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File: ■ Blackcurrant (*Ribes nigrum*, Grossulariaceae)
■ Endothelial Function
■ Peripheral Temperature
■ Smoking

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RE: Blackcurrant May Attenuate the Transient Impairment of Smoking-induced Acute Endothelial Dysfunction and Peripheral Blood Flow in Smokers

Tomisawa T, Nanashima N, Kitajima M, et al. Effects of blackcurrant anthocyanin on endothelial function and peripheral temperature in young smokers. *Molecules*. November 2019;24(23):4295. doi: 10.3390/molecules24234295.

Cigarette smoking is a risk factor for cardiovascular disease and the leading preventable risk factor for coronary artery disease and death. Endothelial dysfunction is a disease that is attributed to abnormal regulation of blood vessel tone and impaired atheroprotective properties of normal endothelium. It is an important pathogenic mechanism for atherosclerosis and early manifestation of cardiovascular disease. Animal studies have shown that blackcurrant (*Ribes nigrum*, Grossulariaceae) exhibits hypotensive effects, inhibits cancer cell spreading, improves insulin resistance, and has antimicrobial properties. Human studies have shown that blackcurrant improves elevated intraocular pressure and retinal artery blood flow in patients diagnosed with glaucoma. Additionally, it has been shown to alleviate asthenopia, increase peripheral blood flow, improve lipid metabolism, and prevent muscle damage. This double-blind, randomized-controlled trial was conducted to determine the effects of blackcurrant anthocyanin on endothelial function and peripheral blood flow correlated with endothelial function after cigarette smoking in healthy young adults.

Twenty-four young adult men participated in the study. Eleven were nonsmokers (N group), and 13 were smokers (S group). The mean age of the N group was 22 ± 2 years and 21 ± 1 year in the S group. Participants of the S group smoked 14 ± 5 cigarettes per day. There was no significant difference in demographics between the groups. No other information was provided in terms of total number of participants recruited, inclusion and exclusion criteria, dates of the study, or location.

Participants were evaluated in a supine position after 15 min of rest in a laboratory. Participants were instructed to refrain from eating or smoking within three hours of testing and to refrain from consuming antioxidant vitamins for one day prior to evaluation. Endothelial function and peripheral blood flow were measured before, one,

and two hours after participants consumed capsule A, B, or the control (no capsule). Capsule A contained blackcurrant anthocyanin (50 mg), and capsule B contained blackcurrant anthocyanin (50 mg) and vitamin E (27 mg). No other information about the supplements is provided. Experiments using capsules A and B were separated by a four-day washout period. Participants made three visits over a minimum of six days.

When no supplement was consumed, a decrease in flow-mediated dilation (FMD) was observed one and two hours after smoking a cigarette compared to baseline in group N. With consumption of capsule A, a significant decrease in FMD was observed one hour after smoking ($P < 0.05$) but returned to baseline at two hours. With capsule B, FMD decreased significantly one and two hours ($P < 0.05$ for both) after smoking a cigarette. Within group changes for the N group were not significant for either of the interventions or the control.

Skin temperature changes were significantly higher two hours after smoking one cigarette in the S group compared to the N group in the left foot (Lt) toes ($P < 0.05$) after consumption of capsule A. No other temperature changes were significant in Lt or right foot (Rt) toes. Temperature in the right foot dorsum (Rd) significantly decreased after smoking one cigarette compared to the N group ($P < 0.05$) under no supplement conditions. With consumption of capsules A and B, temperatures of the Rd and left foot dorsum (Ld) were significantly higher in the S group compared to the N group after smoking one cigarette ($P < 0.05$ for all groups except Ld of S group which was $P < 0.01$).

The authors conclude that “oral anthocyanins and vitamin E supplementation can attenuate the transient impairment of smoking-induced acute endothelial dysfunction and peripheral blood flow in smokers.” Results of this study are consistent with previous findings that polyphenols may be beneficial in prevention of cardiovascular diseases.

The authors declare no conflict of interest.

—*Samaara Robbins*

Referenced article can be accessed at <https://www.mdpi.com/1420-3049/24/23/4295>.

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