Breathing and Olfactory CO₂ Chemoreceptors: Implications in SIDS
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Introduction
“Sudden Infant Death Syndrome (SIDS) is the unexpected, sudden death of a child under age 12 months in which an autopsy does not show an observable cause of death” (NIH, 2008).

The “Triple Risk Model” proposes that SIDS is due to the intersection of a critical developmental period, an exogenous stressor, and an abnormality in cardiorespiratory control (Filiano and Kinney, 1990).

Breathing Study
The objective of this study was to determine if neonatal mice could be used to investigate portions of the “Triple Risk Model”

Methods

Breathing Study
• Breathing was measured in neonatal mice in response to 0, 4, 8% CO₂

Results

Breathing Study
• Breathing responses were measured on days 1, 2, 3, 5, and 8 after birth
• Mice were placed in a plethysmograph chamber (see Figure below)

Conclusions

Breathing Study
• Ventilation was successfully measured in neonatal mice.
• Mice exhibited an age-related increase in ventilation with increasing CO₂ concentrations.
• Ventilation became more regular with age, indicating that central chemoreceptors are not fully developed at birth.

Electrophysiology Study
• Application of Acetazolamide inhibited the receptor responses to CO₂
• Application of Acetazolamide did not affect receptor responses to CO₂

References

Acknowledgements
We thank Dr. and Mrs. Edward Shanbrom for generously funding this project.