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File: ■ Montmorency Tart Cherry (*Prunus cerasus*, Rosaceae)
■ Cerebral Blood Flow
■ Cognitive Function

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RE: Single Serving of Montmorency Tart Cherry Concentrate Improves Cerebral Blood Flow, but Not Cognitive Function

Keane KM, Haskell-Ramsay CF, Veasey RC, Howatson G. Montmorency tart cherries (*Prunus cerasus* L.) modulate vascular function acutely, in the absence of improvement in cognitive performance. *Br J Nutr*. December 2016;116(11):1935-1944.

Cognitive decline during normal aging is related to a reduction in blood flow and oxygen metabolism in the brain. Polyphenol-rich foods such as fruits have been studied for their role in promoting cognitive function and preventing cardiovascular and Alzheimer's diseases. In animal studies, feeding of Montmorency tart cherry (*Prunus cerasus*, Rosaceae) extracts have led to increased nitric oxide production and antioxidant status, and a decrease in lipid oxidation and inflammatory markers, all related to healthy brain function.

A randomized, double-blinded, placebo-controlled, single-dose, crossover trial in 30 subjects (10 females and 20 males; aged 45-60 years) was performed at the Department of Sport, Exercise and Rehabilitation at Northumbria University; Newcastle upon Tyne, United Kingdom. The test material was a concentrate from Montmorency tart cherry fruit. Exclusion criteria included those who had a neurological disorder, head injury, or relevant food allergies, or who used tobacco (*Nicotiana tabacum*, Solanaceae) or excessive caffeine, based on a self-reported assessment.

Subjects were to follow a low-phenolic diet for 48 hours prior to each arm of the trial, fast overnight (≥10 h), and abstain from strenuous exercise. Subjects received either a 60-mL serving of a Montmorency tart cherry concentrate (MC as CherryActive®; CherryActive Ltd; Sunbury, United Kingdom) diluted with 100 mL of water or a placebo (fruit-flavored cordial [Kia-Ora®; Coca-Cola Enterprises; Uxbridge, United Kingdom]) containing < 1% fruit. The treatment and placebo were matched closely in macronutrients, color, and volume. MC contained ~68 mg/L cyanidin-3-glucoside, ~161 mg/L polyphenols by gallic acid equivalents, and ~0.59 mg/L mean Trolox equivalents, a measure of antioxidant capacity.

On study days, subjects reported to the lab from 7-9 a.m. and had blood pressure taken. All subjects then had the following tests: (1) Baseline cognitive assessment using the Computerised Mental Performance Assessment System (COMPASS; Northumbria University); (2) Cerebral blood flow, including oxygenated and total hemoglobin, using near-infrared spectroscopy (NIRS; NIRO-200NX; Hamamatsu Photonics K.K.; Hamamatsu, Shizuoka, Japan); and (3) cerebral blood flow velocity in the middle cerebral artery using Transcranial Doppler sonography (TCD; Doppler-Box™; Compumedics DWL; Singen, Germany). The cognitive tasks included digit vigilance, rapid visual information processing, the Stroop test (a measure of attention, inhibition, and cognitive flexibility), and visual analog scales. Subjects then consumed MC or placebo. Cognitive assessments and blood flow measures were taken 1, 2, 3, and 5 h postconsumption; blood pressure was taken hourly. Subjects watched a non-arousing DVD in between measurements. After a washout period of at least 14 days, subjects returned for the opposite arm of the study.

Twenty-seven subjects completed the study, and baseline measurements between treatment and placebo groups were similar. All subjects complied with the low-polyphenolic diet, according to the food diaries. No adverse events were reported. No measures of mood or cognitive function were affected; however, concentrations of total and oxyhemoglobin were significantly improved during the task period 1 h post-MC consumption ($P = 0.019$). MC consumption significantly lowered systolic blood pressure ($P \leq 0.05$) over a period of 3 h, with a maximum reduction of 6 ± 2 mmHg at 1 h after consumption.

The authors suggest that a single serving of MC can modulate markers of vascular function that may not translate to measurable differences in cognition or mood. Limitations of the study include the acute dosing design, which may not have permitted enough time to realize the potential impact of the treatment. The study excluded subjects consuming a polyphenol-rich diet, which may not reflect real-world applications. Also, practice and fatigue effects for acute cognitive-function studies can be difficult to predict and control.

Overall, the study showed that a single serving of MC can improve some measures of cerebral blood flow, based on increased concentrations of total and oxyhemoglobin using NIRS. The authors also remarked that the reduction in systolic blood pressure was consistent with previous studies on concentrates from this particular type of cherry.

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—Blake Ebersole

The American Botanical Council has chosen not to reprint the original article.