

ABSTRACT

The University of Minnesota's Department of Neuroscience and Department of Curriculum and Instruction in conjunction with the St. Paul Public Schools and Anoka-Hennepin School District propose to develop, implement, evaluate, and disseminate a model high school biomedical science education program combining neuroscience and inquiry-based instruction. The project, **BRAIN (BRINGING RESOURCES, ACTIVITIES, & INQUIRY IN NEUROSCIENCE) TO HIGH SCHOOLS**, will combine University expertise with that of district coaches to **promote enhanced understanding and application of neuroscience and its health-related issues into high school science curriculum**. We propose to develop, implement, test, evaluate, and disseminate a two-year sequence of summertime teacher institutes (called BrainU 101 and BrainU 202) **aimed at high school science teachers and district coaches from the two largest school districts in the state of Minnesota**. In grades 9-12, the 2009 MN Science Standards now require an understanding of how the nervous system maintains homeostasis, a sophisticated concept appropriate for the maturity of high school students. Thus, the content focus of the institutes will be neuroscience, including an understanding of cognition, learning, emotions, the clinical trial process and how the autonomic nervous system regulates homeostasis, with an emphasis on inquiry pedagogy. The program will expand a successful model previously developed for training middle school science teachers to inculcate biology teaching practices within schools buildings and districts that support developing higher order thinking and inquiry skills. The educational research question posed in this proposal is **how does this in-depth teacher neuroscience and inquiry training affect student learning**. A quasi-experimental design is proposed that will compare teacher and student knowledge and attitudes, and use of inquiry practices. Participating teachers and their classrooms will be compared before and after attending the BrainU institutes. Participating teachers and their classrooms will be compared to those of non-participating, within district biology teachers. In addition, standardized student scores on the MN MCA-II Science test from participating high schools will be compared to those from non-participating high schools, matched for socioeconomic variables. By participating in the training experience and in in-service follow-up, district coaches will themselves be trained to assume leadership roles in maintaining the content and pedagogy resident within their districts.

The National Institute of Health (NIH) has funded this 5-year project.

Aims of SEPA Project

The specific aims and their associated objectives are to:

- Aim 1. Develop a high school neuroscience curriculum using open-ended investigative activities and assessments focusing on homeostasis and the neurobiology of learning.
- Aim 2. Determine the impact of intensive teacher professional development in neuroscience and inquiry pedagogy upon student performance. (*Does acquiring an understanding of the concept of Brain Plasticity impact student achievement?*)
- Aim 3. Develop the leadership capabilities of district coaches by training them in neuroscience content, inquiry pedagogy and in the delivery of this professional development to teachers.
- Aim 4. Promote neuroscience graduate student acquisition of pedagogical skills and knowledge.
- Aim 5. Disseminate knowledge of the neurobiology of learning throughout participating high schools through peer-to-peer interactions among participating teachers and their colleagues.