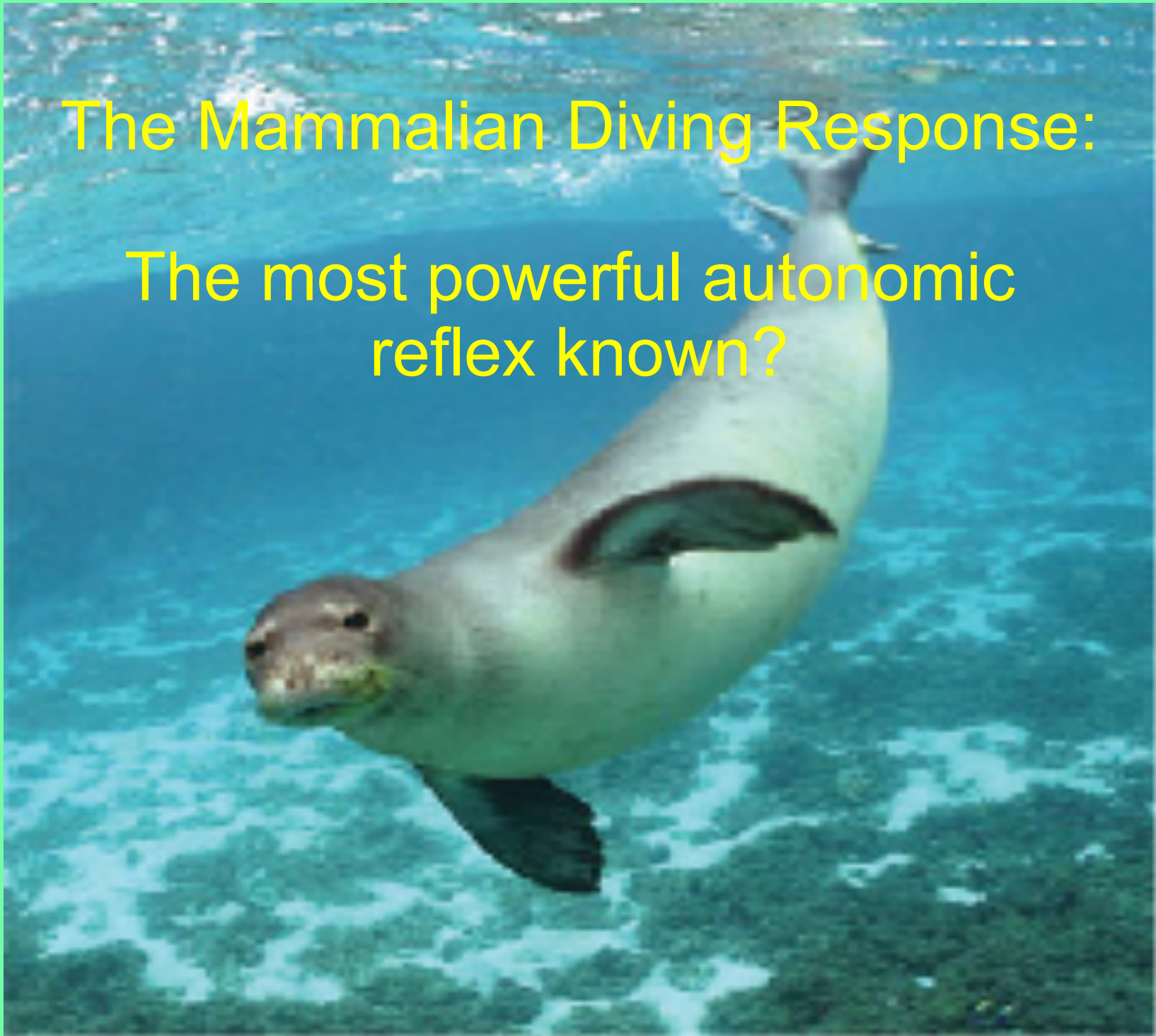


# The Mammalian Diving Response:

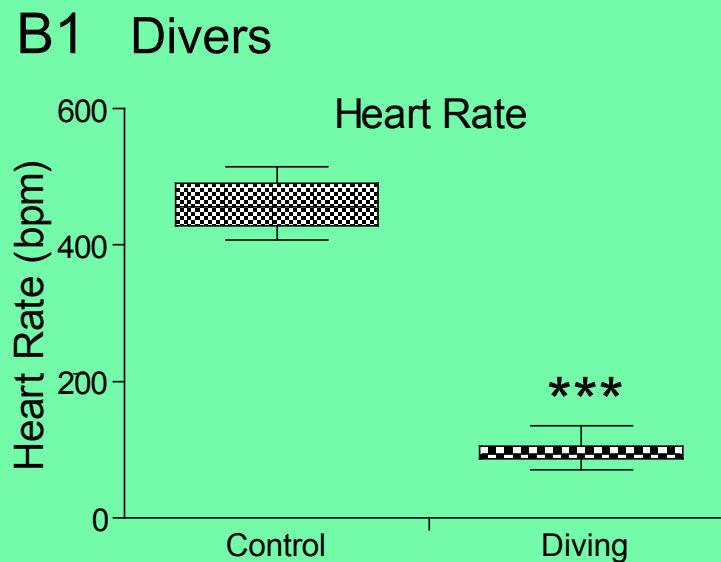
The most powerful autonomic reflex known?





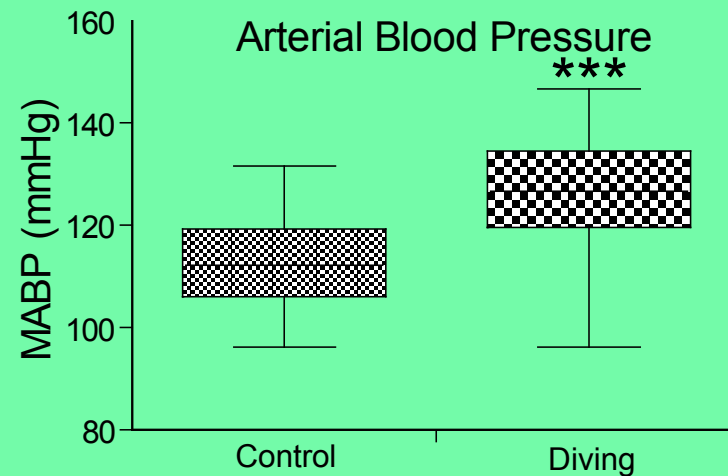
The Diving Response is the compilation of 3 individual reflexes modulating heart rate, arterial blood pressure and respiration

- A massive **BRADYCARDIA**
  - trained rats show a drop in heart rate of ~80%



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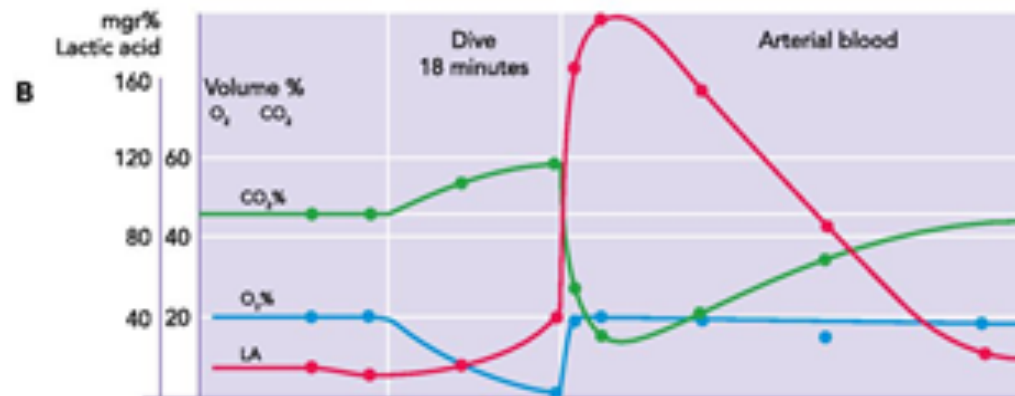
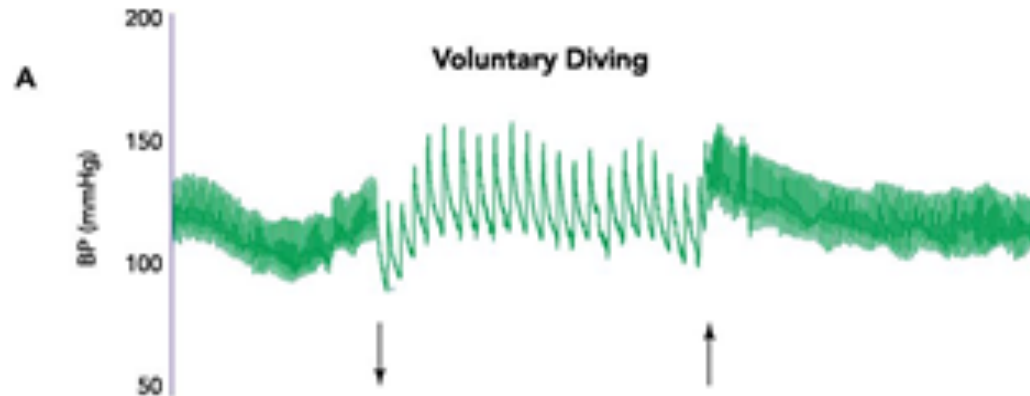
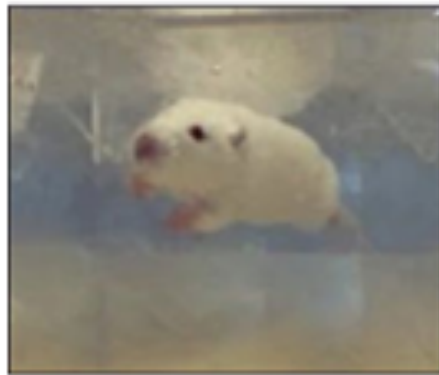


The Diving Response is the compilation of 3 individual reflexes modulating heart rate, arterial blood pressure and respiration. Underwater submersion induces a:

- A massive **BRADYCARDIA**
  - trained rats show a drop in heart rate of ~80%
- A selected peripheral **VASOCONSTRICTION**
  - only arteries to the two most important organs, the heart and brain, maintain perfusion
- An **APNEA**
  - the animal cannot breathe or it will drown
  - CAN YOU HOLD YOUR BREATH UNTIL YOU DIE?

# Apparently yes! But only if the DR is activated.

Homeostatic control of cardiovascular hemodynamics and respiration are disrupted during underwater submersion. A: note the ~80% drop in HR when a laboratory rat (top left photograph) volunteers to dive underwater (down arrow), which persists until it surfaces...

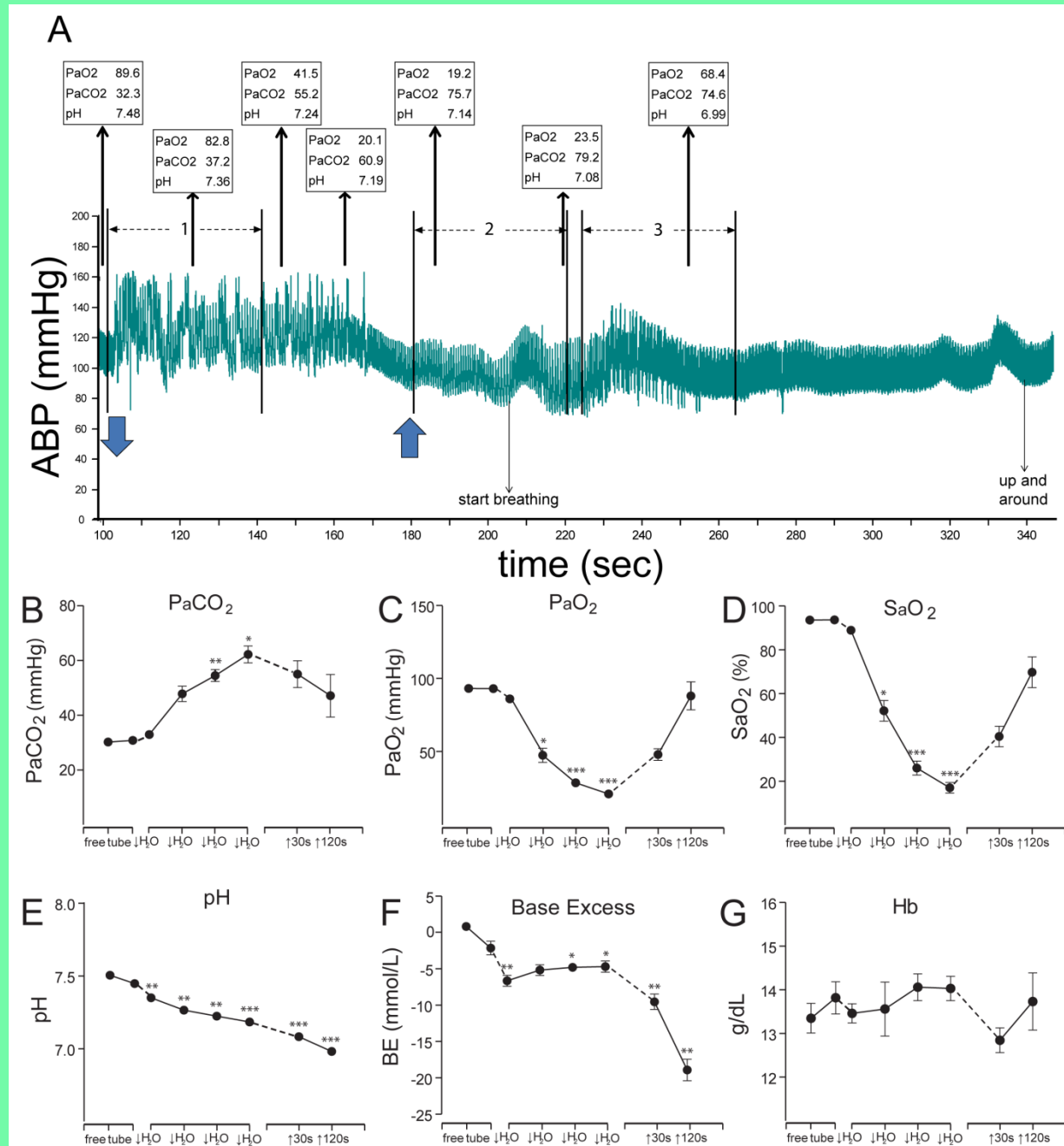


Michael Panneton *WV Physiology* 2013;28:284-297

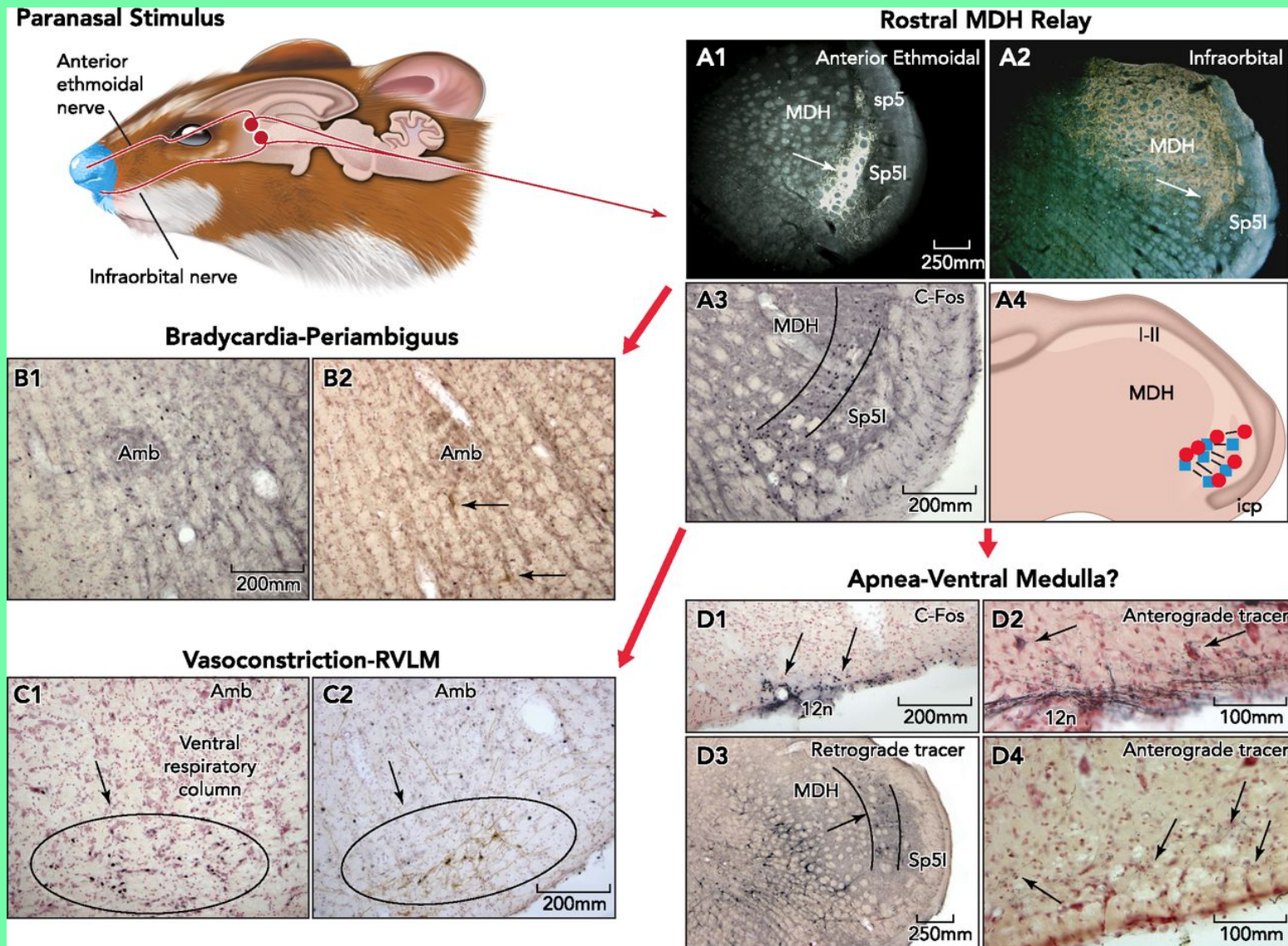
Physiology

# Blood gases change and should induce ventilation.

## 2mm increase in pCO<sub>2</sub> should double ventilation.



My work focusses on the neural control of the diving response. You can read about it if interested.





We have shown the mammalian diving response inhibits basic homeostatic reflexes such as the baroreceptor reflex and chemoreceptor reflex.

We also have shown it may provide the etiology of Sudden Infant Death Syndrome (SIDS).

I propose the mammalian diving response to be the most **POWERFUL AUTONOMIC REFLEX KNOWN.**

QUESTIONS?