



## View abstract data

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Abstract title	Modeling interactions of respiratory CPG with autonomic nervous system
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### Abstract text

Sympathetic nerve activity (SNA) normally exhibits respiratory modulation that suggests the existence of central interactions between the respiratory and sympathetic networks within the brainstem. Hypertension elicited by chronic intermittent hypoxia (CIH) is associated with elevated SNA that displays an enhanced respiratory modulation reflecting a strengthened interaction between the networks. We have developed a computational model of interacting respiratory and sympathetic circuits to investigate the possible mechanisms of sympatho-respiratory interactions and their role in the baroreceptor reflex control of sympathetic activity and in the elevated sympathetic activity following CIH.

We speculate that baroreceptor activation during expiration results in its prolongation via transient activation of post-inspiratory and inhibition of augmenting expiratory neurons of the Bötzinger Complex (BötC). We propose that these BötC neurones are also involved in the respiratory modulation of SNA, and contribute to the respiratory modulation of the sympathetic baroreceptor reflex.

Under hypercapnia expiration becomes active through phasic excitation of abdominal motor nerves (AbN) in late expiration. In rats exposed to CIH, such AbN discharges emerge in normocapnia suggesting that CIH conditioning increases the CO<sub>2</sub> sensitivity of central chemoreceptors. We have confirmed experimentally that CIH conditioned rats under normocapnia exhibit synchronized discharges in AbN and tSN similar to those observed in control rats during hypercapnia. Moreover, the hypocapnic threshold for apnea was significantly lowered in CIH-conditioned rats relative to that in control rats. We conclude that CIH may sensitize central chemoreception and that this significantly contributes to the neural impetus for generation of sympathetic activity and hypertension.

Name of preferred the Session: 5 Cardio-respiratory coupling  
(for keynote speakers only)