propionate and butyrate, has been found to improve insulin sensitivity and reduce blood pressure in clinical studies; however, the underlying mechanism remains elusive. In this study we investigated the effect of SCFAs on high glucose-induced endothelial dysfunction *in vitro*. Human pulmonary microvascular endothelial cells (HPMECs) were pre-incubated with acetate (5mM), propionate (4mM) or butyrate (4mM) for 1 hour before adding high glucose (30mM) and cultured for 24 h in the presence of SCFAs. Compared to cells cultured in the normal glucose medium (5mM), high glucose induced a significant increase ($48.5 \pm 12.6\%$; $p < 0.05$) in endothelial reactive oxygen species (ROS) production as measured by both NADPH-dependant lucigenin-chemiluminescence and DHE fluorescence. Increased ROS production was accompanied with a significant increase in cell death ($30.66 \pm 8.3\%$; $p < 0.05$) as measured by both MTT and trypan blue exclusion assays, and capillary structure breakdown of HPMEC cultured on the metrigels. We then examined the effects of SCFAs on endothelial ROS production, and found that SCFAs slightly increased the levels of ROS production in HPMEC cultured in 5mM glucose medium. However, in the presence of high glucose, SCFAs significantly inhibited high glucose-induced ROS production, reduced cell death and preserved capillary structure on the metrigels. In conclusion, SCFAs inhibit high glucose-mediated endothelial oxidative stress and improve endothelial cell function. SCFAs may represent an effective therapeutic strategy as a food supplement for cardiovascular complications linked to hyperglycaemia and diabetes.

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THE EFFECTS OF SHORT CHAIN FATTY ACIDS ON HIGH LEVELS OF GLUCOSE-INDUCED ENDOTHELIAL OXIDATIVE STRESS

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Hyperglycaemia is a hallmark of type 2 diabetes and plays a prominent role in oxidative stress-induced endothelial cell dysfunction and the development of cardiovascular diseases. Recently, a diet enriched with short-chain fatty acids (SCFAs) i.e. acetate,