

## The effect of anthocyanin intake on cognition: a systematic literature review and meta-analysis

E. Lorzadeh<sup>1</sup>, K. Charlton<sup>1</sup>, S. Roodenrys<sup>1</sup>, K. Green<sup>1</sup> and V. Do Rosario<sup>1</sup>  
<sup>1</sup>University of Wollongong, Wollongong, NSW 2500, Australia

Clinical trials suggest that dietary anthocyanins may improve indices of memory and cognition in populations with different characteristics, including children, healthy adults, and older adults with age-related memory impairment.<sup>(1,2)</sup> However, differences in methodology between studies make comparisons difficult.<sup>(3,4)</sup> A systematic literature review and meta-analysis were undertaken to identify the effect of anthocyanins provided in either food-derived or supplemental form on a range of cognitive domains, including mood in an adult population (> 18 y). A systematic search was conducted using databases (PubMed, Scopus, ISI Web of Science, Google Scholar) and hand searching of the reference lists of identified relevant RCTs, up to February 2022. Data was reported according to PRISMA guidelines. A random-effects model was used, and Hedge's *g* scores were calculated as an estimate of the summary effect size. Eighteen randomised controlled trials consisting of 704 participants were eligible for inclusion in the review. Fifteen studies reported improvement in different domains of cognition performance after anthocyanin intakes such as executive function, working memory, subjective memory, verbal memory, speed of processing, visual-spatial memory, and task twitching. Only one study<sup>(5)</sup> reported significant improvement and anti-fatigue effect on mood in contrast to seven other studies that did not show any significant difference. However, only nine of these studies ( $n = 341$ ) were eligible for meta-analysis. The findings suggest that anthocyanin intake has a significant beneficial effect on verbal memory (Learning: Hedge's  $g = 0.31$ , 95% CI [0.003, 0.614],  $p = 0.048$ ) and working memory (Hedge's  $g = 0.30$ , 95% CI [0.034, 0.559],  $p = 0.027$ ). There were no other statistically significant changes for other cognitive domains. This study indicates that anthocyanin consumption can improve some cognitive domains, however, the heterogeneity in methods used to assess cognitive performance, the different study designs employed, and varying sources and dosages of anthocyanin make it difficult to quantify the magnitude of the effect.

### References

1. Harvey PD (2022) *Dialogues Clin Neurosci* **21**, 227–237.
2. Craik FIM & Bialystok E (2006) *Trends Cogn Sci* **10** (13), 131–138.
3. Eker ME, Aaby K, Budic-Leto I, *et al.* (2019) *Foods* **9** (1), 2.
4. Sterne JAC, Savović J, Page MJ, *et al.* (2019) *BMJ* **366**, 14898.
5. Kimble R, Keane KM, Lodge JK, *et al.* (2022) *Br J Nutr*, 1–12.