

NEURONS PROJECTING TO THE PARAVENTRICULAR NUCLEUS ARE ACTIVATED AND
CONTRIBUTE TO CARDIORESPIRATORY RESPONSES DURING ACUTE HYPOXIA

T Luise King

Dr. Eileen M. Hasser, Dissertation Supervisor

ABSTRACT

Activation of peripheral and central chemoreceptors contributes to homeostatic responses that maintain optimal blood gas levels, including oxygen and carbon dioxide. Brainstem neurons in the nTS and CVLM integrate and modulate chemosensory information and participate in control of cardiorespiratory function. These neurons have wide projections, including to the PVN. The PVN has the ability to play a role in all facets of in cardiorespiratory and neuroendocrine responses to hypoxia. We therefore asked the overall question of how the PVN receives chemoreceptor information and what the functional significance of these projections are. In **Study 1 and 2**, we found that PVN-projecting neurons are activated by hypoxia and a large percentage of them are catecholaminergic (approximately 73% of PVN-projecting nTS and 89% of PVN-projecting CVLM neurons activated by hypoxia are catecholaminergic). In **Study 3**, we evaluated the functional significance of these two pathways to peripheral and central chemoreflex function. We found that lesion of PVN-projecting catecholaminergic cells significantly attenuated ventilatory responses to hypoxia and hypercapnia. Data indicate that catecholamine neurons projecting to the PVN are critical for both peripheral and central chemoreflex respiratory responses.