

A ROLE FOR INSULIN IN THE CENTRAL CONTROL OF SYMPATHETIC NERVE
ACTIVITY IN HUMANS

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ABSTRACT

Although well recognized for the regulation of peripheral metabolism, an emerging body of literature has begun to also establish a role for insulin in neural-cardiovascular control. In this regard, direct administration of insulin into the brain of experimental animals, or acute elevations in plasma insulin in healthy humans, result in robust increases in sympathetic nerve activity. In addition to evoking increases in central sympathetic outflow, recent work in rats has reported a modulatory role for insulin in the regulation of arterial baroreflex control of sympathetic nerve activity. The experiments within this dissertation were designed to further the understanding of insulin's role in modulating central sympathetic outflow in humans. The data presented demonstrate that an enhancement in insulin sensitivity increases insulin-mediated sympatho-excitation. Furthermore, we provide evidence for the first time that insulin increases the gain (i.e. sensitivity) of arterial baroreflex control of sympathetic nerve activity in healthy humans. Lastly, results are also presented in which we have begun to translate this area of research to a condition of chronic insulin resistance; type II diabetes mellitus. Collectively, the findings further our understanding of insulin in neural-cardiovascular control by demonstrating a clear role for insulin in the regulation of central sympathetic outflow in humans.