

**Developmental brain sciences toward understanding of origin of intelligence**

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**【Outline of survey】**

The aim of our project is to understand the developmental origin of human intelligence. The intelligence involves generation of adaptive behaviors in the physical and social environment and acquisition of knowledge, which enriches one's mind and produces individual diversity. To detect emergence of and developmental changes in various types of intelligence, we conduct multidisciplinary studies involving brain imaging using near infrared optical topography, measurement of eye and body movements, psychological testing and dynamical systems modeling. We focus on the issues of domain specificity/generalizability of development, U-shaped development, sensitive periods and plasticity, interference of learning and development over different time scales, and the origin of rational thinking. We try to capture dynamic changes in behaviors and functional brain activations in early infancy and construct a new framework for system-level understanding of innateness and development of human intelligence.

**【Expected results】**

We expect to gain a deeper understanding of the relationship between the innate constraints and experience-dependent mechanisms for the acquisition of intelligence on behavioral and neural levels. This project will not only add new findings in special fields of cognitive science, behavioral science, neuroscience and developmental psychology, but also provide a new vision of development in pediatrics, childcare, education, engineering and philosophy, each of which pursues essential understanding of human being.

**【References by the principal investigator】**

- G. Taga, K. Asakawa, A. Maki, Y. Konishi, H. Koizumi: Brain imaging in awake infants by near infrared optical topography. PNAS, 100-19, 10722-10727, 2003
- H. Watanabe, G. Taga: General to specific development of movement patterns and memory for contingency between actions and events in young infants. Infant Behav.Dev. 29, 402-422, 2006
- F. Homae, H. Watanabe, T. Nakano, G. Taga: Speech perception in the developing brain. Neurosci. Res. 59, 29-39, 2007

**【Term of project】** FY2008- 2012

**【Budget allocation】**

**80,000,000 yen** (direct cost)

**【Homepage address】**

<http://www.p.u-tokyo.ac.jp/~taga/>