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EMERGING ROLES FOR FOLATE AND RELATED B-VITAMINS IN BRAIN HEALTH ACROSS THE LIFECYCLE

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Nutrition plays a fundamental role in supporting the structural and functional development of the human brain from conception, throughout early infancy and extending into later life.

A growing body of evidence suggests that folate and the metabolically related B-vitamins are essential for brain health across all age groups, owing to their specific roles in C1 metabolism and particularly in the production of S-adenosylmethionine, a universal methyl donor essential for the production of neurotransmitters.

Emerging, though not entirely consistent, evidence suggests that maternal folate status throughout pregnancy may influence neurodevelopment and behaviour of the offspring.

Furthermore optimal B-vitamin status is associated with better cognitive health in ageing. Of note, a recent clinical trial provided evidence that supplementation with folic acid and related B-vitamins over a 2-year-period reduced global and regional brain atrophy, as measured by MRI scan in older adults.

In terms of potential mechanisms, the effects of these B-vitamins on cognitive health may be independent or may be mediated by nutrient-nutrient and/or relevant gene-nutrient interactions.

Furthermore, a new area of research suggests that the in utero environment influences health in later life. Folate, an important cofactor in C1 metabolism, is indirectly involved in DNA methylation, which in turn is considered to be one of the epigenetic mechanisms that may underlie fetal programming and brain development.

The present review will explore the evidence that supports a role for folate and the related B-vitamins in brain health across the lifecycle, and potential mechanisms to explain such effects.

Keywords: B-vitamins; Folate, C1 metabolism; Cognitive health; Cognitive performance