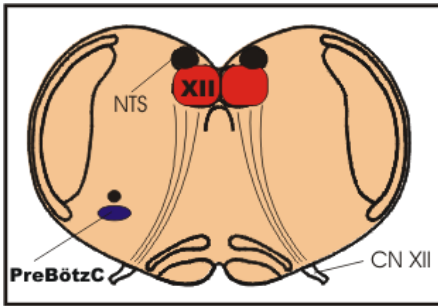




The Singer and the PreBötzing Complex

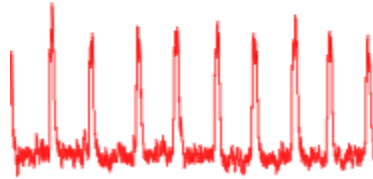
Maggie Khuu
Summer Neuroscience Program
August 25th, 2011



PreBötC



XII



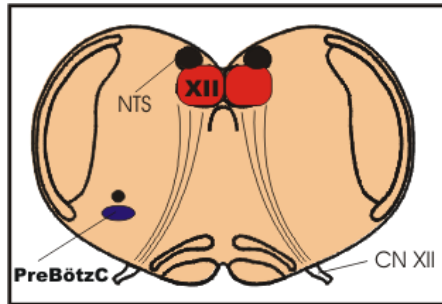
Hypoglossal

Breathing

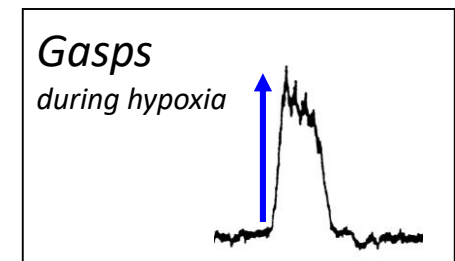
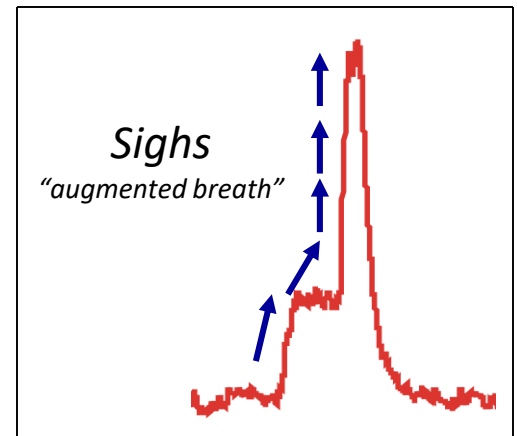
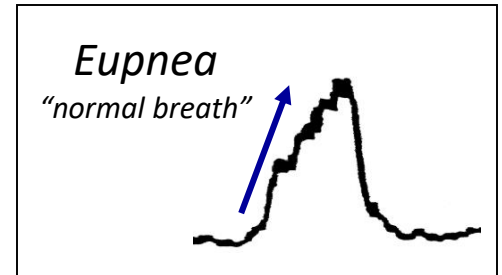
PreBötC



PreBötzing Complex: Rhythm Generator

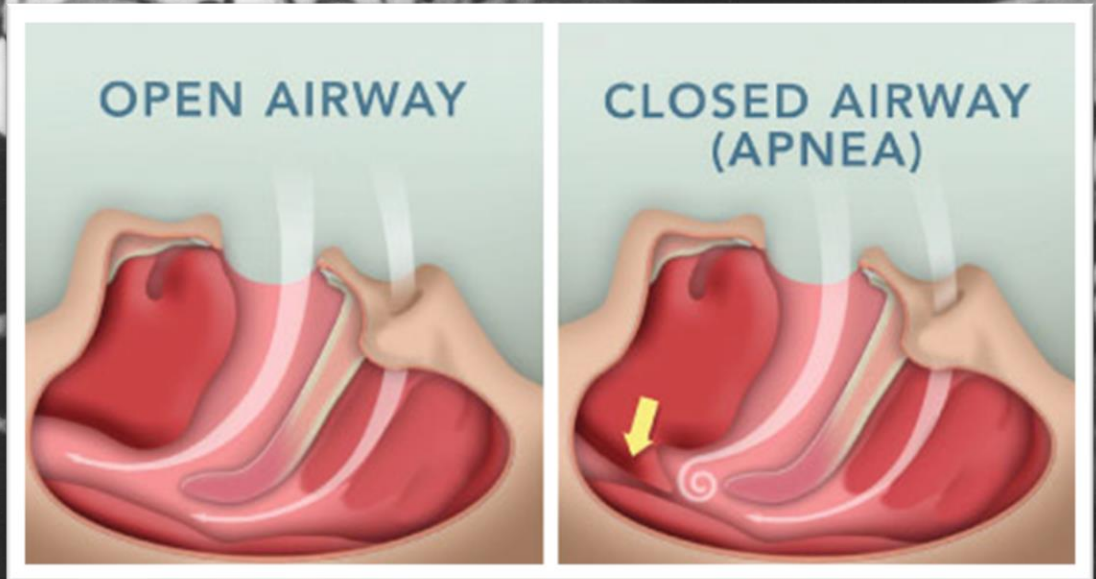


pre-Bötzing
complex



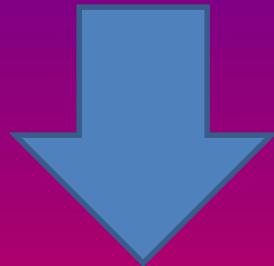
Deficiencies in the center of breathing can give rise to...

- 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

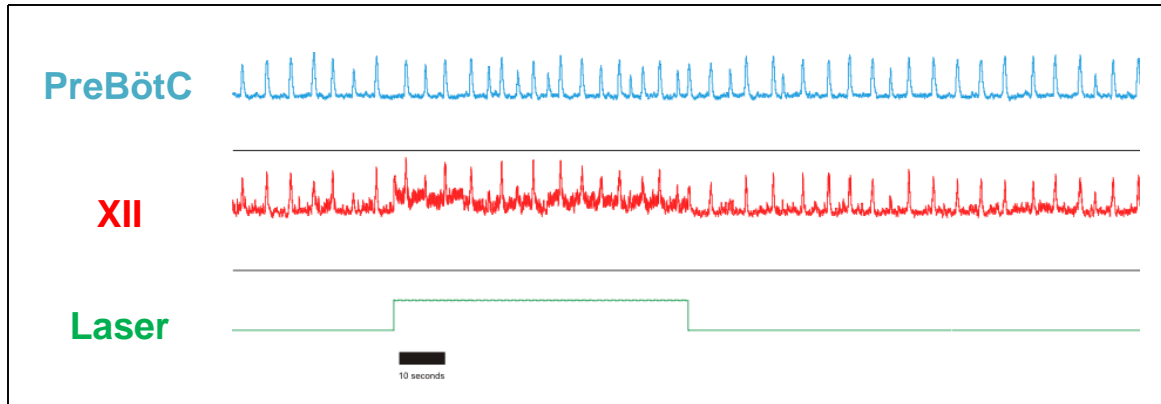


Brief Episodes of Hypoxia

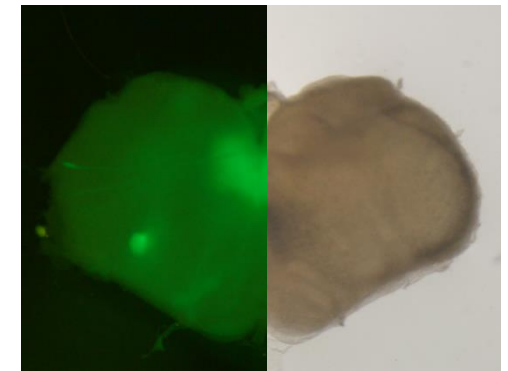
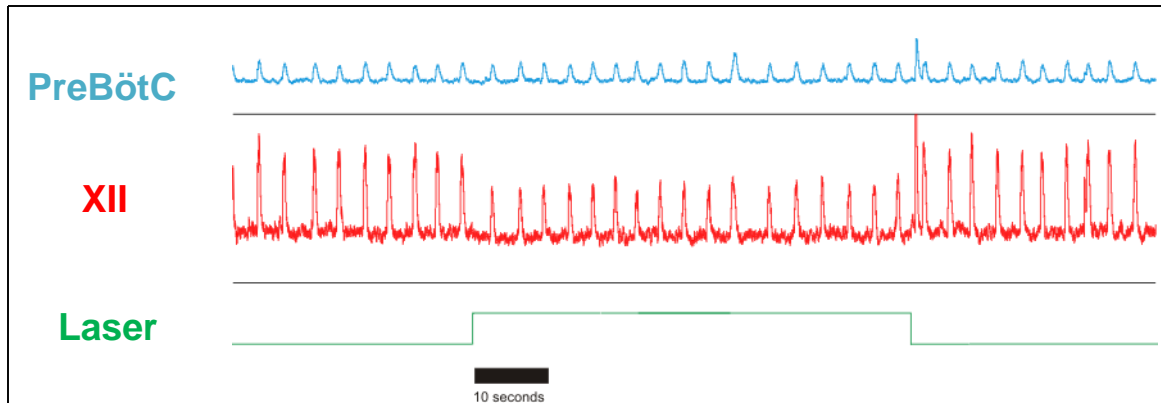
Cholinergic Neurons

- Produce acetylcholine as their neuromodulator
 - In REM sleep cholinergic drive is high

Stimulation and inhibition of respiratory rhythms in optogenetic mice

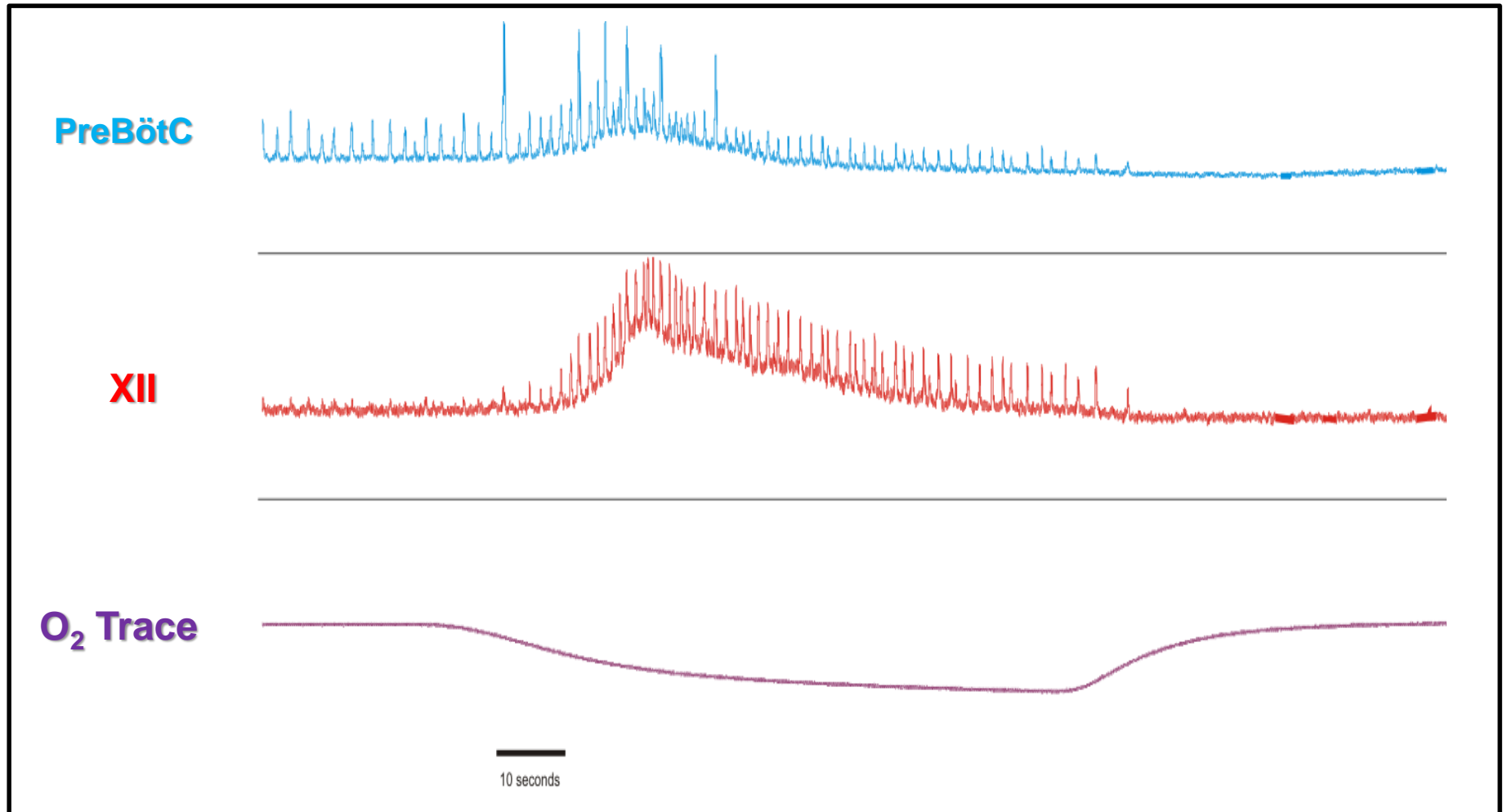


**AI27
channelrhodopsin**



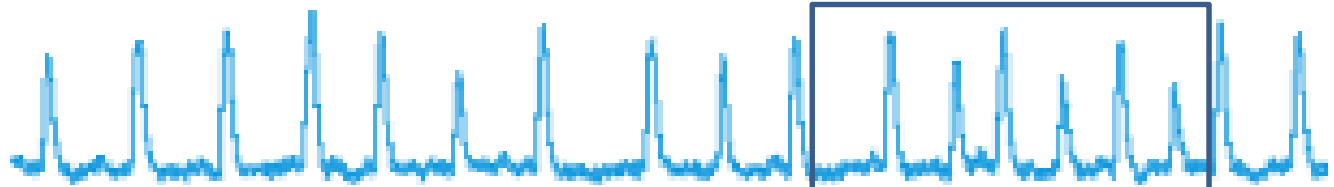
AI35 halorhodopsin

AIH: Acute Intermittent Hypoxia

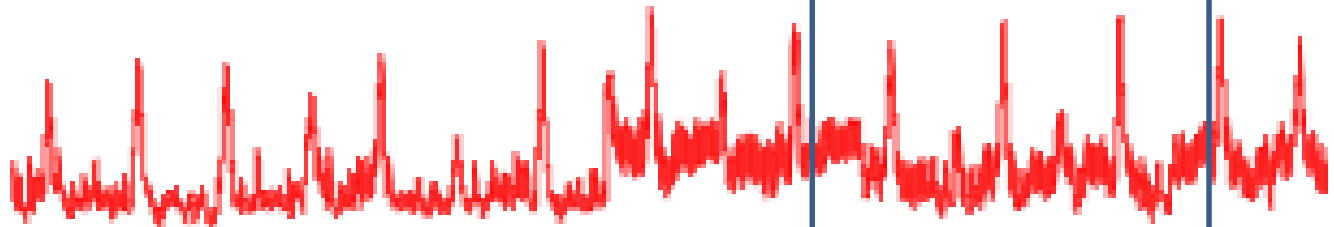


Close-up during hypoxia

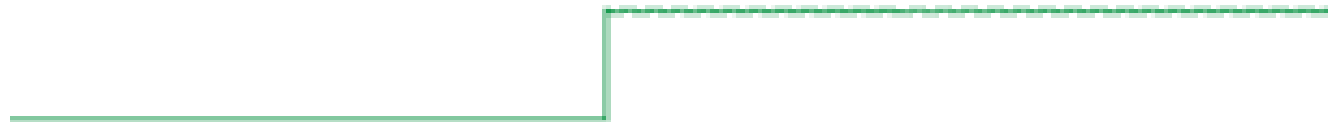
PreBötC



XII



Laser



10 seconds

Acknowledgements

- **Summer Neuroscience Program 2011**
- **CHRI: Center of Integrative Brain Research**
 - **Ramirez Lab**
 - Nino Ramirez
 - Henner Koch
 - Atsushi Doi
 - Tatiana Malashenko
 - Frank Elsen
 - Special thanks to Alfredo Garcia
 - Suk-Lin and Alena

