Abstract

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BACKGROUND AND AIMS: Fructose is a major dietary component directly related to vascular dysfunction and diseases such as obesity, diabetes, and hypertension. Zinc is considered a non-pharmacological alternative for treating diabetes due to its antioxidant and hyperglycemia-lowering effects in diabetic animals. Therefore, the aim of this study was to evaluate the effects of dietary zinc supplementation on the microcirculatory parameters of fructose-fed hamsters.

METHODS AND RESULTS: Male hamsters (Mesocricetus auratus) were fed drinking water substituted by 10% fructose solution for 60 days, whereas control animals were fed drinking water alone. Their microcirculatory function was evaluated using cheek pouch preparation, as well as their blood glucose and serum insulin levels. Their microcirculatory responses to acetylcholine (ACh, an endothelium-dependent vasodilator) and to sodium nitroprusside (SNP, an endothelium-independent vasodilator) as well as the increase in macromolecular permeability induced by 30 min of ischemia/reperfusion (I/R) were noted. Endothelium-dependent vasodilation was significantly increased in control animals with high zinc supplementation compared to the groups without zinc supplementation. Zinc was able to protect against plasma leakage induced by I/R in all control and fructose-fed groups, although the microvascular permeability was higher in animals fed drinking water substituted by 10% fructose solution compared to those fed filtered drinking water alone.

CONCLUSION: Our results indicate that dietary zinc supplementation can improve microvascular dysfunction by increasing endothelial-dependent dilatation and reducing the increase in macromolecular permeability induced by I/R in fructose-fed animals.

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