Apocynin Treatment Reduces High-fat Diet-induced Obesity and Hypertension but Has No Significant Effect on Hyperglycaemia

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Dietary obesity is associated with insulin resistance and cardiovascular oxidative stress. Apocynin has traditionally been regarded as an inhibitor of NADPH oxidase but recently it was reported to be predominately an antioxidant in the vascular system. In this study we examined the anti-oxidative stress effect of apocynin on high-fat diet (HFD)-induced metabolic disorders and endothelium dysfunction. Mice (C57BL/6J at 6-7 month of age, n=7 per group) were fed with HFD (44% fat) or normal chow diet (12% fat) for 15 weeks. The treatment group was supplied with apocynin (5 mM) dissolved in drinking water and control group was supplied with vehicle. Compared to chow diet, HFD significantly increased the body weight (~35%), the systolic blood pressure (BP, 13%) and the levels of fasting blood glucose (46%). Apocynin treatment significantly attenuated the HFD-induced overweight (44.1±2.96 vs 37.5±2.43 g) and the high BP (136.7±7.9 vs 118.4±5.3 mmHg), but had no significant effect on blood glucose levels (8.74±1.62 vs 8.13±1.68 mM). Compared to chow diet, HFD significantly impaired the endothelium-dependent vessel relaxation to acetylcholine as examined by an organ bath, and this was reversed back to control levels by adding tiron which is a cell membrane permeable superoxide scavenger. Apocynin treatment preserved endothelium-dependent vessel relaxation to acetylcholine in HFD group. In conclusion, antioxidant treatment with apocynin attenuated the HFD-induced increases in body weight; blood pressure and preserved the endothelium function. However, apocynin had no effect on HFD-induced increase in fasting blood glucose levels.