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Neonatal Respiratory Rhythms and Prematurity

THE LINK BETWEEN PRETERM BIRTH AND RESPIRATION ISSUES IN INFANTS

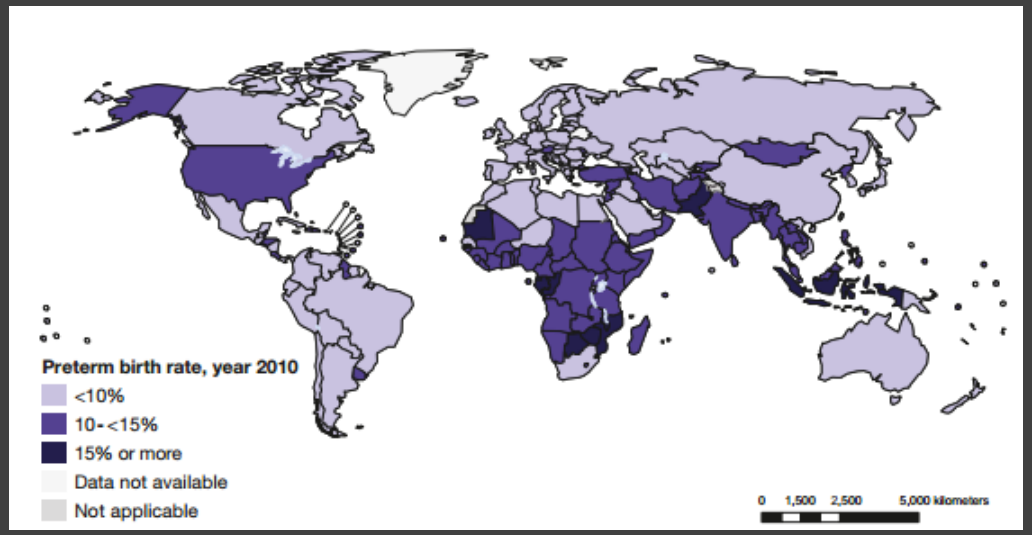
Why Study Prematurity?

15 million babies born prematurely per year

90% of premature babies die within days of birth in low-income countries

Issues surrounding ventilation of premature infants

- Costly and lack of availability
- Leads to future respiration issues

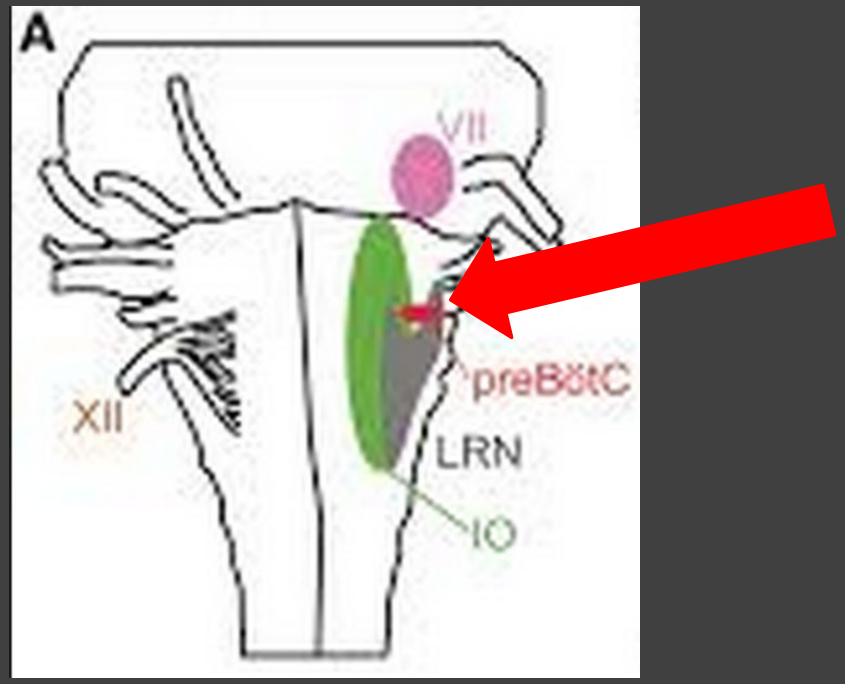


The Ramirez Lab

Hypothesis involving the central nervous system—pre-Bötzinger Complex

Mouse models of prematurity

- Lipopolysaccharide (LPS)
- Control
- C-Section



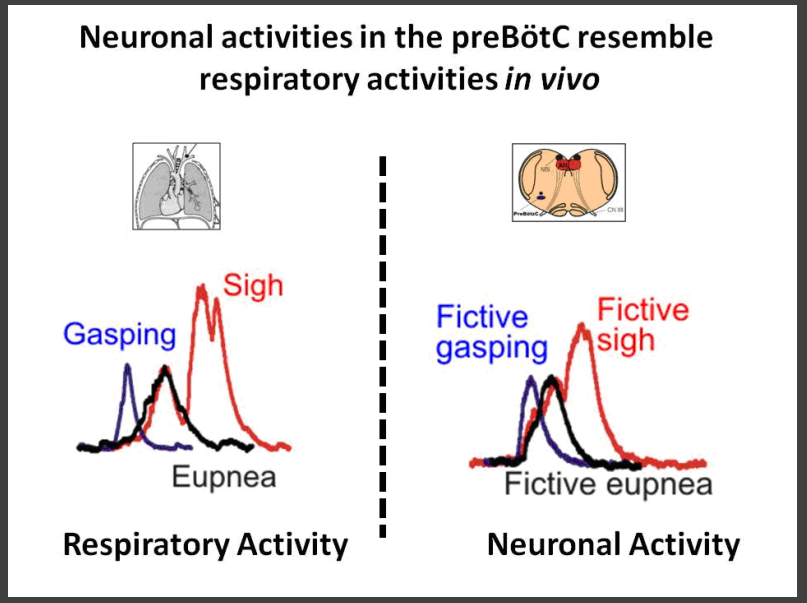
In vivo vs. *In vitro*

Translating breathing into neural firing from respiratory centers

- Slicing and electrophysiology

Analyzing different types of breathing with plethysmography

- Eupneas, sighs, and gasps



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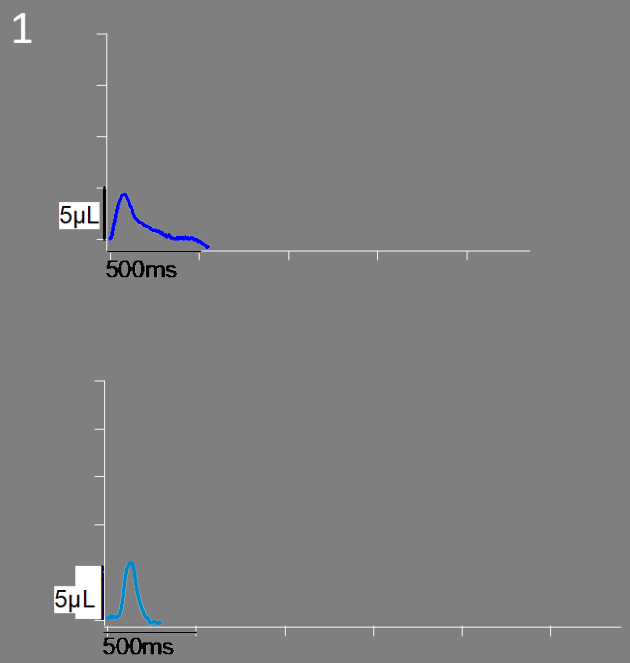

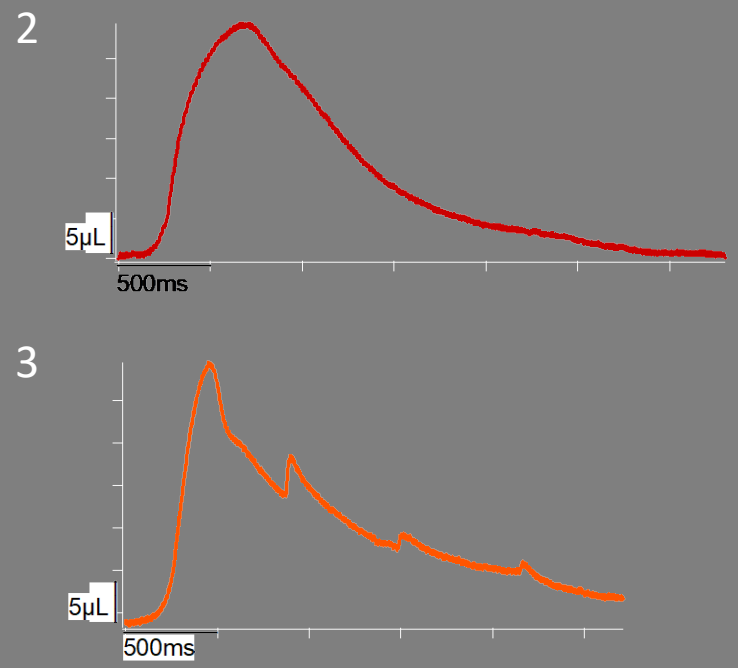

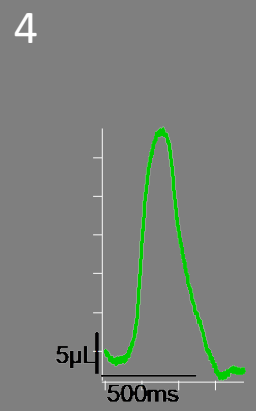

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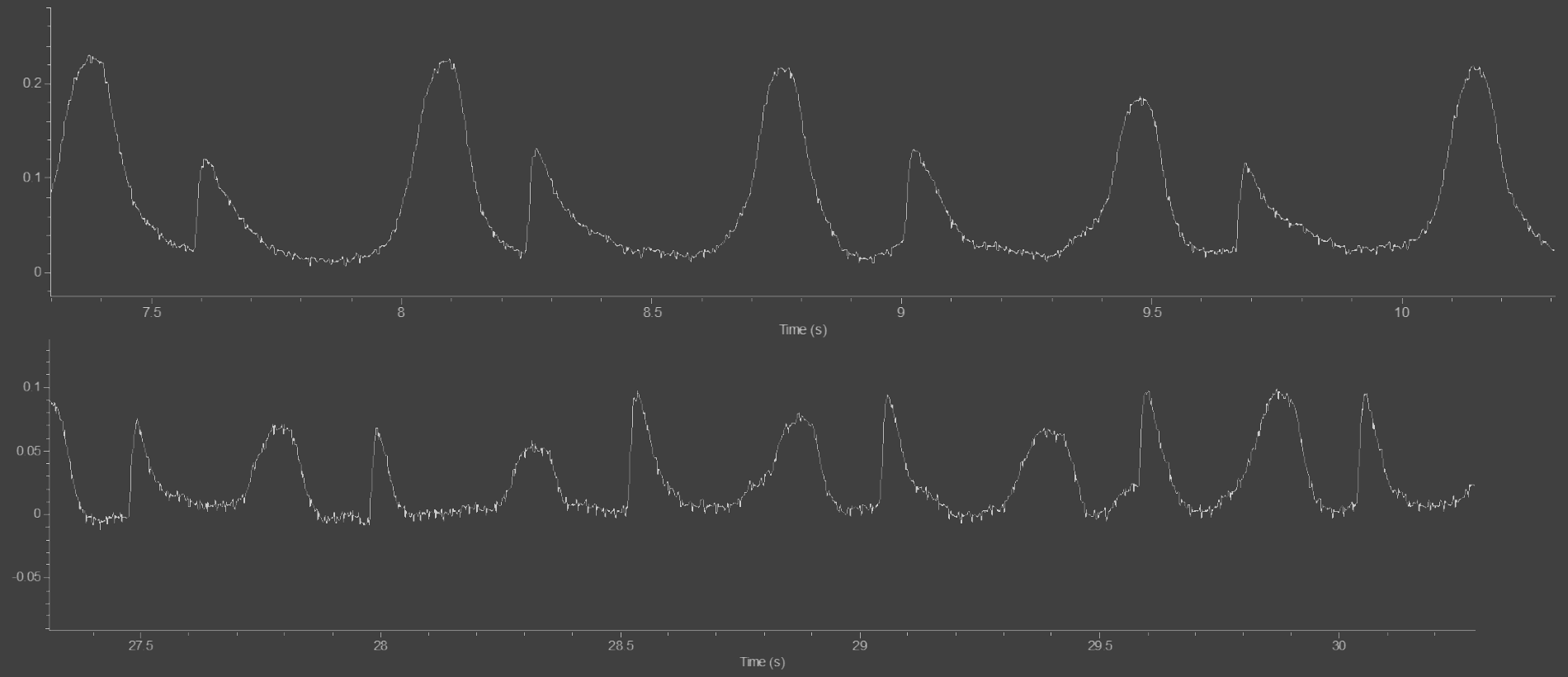
Types of Respiration in a Mouse Model

1. Eupneas
2. Large breaths
3. Saw Breaths
4. Gasps

Control Breathing (Term Birth)



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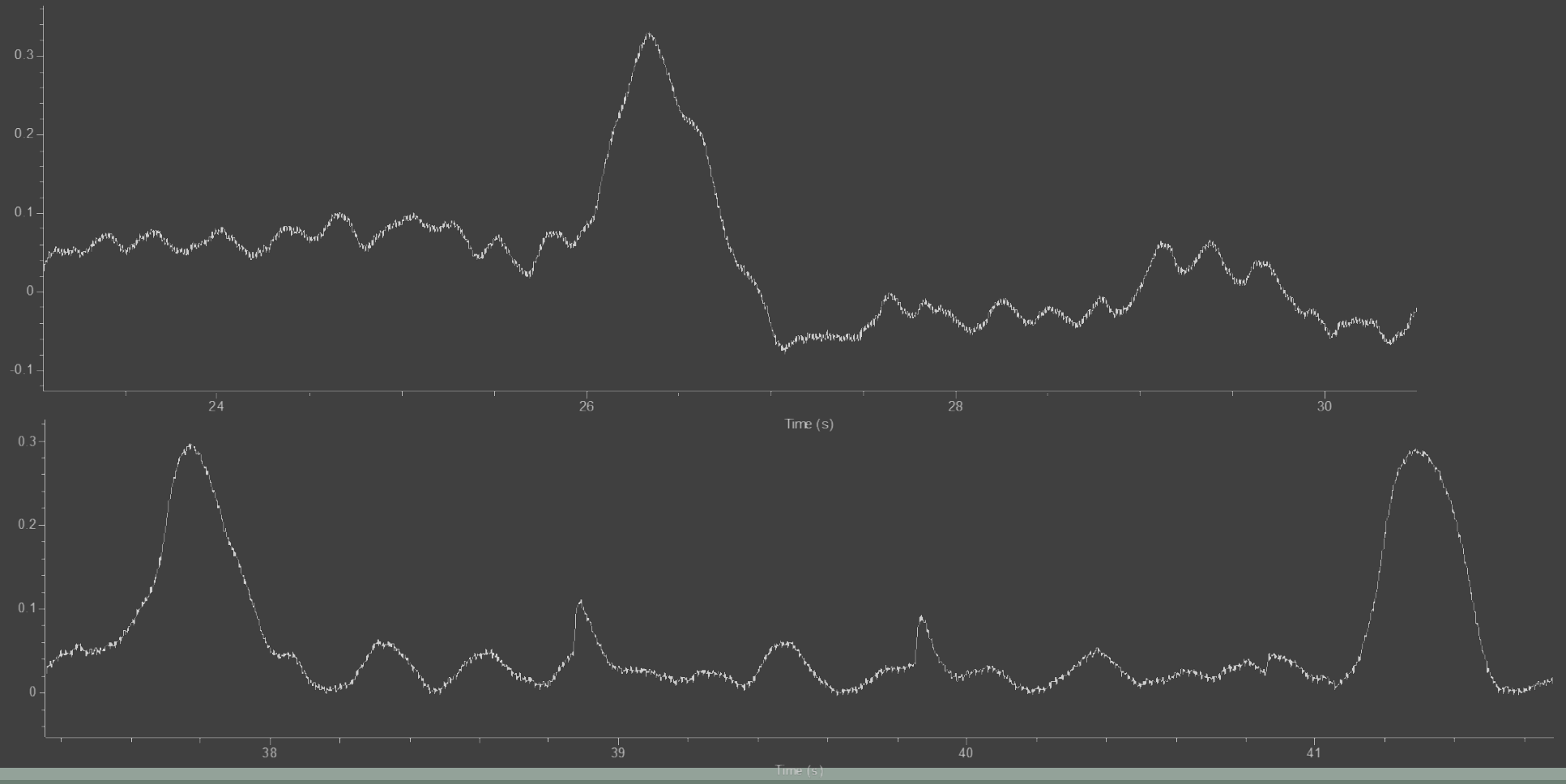
LPS Breathing (Preterm Birth)



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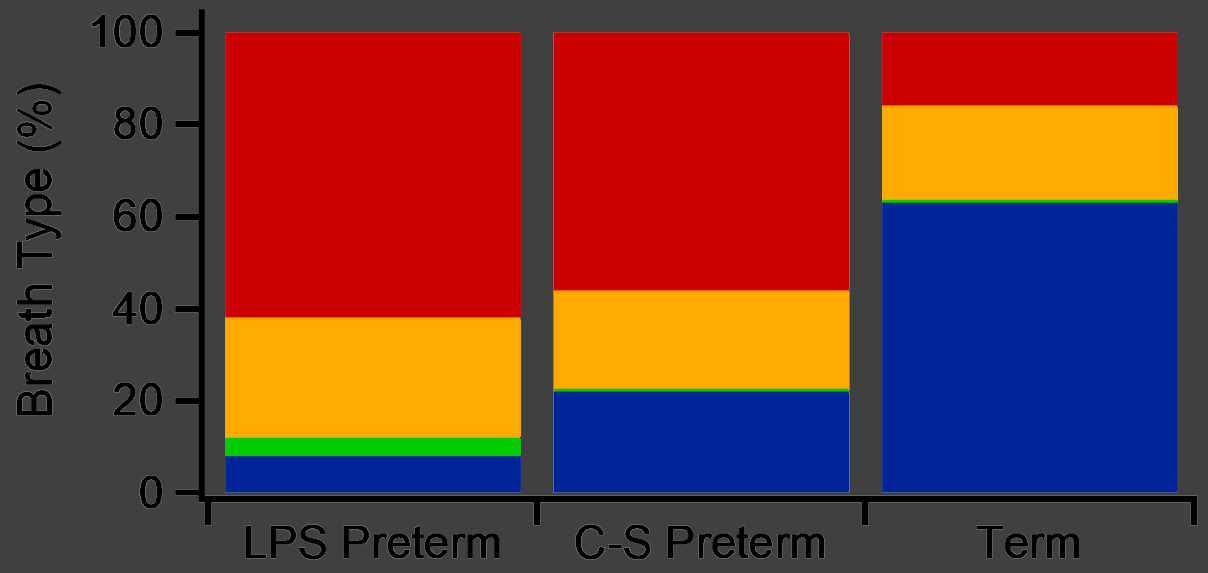
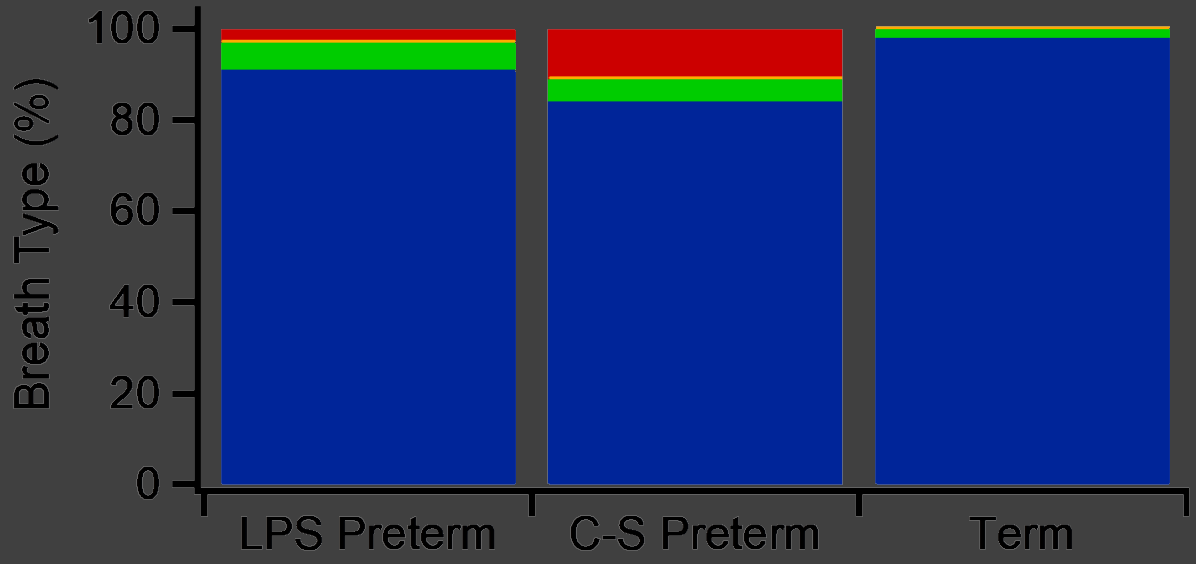
Control vs. LPS Transitions (10 vs 60 m)





Large Saw Gasp Eupnea

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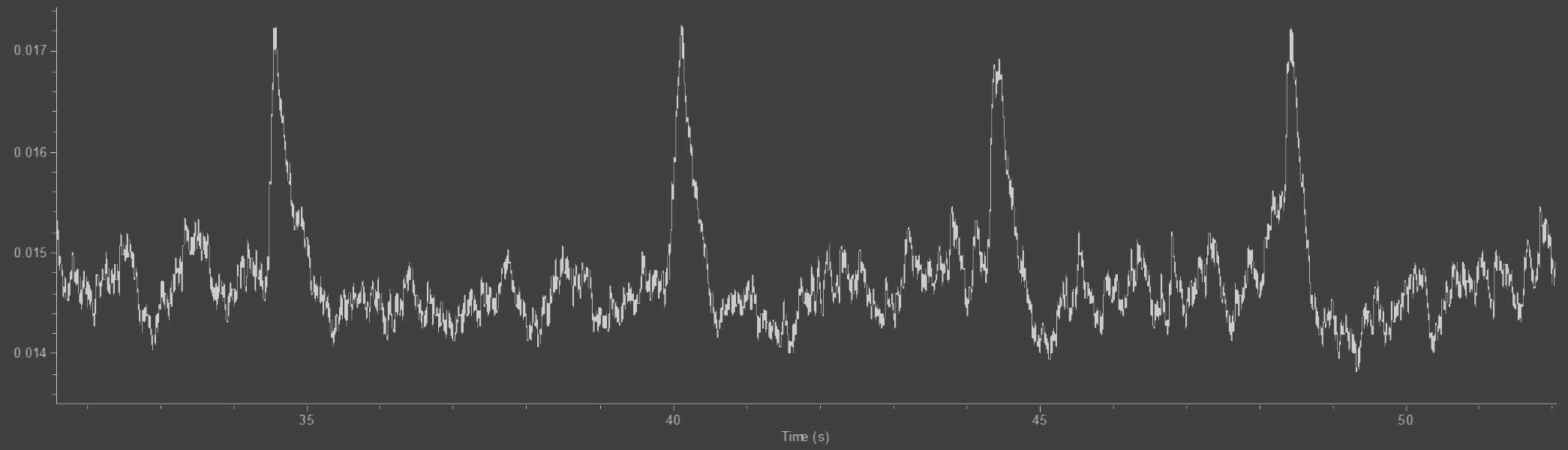
in vitro preBötC Rhythm: Control (include area)



Burst area: 0.788836642

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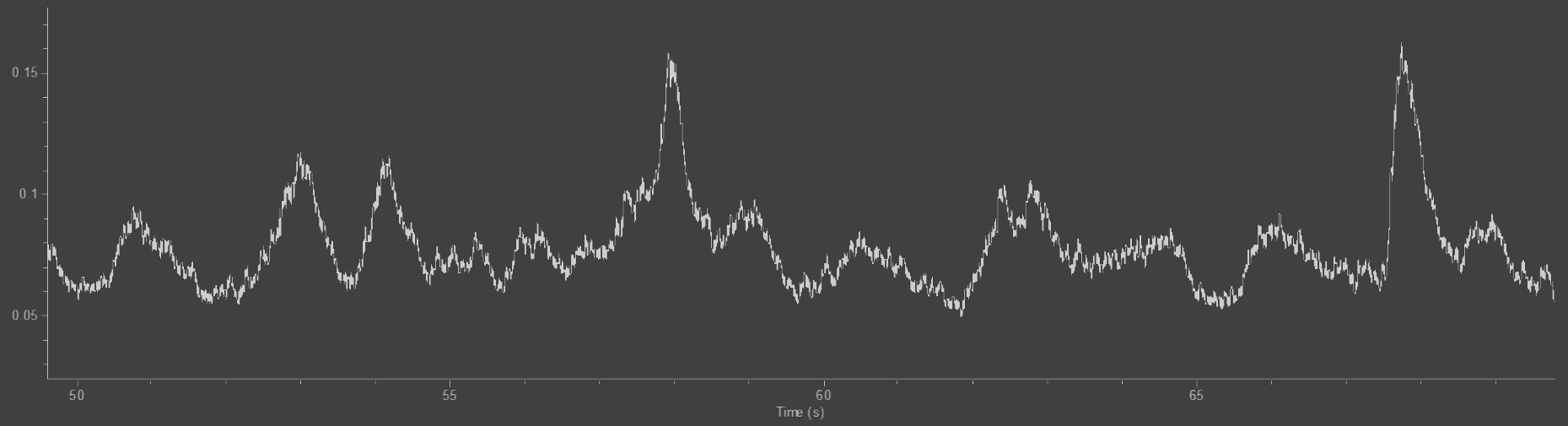
in vitro preBötC Rhythm: LPS



Burst area: 38.0366854

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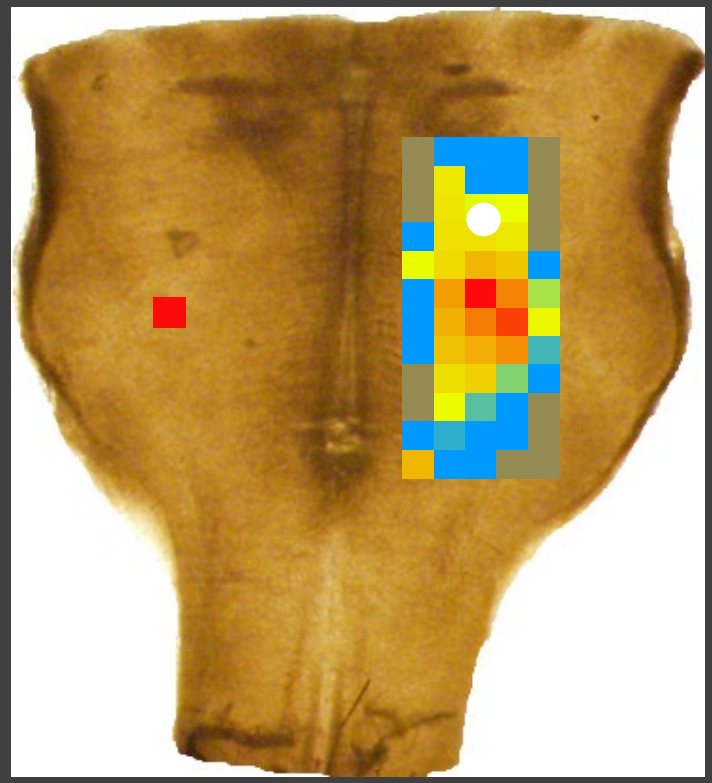
The Next Step

A newer hypothesis introducing the post-inspiratory complex (PIC)

New slicing and recording approaches

Drug manipulation and responses from each center

- Ex. morphine



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Thank you!

Dr. Ellenbogen

Mrs. Ellenbogen

Dr. Nino Ramirez

Sanja Ramirez

Christina Buckman

Jim Pridgeon