Abstract: Breathing is tightly coordinated with other behaviors such as vocalization, swallowing, and coughing. These behaviors occur after inspiration, during a respiratory phase termed postinspiration. Failure to coordinate postinspiration with inspiration leads to aspiration pneumonia, the leading cause of death in Alzheimer’s and Parkinson’s disease. This talk will describe an excitatory network that generates postinspiratory activity. We refer to this novel network as the postinspiratory complex (PiCo). PiCo has autonomous rhythm generating properties and distinct responses to neuromodulators when compared with other excitatory brainstem networks. Based on our discovery we propose that each of the three phases of breathing is generated by a distinct excitatory CPG: The preBötzinger complex, which has been linked to inspiration (Smith et al. 1991), PiCo for the control of postinspiration (Anderson et al. 2016), and the Lateral parafacial region ((pFL) Huckstepp et al. 2016), which has been associated with active expiration, a respiratory phase recruited during high metabolic demand. This finding for the respiratory network is consistent with the more general concept that rhythmic behaviors are generated by coupled oscillators.