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## Vessels and Endothelium

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### 12.2 Black Tea Dose-Dependently Improves Endothelial Function and Decreases Blood Pressure and Peripheral Arterial Stiffness in Healthy Males

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**Introduction.** Flavonoids from food may protect against cardiovascular disease. Nevertheless, data on the vascular beneficial effects are yet controversial and not univocal. A large part of the inconsistency in human intervention studies may be due to flaws in the study design and the wide range of flavonoid doses tested. Indeed, although a rationale for the used dose is often mentioned, no study has evaluated the dose-response curve to tea flavonoids.

**Aim.** To test the effects of an increasing dose of black tea on vascular function, blood pressure (BP) and insulin resistance in healthy volunteers.

**Methods.** 19 healthy males (mean age 32.8 years) were assigned in a randomized, double-blind, balanced, cross-over design, to receive either 5 treatments with a twice daily intake of black tea with increasing dose of flavonoids (0, 100, 200, 400 and 800 mg gallic acid equivalents per day) in 5 periods lasting 1 week each. Flow-mediated dilation (FMD), arterial stiffness, monitored and office BP, insulin resistance, vascular inflammation, endothelial and platelet activation were evaluated after each intervention phase.

**Results.** Black tea dose-dependently increased flow-mediated dilation (FMD) from 7.8% (control) to 9.0%, 9.1%, 9.6%, and 10.3% after the different flavonoid doses, respectively ( $p=0.0001$ ). Even 100 mg/day increased FMD compared to control ( $P=0.0113$ ), FMD improvement after 800 mg/day was significant compared to control ( $P<0.0001$ ) but also to 100 mg/day ( $P=0.0121$ ) and 200 mg/day ( $P=0.0275$ ). Black tea intake decreased office systolic (-2.6 mmHg,  $P=0.0007$ ) and diastolic (-2.2 mmHg,  $P=0.006$ ) BP as well as stiffness index ( $P=0.0159$ ) without changes in other parameters studied.

**Conclusions.** Daily ingestion of black tea (equivalent 1-6 daily cups), dose-dependently improved FMD and decreased BP and peripheral arterial stiffness in healthy volunteers. All these findings could be involved in the protective effects exerted by tea against cardiovascular disease as reported in observational studies.