VASORELAXANT EFFECT OF PROCYANIDIN B2 ON HUMAN INTERNAL MAMMARY ARTERY

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Introduction: Procyanidins are polyphenols abundantly found in plant food such as apples, grapes, nuts, cocoa, tea and red wine. Cardioprotective effect of procyanidins might be attributed, in part, to their vasorelaxant properties. The mechanism of vasorelaxation induced by procyanidin B2 is still unknown.

Aim: The aim of the present study was to investigate and characterize vasorelaxant effect of procyanidin B2 on human internal mammary artery (HIMA) as one of the mechanisms of its protective effect against vascular risk.

Material & Methods: Discarded segments of HIMA were collected from patients undergoing coronary artery bypass grafting, transported to the laboratory and studied in organ baths. The HIMA rings were pre-contracted with phenylephrine.

Results: Procyanidin B2 induced strong concentration-dependent relaxation of HIMA rings pre-contracted by phenylephrine. Pretreatment with L-NAME, a NO synthase inhibitor, hydroxocobalamin, a NO scavenger, and ODQ, an inhibitor of soluble guanylate cyclase, significantly inhibited procyanidin B2-induced relaxation of HIMA, while indomethacin, a cyclooxygenase inhibitor, considerably reduced effects of low concentrations. Among K⁺ channel blockers, iberiotoxin, a selective blocker of large conductance Ca²⁺-activated K⁺ channels (BKCa), abolished procyanidin B2-induced relaxation, glibenclamide, a selective ATP-sensitive K⁺ (KATP) channels blocker, induced partial inhibition, while 4-aminopyridine, a blocker of voltage-gated K⁺ (KV) channels, and TRAM-34, an inhibitor of intermediate-conductance Ca²⁺-activated K⁺ (IKCa) channels, slightly reduced maximal relaxation of HIMA. Further, procyanidin B2 relaxed contraction induced by phenylephrine in Ca²⁺ free Krebs solution, but had no effect on contraction induced by caffeine. Finally, thapsigargin, a sarcoplasmic reticulum Ca²⁺-ATPase inhibitor, significantly reduced relaxation of HIMA produced by procyanidin B2.

Conclusion: These results demonstrate that procyanidin B2 produces endothelium-dependent relaxation of HIMA pre-contracted by phenylephrine. This effect is primarily the result of an increased NO synthesis and secretion by endothelial cells and partially of prostacyclin, although it involves activation of BKCa and KATP, as well as KV and IKCa channels in high concentrations of procyanidin B2.