

**Respiratory-Sympathetic Interactions and Central Baroreflex Pathways: Insights from Computational Modeling**

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The sympathetic nerve activity (SNA) is modulated by respiratory activity which indicates the existence of direct interactions between the respiratory and sympathetic networks within the brainstem. Our experimental studies reveal the respiratory phase- and pontine-dependent effects of baroreceptor stimulation on both the respiratory pattern and the respiratory modulation of SNA. This suggests that the sympathetic baroreceptor reflex has two central pathways: one is independent of the respiratory-sympathetic interactions, and the other operates via the respiratory pattern generator and is dependent on the respiratory modulation of SNA. Our experimental studies in the perfused in situ rat preparation and complementary computational modeling studies support the hypothesis that baroreceptor activation during expiration prolongs the expiratory phase via activation of the post-inspiratory neurons of the Bötzinger Complex. Further, these neurons are critically involved in the respiratory modulation of SNA and mediate an additional central pathway of the sympathetic baroreceptor reflex. Supported by: NIH (R01 NS057815, R33 HL087379, R01 NS069220).