-based protein, supporting gut and brain health.
Avocado:	Adds healthy fats and creaminess to the tacos.
Pico De Gallo:	Fresh tomatoes, onions, and cilantro for antioxidants and flavor.
Dinner: Salmon with Mole Verde, Served with Quinoa and Steamed Broccoli	
Salmon	Rich in omega-3 fatty acids, supporting brain cell structure and function.
Mole Verde:	A green sauce made with pumpkin seeds, tomatillos, and herbs, providing vitamins and minerals.
Quinoa:	A whole grain offering fiber and plant-based proteins.
Steamed Broccoli:	Provides antioxidants and essential vitamins for brain health.

LIMA, PERU	
Breakfast: Quinoa Porridge with Chirimoya and Fresh Berries	
Quinoa:	An Andean superfood rich in protein and fiber, supporting brain health and energy levels.
Chirimoya:	A native fruit providing natural sweetness and a source of vitamin C and antioxidants.
Fresh Berries:	Blueberries or strawberries for antioxidants and polyphenols, promoting cognitive function.
Lunch: Ceviche with Sweet Potato and Corn	
Fresh White Fish:	A good source of lean protein and B vitamins supporting cognitive function. Lime Juice: Provides vitamin C and natural acidity to preserve the fish and enhance flavor.
Sweet Potato:	Offers complex carbohydrates to support sustained energy and beta-carotene providing anti-inflammatory benefits for brain health.
Corn:	A staple providing fiber, vitamins, and minerals contributing to overall brain health.
Dinner: Grilled Trout with Quinoa and Andean Vegetables	
Trout:	A local source of omega-3 fatty acids, supporting brain health and reducing inflammation.
Quinoa:	Rich in protein and fiber, contributing to sustained energy and cognitive function.
Andean Vegetables:	Includes native vegetables like olluco and caigua, offering vitamins, minerals, and antioxidants.

MADRID, SPAIN	
Breakfast: Tortilla Española (Spanish omelet) with Spinach and Fresh Berries	
Eggs:	A good source of protein and vitamins that provide anti-inflammatory benefits.
Potatoes:	Traditional component of this Spanish omelet, used in moderation, provide carbohydrates for energy and vitamins and minerals for brain health.
Spinach:	Rich in vitamins and minerals, supports brain health.
Olive Oil:	Provides healthy monounsaturated fats, essential for brain function.
Fresh Berries:	Rich in antioxidants and polyphenols, supporting cognitive health.
Lunch: Grilled Pisto Manchego with Quinoa and Almonds	
Pisto	Traditional Spanish vegetable stew with tomatoes, peppers, and zucchini, rich in antioxidants.
Quinoa:	A whole grain high in fiber and protein, supports brain health.
Almonds:	Source of healthy fats and vitamin E, beneficial for cognitive function.
Olive Oil:	Used for cooking, provides healthy fats.
Dinner: Grilled Sardines with a Side of Sautéed Broccoli and Brown Rice	
Sardines:	Rich in omega-3 fatty acids, crucial for maintaining neuronal health.
Broccoli:	Provides antioxidants and essential vitamins for brain health.
Brown Rice:	Whole grain providing complex carbohydrates for sustained energy.
Lemon Juice:	Adds flavor and vitamin C, enhancing iron absorption.

BANGKOK, THAILAND	
Breakfast: Thai Jasmine Rice Congee with Fresh Berries	
Jasmine Rice Congee:	A traditional Thai breakfast dish, jasmine rice congee is a comforting, low-fat option providing complex carbohydrates and fiber.
Fresh Berries:	Incorporating local berries such as mulberries or imported options like blueberries for antioxidants and polyphenols.
Ginger:	Aromatic addition that provides anti-inflammatory properties and aids digestion.
Spring Onion:	Rich in vitamins and antioxidants, adding flavor and nutrients to breakfast.
Lunch: Grilled Lemongrass Chicken with Quinoa and Som Tam	
Grilled Lemongrass Chicken:	Lean protein source, flavored with lemongrass for a citrusy aroma, prepared using healthy grilling methods.
Quinoa:	A whole grain providing fiber and plant-based protein, offering a nutritious alternative to traditional white rice.
Som Tam (Green Papaya Salad):	A classic Thai salad with green papaya, tomatoes, and peanuts, rich in vitamins, fiber, and healthy fats.
Peanuts:	Adds healthy fats and protein, supporting brain health.
Dinner: Steamed Fish with Chili and Lime, Served with Steamed Broccoli, and Brown Rice	
Steamed Fish:	Local fish such as whiting, rich in omega-3 fatty acids, steamed to retain nutrients and flavor.
Chili and Lime Sauce:	A zesty sauce made from fresh chilies and lime juice, enhancing flavor without added sugar.
Steamed Broccoli:	Provides fiber, vitamins, and antioxidants, supporting overall brain health.

LONDON, UNITED KINGDOM	
Breakfast: Porridge with Mixed Berries and Walnuts	
Porridge:	Made from whole oats, providing fiber and complex carbohydrates for sustained energy.
Mixed Berries:	Includes blueberries and blackberries, rich in antioxidants and polyphenols.
Walnuts:	Source of omega-3 fatty acids and healthy fats, supporting brain health.
Lunch: Grilled Pollock with Quinoa and Roasted Vegetables	
Grilled Pollock:	Rich in omega-3 fatty acids, essential for neuronal structure and function.
Quinoa:	Provides complete protein and fiber, supporting overall health.
Roasted Vegetables:	Includes seasonal vegetables like carrots and broccoli, offering vitamins and antioxidants.
Dinner: Shepherd's Pie with Lentils and Sweet Potato Mash	
Lentils:	High in protein and fiber, supporting gut health and providing sustained energy.
Sweet Potato Mash:	Rich in beta-carotene and fiber, offering antioxidants and energy.
Mixed Vegetables:	Includes peas and carrots, adding vitamins and minerals.

LOS ANGELES, UNITED STATES	
Breakfast: California Avocado Toast with Spinach and Mixed Berries	
Whole Grain Bread:	Provides fiber and complex carbohydrates, supporting brain function.
Avocado:	Rich in monounsaturated fats, supports heart and brain health.
Spinach:	High in vitamins and antioxidants, aids in reducing oxidative stress.
Mixed Berries:	Blueberries or strawberries for antioxidants and polyphenols.
Lunch: Grilled Fish Tacos with Avocado and Cabbage Slaw	
Grilled Fish:	Fatty fish, like salmon or whiting, for omega-3 fatty acids.
Corn Tortillas:	Whole grain option providing fiber and nutrients.
Avocado:	Adds healthy fats and a creamy texture.
Cabbage Slaw:	Crunchy and rich in vitamins, paired with lime juice for flavor.
Dinner: Quinoa Bowl with Roasted Vegetables and Grilled Chicken	
Quinoa:	Complete protein source and high in fiber.
Roasted Vegetables:	Seasonal vegetables like bell peppers, zucchini, and carrots for antioxidants.
Grilled Chicken:	Lean protein source, grilled to retain nutrients.
Olive Oil:	Used for roasting, provides unsaturated fats beneficial for brain health.

DIETARY PLANS STUDIED

Food & Dietary Component	Serving Size for 1 Portion	MIND	DASH	Our Recommended Hypothesis (Servings per Day or Week)
ENCOURAGE				
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw			≥ 5/day*
GREEN LEAFY VEGETABLES		≥ 6/week		≥ 1/day
BERRIES		≥ 2/week		≥ 4/week
OTHER FRUIT & VEGETABLES		≥ 1/day	≥ 8/day	≥ 4/day
BEANS/LEGUMES	1/2 cup cooked	> 3/week	≥ 4/week	≥ 3/week
NUTS	1 ounce	≥ 5/week		≥ 1/day
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	≥ 3/day (whole grains)	≥ 7/day (total grains)	3/day (whole grains)
FISH	5 ounces	≥ 1/week		3/week (emphasis on fatty fish w/ omega-3 supplement recommended daily)
UNSATURATED FAT/OILS	1 tbsp	Olive oil as primary	≤ 21% of kcals	3/day (olive oil)
MODERATE				
DAIRY (YOGURT,MILK,CHEESE)	1 cup	< 1/week (cheese)	≥ 2/day (low-fat)	1/day low-fat yogurt/milk + low-fat cheese ≤ 1/week
EGGS	3 ounces			2-4/week organic
POULTRY	3 ounces	≥ 2/week	≤ 2/day (including fish)	2-3/week (grass fed. hormone-free)
RED MEAT (BEEF, PORK, LAMB)	3 ounces	< 4/week		1/week (grass fed. hormone-free, not charred)
POTATOES	1/2 cup			≤ 4/week
WINE/ALCOHOL	4 ounces	1/day		≤ 2/day for men, ≤ 1/day for women (wine, not alcohol)
LIMIT				
SWEETS	4 ounces	< 5/week (after a meal)	≤ 5/week	< 3/week (after a meal)
FAST/FRIED FOODS	N/A	< 1/week		< 1/week
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A			0
SODIUM	N/A		≤ 2.3g/day	≤ 2.3g/day
SATURATED FAT/OILS	1 tbsp	< 1/day	≤ 6% of kcals	< 10% of kcals

Food & Dietary Component	Serving Size for 1 Portion	MeDi	MMKD	Our Recommended Hypothesis (Servings per Day or Week)
ENCOURAGE				
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw			≥ 5/day*
GREEN LEAFY VEGETABLES			Encouraged	≥ 1/day
BERRIES			Encouraged	≥ 4/week
OTHER FRUIT & VEGETABLES		> 7/day	≥ 4/day	≥ 4/day
BEANS/LEGUMES	1/2 cup cooked	> 6/week	≥ 2/week	≥ 3/week
NUTS	1 ounce		≥ 1/day	≥ 1/day
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	>4/day (whole grains)	None	3/day (whole grains)
FISH	5 ounces	>6/week	≥ 2/week	3/week (emphasis on fatty fish w/ omega-3 supplement recommended daily)
UNSATURATED FAT/OILS	1 tbsp	≥ 1/day (olive oil primary)	≥ 1/day (olive oil primary)	3/day (olive oil)
MODERATE				
DAIRY (YOGURT,MILK,CHEESE)	1 cup	≤ 10/week (full fat)	2/day (full fat)	1/day low-fat yogurt/milk + low-fat cheese ≤ 1/week
EGGS	3 ounces		2-4/week	2-4/week organic
POULTRY	3 ounces	≤ 3/week	2/week	2-3/week (grass fed. hormone-free)
RED MEAT (BEEF, PORK, LAMB)	3 ounces	≤ 1/week	≤ 2/week	1/week (grass fed. hormone-free, not charred)
POTATOES	1/2 cup	> 2/day	0	≤ 4/week
WINE/ALCOHOL	4 ounces	> 0 < 10oz/day	≥ 1/day	≤ 2/day for men, ≤ 1/day for women (wine, not alcohol)
LIMIT				
SWEETS	4 ounces		0	< 3/week (after a meal)
FAST/FRIED FOODS	N/A			< 1/week
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A			0
SODIUM	N/A			≤ 2.3g/day
SATURATED FAT/OILS	1 tbsp			< 10% of kcals

DIETARY PLANS STUDIED

Food & Dietary Component	Serving Size for 1 Portion	Nordic	EAT-Lancet	USDA Dietary Guidelines for Americans	Our Recommended Hypothesis (Servings per Day or Week)
ENCOURAGE					
TOTAL VEGETABLES AND FRUIT	1/2 cup cooked/canned or 1 cup raw				≥ 5/day*
GREEN LEAFY VEGETABLES			≥ 1/day	1.5/week	≥ 1/day
BERRIES		Encouraged			≥ 4/week
OTHER FRUIT & VEGETABLES		≥ 5/day	≥ 4/day	≥ 4.5/day	≥ 4/day
BEANS/LEGUMES	1/2 cup cooked		≥1/day	1.5/week	≥ 3/week
NUTS	1 ounce	≤ 1/day	≥ 1.5/day	5/week	≥ 1/day
WHOLE GRAINS	1/2 cup cooked rice/pasta or 1 slice of bread	≥ 2/day (whole grains)	3/day	6/day (50% whole grain)	3/day (whole grains)
FISH	5 ounces	< 5/week	2/week	8/week	3/week (emphasis on fatty fish w/ omega-3 supplement recommended daily)
UNSATURATED FAT/OILS	1 tbsp	Canola oil as primary	3/day		3/day (olive oil)
MODERATE					
DAIRY (YOGURT, MILK, CHEESE)	1 cup	2/day (low-fat)	1/day	3/ day	1/day low-fat yogurt/milk + low-fat cheese ≤ 1/week
EGGS	3 ounces		1/ week	5.5 oz/day	2-4/week organic
POULTRY	3 ounces	< 6/week (all lean meat)	≤ 2.5/week		2-3/week (grass fed, hormone-free)
RED MEAT (BEEF, PORK, LAMB)	3 ounces	< 4/week	≤ 1/week		1/week (grass fed, hormone-free, not charred)
POTATOES	1/2 cup	< 1/day	< 4/week		≤ 4/week
WINE/ALCOHOL	4 ounces			≤ 2/day for men, ≤ 1/day for women	≤ 2/day for men, ≤ 1/day for women (wine, not alcohol)
LIMIT					
SWEETS	4 ounces		≤ 2 tbsp/day (added sugars)	< 10% of kcals (added sugars)	< 3/week (after a meal)
FAST/FRIED FOODS	N/A				< 1/week
PROCESSED / ULTRAPROCESSED / REFINED GRAINS	N/A				0
SODIUM	N/A	≤ 6g/day		< 2.3g/day	≤ 2.3g/day
SATURATED FAT/OILS	1 tbsp		< 1/day	< 10% of kcals	< 10% of kcals

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