Intermittent Hypoxia Disrupts Adult Neurogenesis in the Dentate Gyrus

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Airway is blocked and air does not move through

Normal airway Air

Airway is open and air moves through

Sleep Apnea (SA) and Intermittent Hypoxia (IH)

Sleep Apnea is a respiratory disorder in which breathing

repeatedly stops and starts.

Caused by:

- Upper airway obstruction
- Failure of central respiratory network to signal

Results: Intermittent Hypoxia





Adult Neurogenesis

The process of generating functional neurons from adult neural precursors, occurs throughout life in restricted brain regions in mammals.

ML

GCL

SGZ





Hypothesis

 Intermittent Hypoxia increases the proliferation of neural progenitor cells and not glial cells.

Glial cells: CIH > Control











Methods

Immunohistochemistry (IHC)

GREEN

FARRED

BLUE

- SOX2: Neural Progenitor Cell and Glial cells
- Ki67: Actively dividing cells
- DAPI: nuclei Marker,

Confocal Imaging

Z stack: combines multiple images taken at different focal distances to provide a composite image with a greater depth of field



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RESEARCH + FOUNDATION



- Protocol Automated Cell Count for different channels.
- Collaboration with another laboratory





Ki67⁺ = Red, Sox2⁺ = Green, DAPI = Blue, Scale bars = 100μm



Results

Still in progress...

- The Intermittent Hypoxia increases proliferations of neural progenitor cells in Sub granular Zone.
- The Intermittent Hypoxia decreases the number of immature neurons.

WHAT IS NEXT?

- Cell count are going to be finished.
- No difference between groups likely that IH doesn't affect glial cells.
- ▶ If more cells in CIH \rightarrow CIH promotes cell proliferations.
- ▶ Less glial cells in \rightarrow Further research is needed.



Acknowledgement

- Dr. Richard Ellenbogen
- Mrs. Ellenbogen
- Jana Pettit
- Ellie Thorstad
- Jim Pridgeon
- Dr. Christine Mac Donald
- Dr. Jan Marino Ramirez
- Dr. Chelsea Pagan
- Dr. Aguan wei
- UW Neurological Surgery Donors, Faculty, Residents, and Fellow Summer Students

Grants

- NIH R25 NS095377
- NIH P01 HL094374





