The Singer and the PreBötzinger Complex

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Hypoglossal Breathing
PreBötzinger Complex: Rhythm Generator

Eupnea
“normal breath”

Sighs
“augmented breath”

Gasps
during hypoxia
Deficiencies in the center of breathing can give rise to...

- SIDS
- Sleep Apnea
The lab hypothesized that...

In sleep apnea cholinergic neuromodulation can lead to a loss of synchronization between PreBötC and XII

Obstruction of airway

Brief Episodes of Hypoxia
Cholinergic Neurons

- Produce acetylcholine as their neuromodulator
- In REM sleep cholinergic drive is high
Stimulation and inhibition of respiratory rhythms in optogenetic mice

PreBötc  | XII  | Laser  
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10 seconds

AI27 channelrhodopsin

AI35 halorhodopsin
AIH: Acute Intermittent Hypoxia

Close-up during hypoxia

- PreBötC
- XII
- $O_2$ Trace
Findings up to this point…

Stimulating cholinergic neurons in the VRG following the AIH protocol can promote instability in breathing rhythms.
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