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Erythritol is a sweet antioxidant

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Abstract

Objective

Hyperglycemia, oxidative stress, and the onset and progression of diabetic complications are strongly linked. Reduction of oxidative stress could be of utmost importance in the long-term treatment of diabetic patients. The chronic nature of the disease calls for a mode of antioxidant intake that can be sustained easily, e.g., by the diet. Erythritol, a simple polyol, could be such a compound. It is orally available, well tolerated, and its chemical structure resembles that of mannitol, a well-known hydroxyl radical (HO·) scavenger.

Methods

We studied the antioxidant properties of erythritol in vitro and subsequently determined its antioxidant activity and its vasoprotective effect in the streptozotocin diabetic rat.

Results

Erythritol was shown to be an excellent HO· radical scavenger and an inhibitor of 2,2'-azobis-2-amidinopropane dihydrochloride-induced hemolysis but inert toward superoxide radicals. High-performance liquid chromatographic and electron spin resonance spectroscopy studies showed that the reaction of erythritol with hydroxyl radicals resulted in the formation of erythrose and erythrulose by abstraction of a carbon-bound hydrogen atom. In the streptozotocin diabetic rat, erythritol displayed an endothelium-protective effect and, in accordance with the in vitro experiments, erythrose was found in the urine of erythritol-consuming rats.

Conclusion

Erythritol acts as an antioxidant in vivo and may help protect against hyperglycemia-induced vascular damage.

Keywords: Erythritol, Diabetes, Oxidative stress, Rat

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