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Aron K. Barbey, Teresa A. Davis



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**Nutrition and the Brain – Exploring Pathways for Optimal Brain Health through
Nutrition: A Call for Papers**

Aron K. Barbey¹ and Teresa A. Davis²

¹Center for Brain, Biology & Behavior, University of Nebraska-Lincoln, Lincoln, NE, USA;

²United States Department of Agriculture / Agricultural Research Service, Children’s Nutrition
Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX USA

Corresponding Author: Aron K. Barbey, Center for Brain, Biology & Behavior, University of
Nebraska-Lincoln, C89 East Stadium, Lincoln, NE 68588, USA; Email: abarbey2@unl.edu

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1 Recent advances in neuroscience have transformed our understanding of the human brain,
2 yielding more detailed images of its cells, more accurate measures of its function, and more
3 precise models of its network organization. As our knowledge of the brain deepens, it becomes
4 increasingly clear that the food we consume plays a vital role in its development, maintenance,
5 and resilience throughout life (1). Nutrition influences brain function at multiple levels, from
6 molecular and cellular mechanisms to the complex neural networks that underlie human
7 intelligence and mental health.

8 Despite the growing recognition of nutrition's impact on the brain, researchers face
9 several scientific challenges. This Special Collection on *Nutrition and the Brain* aims to address
10 these challenges and foster a deeper understanding of how nutrition affects cognitive and brain
11 health. We invite researchers from the nutritional and brain sciences to contribute original
12 empirical research, systematic reviews, and thought-provoking perspectives to this collection,
13 focusing on the following scientific challenges.

14

15 **Interdisciplinary Studies of Nutrition and the Brain**

16 The complexity of the brain itself presents a primary challenge for researchers. Comprised of
17 billions of neurons and trillions of connections, the brain's complex signaling pathways make it
18 difficult to comprehend the precise mechanisms through which nutrition influences brain health.
19 Therefore, we encourage studies that (i) apply advanced neuroimaging methods to investigate the
20 respects in which diet and nutrition may influence the network organization and dynamics of the
21 brain (2-4), (ii) employ state-of-the-art computational modeling methods that integrate
22 neuroimaging with measures of nutritional status to derive novel brain health phenotypes (5), and
23 (iii) apply nutrient biomarker pattern analysis (1-5) and other modern omics techniques to

24 uncover possible mechanisms of action with respect to the genome, transcriptome, proteome, and
25 metabolome. These approaches will help to elucidate the complex signaling pathways that link
26 nutrition to the brain and provide new insights into the effects of diet and nutrition on brain
27 health, employing both human and animal models (6-7).

28

29 **Nutrition and the Gut-Brain Axis**

30 Modern research in the nutritional and brain sciences has revealed novel signaling pathways
31 between the gut and the brain, known as the gut-brain axis. Emerging research suggests that a
32 healthy gut microbiome, promoted by a diverse and fiber-rich diet, may have positive effects on
33 brain health, mood regulation, and even mental disorders such as depression and anxiety (8-10).
34 Researchers are encouraged to explore the dynamic relationship between nutrition, the gut, and
35 the brain, elucidating the mechanisms involved and investigating potential dietary strategies for
36 maintaining optimal gut and brain health.

37

38 **Nutrition and Lifespan Development**

39 Understanding the role of nutrition in brain health throughout the lifespan is another important
40 challenge. Diet influences brain health not only during early development but also throughout
41 adulthood and into old age (11-13). Chronic consumption of an unhealthy diet, characterized by
42 high levels of saturated fats, refined sugars, and processed foods, has been linked to an increased
43 risk of developing neurodegenerative disorders. Conversely, a diet rich in antioxidants,
44 polyphenols, and anti-inflammatory compounds has shown protective effects against age-related
45 cognitive decline and neurodegenerative conditions (14). Further research to examine the effects
46 of natural protein sources on brain health, including beef, pork, poultry, eggs, fish, and plant-

47 based protein, will be important for understanding the impact of diet and nutrition on brain health
48 across the lifespan. We therefore invite researchers to investigate how specific nutrients, dietary
49 patterns, and nutritional interventions can influence brain health at different stages of life,
50 including the potential for dietary interventions to promote early brain development or mitigate
51 neurodegenerative diseases in late life.

52

53 **Nutrition and Cognition**

54 Research on the importance of nutrition for brain health further establishes its effects on
55 cognitive performance throughout life (15, 16). Deficiencies in specific nutrients have been
56 associated with impaired cognitive function, including decreased attention, learning, and
57 memory. Conversely, a nutrient-rich diet, particularly during critical periods of brain
58 development, has been linked to improved cognitive abilities and enhanced academic
59 performance. Investigating the underlying mechanisms and identifying potential dietary
60 interventions to promote cognitive function is a critical challenge.

61

62 **Nutrition and Mental Health**

63 The influence of nutrition on mental health is an increasingly important area of study (17, 18).
64 Diet has been linked to the risk and progression of psychiatric conditions, such as mood and
65 anxiety disorders. Researchers are invited to explore the relationship between nutrition and
66 mental health, including the mechanisms through which diet influences psychiatric conditions
67 and the potential for dietary interventions to support mental health and psychological wellbeing.

68

69 **Nutrition and Public Health**

70 Given the significant impact of diet and nutrition on brain health, promoting healthy eating
71 habits becomes a public health imperative (19-20). Educational campaigns, policy interventions,
72 and targeted initiatives should aim to raise awareness about the importance of nutrition in brain
73 function, particularly among vulnerable populations. Additionally, interdisciplinary
74 collaborations involving healthcare professionals, nutritionists, educators, and policymakers are
75 crucial for developing evidence-based guidelines that encourage brain-healthy dietary choices.
76 We invite submissions that discuss the implementation and dissemination of evidence-based
77 nutritional interventions and highlight strategies to bridge the gap between research and practice.

78

79 **Call for Papers**

80 *The Journal of Nutrition* invites submission of high-quality, original research manuscripts,
81 reviews, perspectives, and systematic reviews with meta-analyses on studies that apply
82 interdisciplinary methods to advance research on nutrition and the brain. Papers must be
83 submitted by 15 December 2024 to be considered for this Special Collection. To be included in
84 the Collection, select the appropriate Article Type for your manuscript. You will later be
85 prompted to enter a Section/Category. Select “Nutrition and the Brain” to be considered for this
86 Collection.

87 Accepted papers will be published continuously in their respective monthly issues, as
88 well as on a collection landing page. Please prepare submissions in compliance with *The Journal*
89 *of Nutrition’s* Instructions for Authors and submit them on *The Journal of Nutrition* submission
90 site, selecting the Article Type of “Nutrition and the Brain.”

91 Articles will be peer reviewed, and submission does not guarantee manuscript
92 acceptance. Articles are subject to the charges described under the “Policies, Fees, and Style”

93 section in the author guidelines. Dr. Aron Barbey will serve as Guest Editor of the Collection.

94 Please send questions to *The Journal of Nutrition*'s Editor-in-Chief.

95

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98 manuscript and read and approved the final manuscript.

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