

Brain Cooling Device

Client

Dr. Ugo Faraguna

Team Members

Jay Sekhon(Leader)

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Progress Report 3

February 26 to March 5, 2009

Problem Statement:

Sleep is homeostatically regulated; the more we are awake, the more and more intensively we need to sleep afterward. Despite this common notion, the mechanisms underlying the homeostatic regulation of sleep are still unknown. One key question pertains to which brain activities during waking are relevant for the subsequent homeostatic increase in sleep intensity. In parallel, one could argue what is relevant for the homeostatic decline of sleep intensity across the night. In other words what are the mechanisms underlying the idea that the more we sleep, the less we need to sleep. One option is that just the passage of time is relevant for both aspects of the homeostatic process regardless of any specific brain activity. Another option is that specific activities inducing neuronal or metabolic changes during waking are reflected during subsequent sleep. To distinguish these possibilities, an intriguing approach consists of selectively silencing neural activity in brain areas important for the sleep-wake cycle regulation; in particular of locally and reversibly silencing patches of cerebral cortex (where the homeostatic process most likely occurs). The specific aim of the project consists of developing a miniature cooling device able to reversibly silence neural activity in spatially defined brain areas of freely moving rodents.

Last Week's Goals

- Outline Mid-Semester Report and begin writing
- Continue vortex tube testing
- Complete design matrix and begin design evaluation

Summary of Accomplishments

- Finished Mid-Semester Presentation
- Finished Design Matrix + design evaluation

This Week's Goals

- Finish Mid-Semester Report
- Begin searching for peltier cells and other design components.

Individual Goals

- Mark: Worked on Mid-Semester Presentation and Report
- Jay: Wrote weekly progress report. Worked on Mid-Semester Presentation.
- David: Worked on Mid-Semester Presentation and Design Matrix.
- Jon: Worked on Mid-Semester Presentation and Design Matrix.

Project Difficulties

Activities

- 2-27-09: Project meeting with Dr. Tyler
- 3-5-09: Mid-Semester Presentation meeting + work.
- 3-5-09: Jay wrote progress report.

Expenses

