

Brain Cooling Device

Client

Dr. Ugo Faraguna

Team Members

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Progress Report 8

March 13 to April 1, 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

- Search for components for Peltier Cell circuit
- Test design options for Peltier heatsink.

Summary of Accomplishments

- Obtained 3 Peltier cells to begin testing
- Constructed aluminum "fins" to act as heatsinks on Peltier cell

This Week's Goals

- Build a prototype Peltier cell circuit
- Test Peltier cell at different voltages to see cooling effects

Individual Goals

Mark: Began building Peltier cell test rig, worked on finding a good voltage source

Jay: Wrote weekly progress report. Built aluminum fins for a heat sink

David: Began building Peltier cell test rig, worked on finding a good voltage source

Jon: Obtained Peltier cells. Began building Peltier cell test rig.

Project Difficulties**Activities**

- 3-14-09 to 3-22-09: Spring Break
- 3-26-09: Meeting at Ugo's lab to test Peltier cells; built heatsink.
- 4-2-09: Jay wrote progress report.

Expenses

