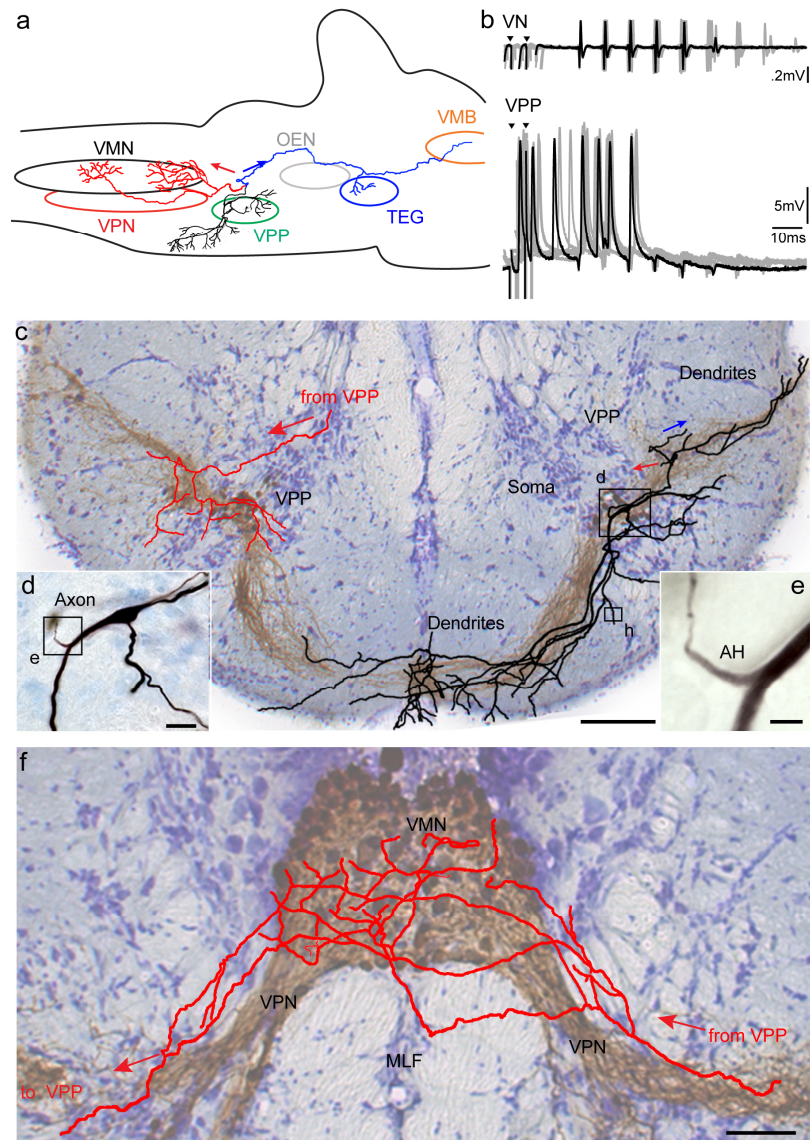
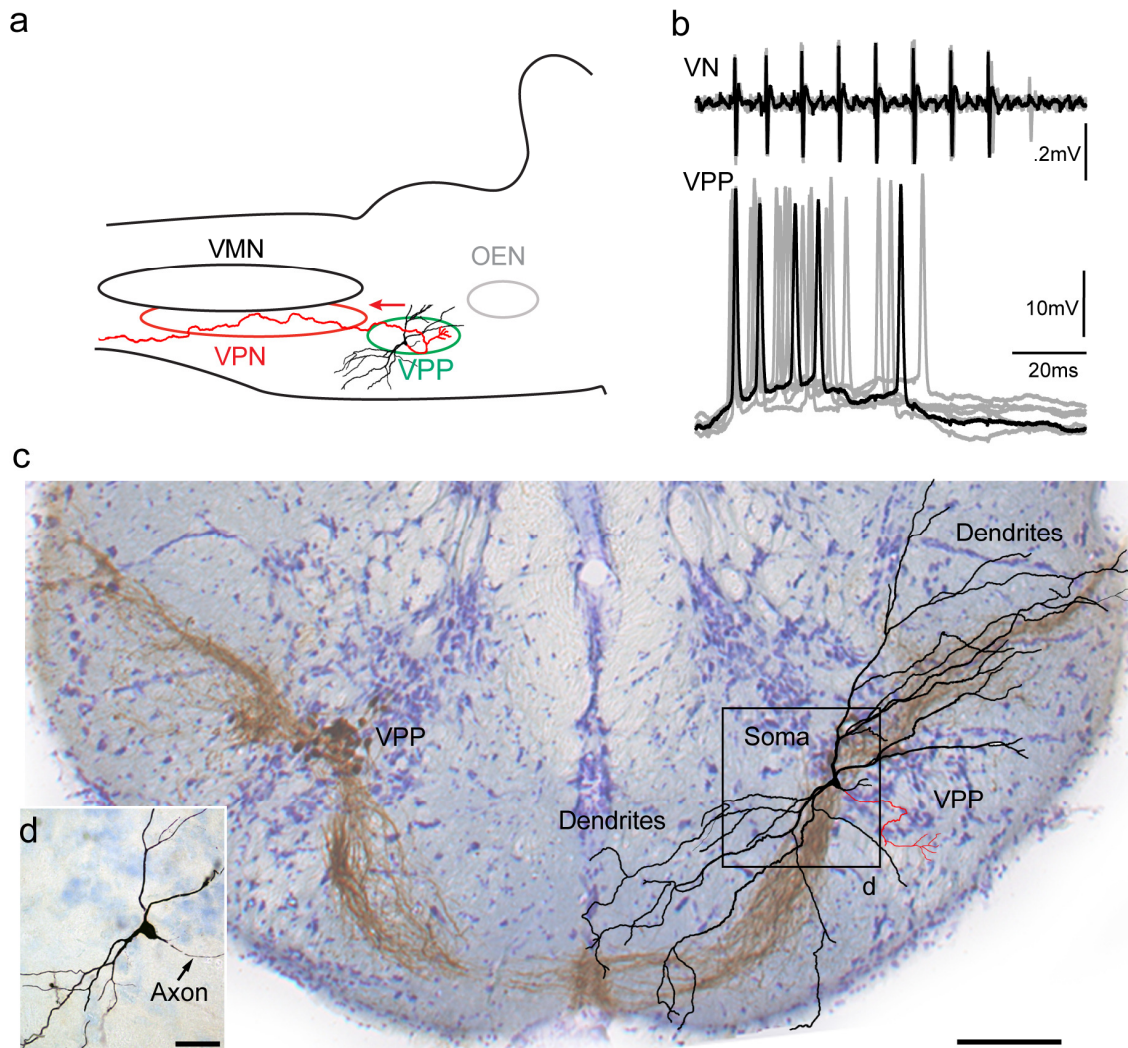


Supplementary Figure S1 Vocal pacemaker neuron physiology and morphology. **(a)** Midbrain evoked vocal nerve (VN) (top) and intracellularly recorded vocal pacemaker neuron (VPN, bottom) responses superimposed with one highlighted trace (black). Traces aligned to the first VN potential. **(b)** Sagittal Line drawing of somato-dendritic region (black) and axon (red) of reconstructed neurobiotin-filled neuron. **(c)** Photomicrograph of reconstructed neuron in **b** showing soma and primary dendrites, **(d)** axon terminals (arrows) in contralateral VPN and **(e)** axon hillock (AH) emerging from primary dendrite (Den; see box in **c**). Scale bars represent 30 μm in **(c)**, 10 μm in **(d)** and 5 μm in **(e)**. **(f)** Action potential evoked (red) during subthreshold activation does not lead to a sustained oscillation. Subthreshold EPSP alone also shown (blue). **(g)** Midbrain evoked sustained oscillations in the same neuron as **f** with (red) and without (black) current injection. Bottom traces in **f** and **g** indicate square pulse used to evoke action potential.



Supplementary Figure S2 Vocal prepacemaker neuron morphology. **(a)** Sagittal hindbrain view of reconstructed vocal prepacemaker neuron indicating location of somato-dendritic region (black) and axon with rostral (blue) and caudal (red) branches. Abbreviations: OEN, octavolateralis efferent nucleus; VMB, vocal midbrain (orange); TEG, auditory-recipient tegmental nucleus (blue); VMN, vocal motor nucleus (black); VPN, vocal pacemaker nucleus (red); VPP, vocal prepacemaker nucleus (green). **(b)** Electrically evoked vocal nerve (VN, top) and intracellular VPP records (bottom) superimposed with one record highlighted (black). **(c)** Camera lucida drawing of VPP neuron in transverse plane showing somato-dendritic region (black) and axonal branching in contralateral VPP (red). For ease of visibility, drawing superimposed on background image of transneuronally labeled VPP nuclei (brown, biocytin label; cresyl violet counterstain). **(d)** Photomicrograph of same neuron's soma and axon and **(e)** axon hillock (AH). **(f)** Camera lucida drawing of caudal axonal branch of neuron in **(c)** that terminates bilaterally throughout VPN – VMN region and then projects to contralateral VPP (indicated in **(c)**). Superimposed on image of transneuronally labeled VMN and VPN neurons. Abbreviation: MLF, medial longitudinal fasciculi. Scale bars represent 100 μm in **(c, f)**, 25 μm in **(d)**, 5 μm in **(e)**.



Supplementary Figure S3 Vocal prepacemaker neuron morphology. **(a)** Line drawing of reconstructed vocal prepacemaker soma and dendrites (black), and axon (red) in sagittal view. Abbreviations: OEN, octavolateralis efferent nucleus (grey); VMN, vocal motor nucleus (black); VPN, vocal pacemaker nucleus (red); VPP, vocal prepacemaker nucleus (green). **(b)** Vocal nerve (VN) (top, electrically evoked) and intracellular VPP (bottom) recordings of reconstructed neuron superimposed with one record highlighted in black. **(c)** Camera lucida drawing of somato-dendritic region (black) and axon (red) of reconstructed neuron in **(a)**. Drawing superimposed on background image of transneuronal labeling of VPP nuclei (brown, biocytin label; cresyl violet counterstain). **(d)** Photomicrograph of neuron's soma, primary dendrites and axon (box in **c**). Scale bars represent 100 μm in **(c)** and 50 μm in **(d)**.