

Glucose infusion ameliorates restraint stress-induced elevation of plasma adrenaline level and impairment of cardiac function in rats

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Stress-triggered sympathetic activation increases plasma catecholamine levels, resulting in elevations in blood pressure and heart rate. In addition, facilitated secretion of adrenaline and pancreatic glucagon associated with sympathetic activation increase blood glucose level. We previously reported that corticotropin-releasing factor and acute restraint stress elevates plasma catecholamine levels and that prostanoids in the brain, especially in the paraventricular hypothalamic nucleus (PVN), mediates these responses. Therefore, there is a high possibility that brain prostanoids are involved with stress-related changes in glucose dynamics. In this study, we examined effects of glucose infusion on plasma catecholamine levels and brain prostanoid levels under restraint stress in rats. Glucose solution infused intravenously and intracerebroventricularly effectively suppressed stress-induced elevation of plasma adrenaline level. In addition, we found that stress exposure increased thromboxane B₂ in PVN dialysates, and that the increase in thromboxane B₂ level was suppressed by glucose infusion. Furthermore, glucose infusion improved stress-triggered cardiac dysfunction. Our results suggest that glucose infusion can ameliorate stress-induced sympathetic activation and cardiac dysfunction, and that prostanoids in the PVN are involved with this mechanism.