NIH Award from the National Institute on Deafness and Other Communication Disorders

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- Project: Genetic Factors in Speech Learning
- Start Date: July 17, 2009
- Total Award Amount: $105,339

How the results of this project will benefit society:
Genetic and environmental factors affect our brain and its function including language communication. In an increasingly multilingual/multicultural world, many people, including adults, are interested in learning a foreign language even though it is difficult for them to do so. Our proposed research seeks to understand why some people can learn spoken language more successfully than others by examining genetic differences across learners.

The problem the project is trying to solve:
Genetic factors, along with environmental factors such as long- and short-term experiences, shape the physiologic foundations for the acquisition of communicative behaviors. Although much research has been conducted on the genetic bases of peripheral hearing loss and craniofacial anomalies that result in speech production deficits, no research has focused on the genetic predispositions associated with success in language learning in adulthood. Such lack of research occurs in the context of a longstanding pattern of findings indicating large individual differences in language recovery, auditory training, and second language learning.

How this project will work:
The proposed research synergistically builds upon three independent lines of recent (within past 6 months) high-impact research developments, with the aim to produce transformative findings concerning the interactions among language learning, the brain, and genetic differences. These latest developments include: (1) the association between individual differences in language learning and neuroanatomic and neurophysiologic differences; (2) the genetic link to differences in language typology; and (3) the association between specific allelic variations and brain functions. Although possessing a significant risk, this research will form a foundation for proteomic studies examining protein expression patterns that are directly consequential to brain development that affects spoken language processing and learning, including rehabilitative/ habilitative audiologic, and neurogenic language treatment paradigms. This research is not only particularly timely, but is also consistent with all priority areas stated in the latest NIDCD strategic plan (FY2006-2008). It will bring together investigators from two ends of the communication sciences discipline (molecular biology and cognitive neuroscience) for a lifelong collaboration on high-impact research of broad significance to clinical diagnosis and treatment. The specific aims are to (1) examine whether spoken language differences and the accompanying neural differences are associated with specific allelic variations; and (2) examine whether such allelic variations are specific to one type or multiple types of spoken language learning.

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