1. Principal Researcher  
   Akemi Tomoda, MD, PhD.  
   Professor  
   Research Center for Child Mental Development, Graduate School of Medical Sciences, University of Fukui

2. Project Title:  
   Influences on brain development in children and adolescents.

3. Japanese Group  
   **Chief:** Akemi Tomoda, MD, PhD, Professor, Research Center for Child Mental Development, University of Fukui  
   **Collaborator:**  
   Masako Myowa, Professor, Kyoto University, Kyoto, Japan  
   Takashi Fujisawa, Instructor, University of Fukui, Fukui, Japan  
   Shinichiro Takiguchi, Assistant Professor, University of Fukui, Japan  
   Yoshifumi Mizuno, Assistant Professor, University of Fukui, Japan

4. U.S. Group  
   **Chief:** Jay Giedd, MD, PhD, Professor, University of California, San Diego, USA  
   **Collaborator:**  
   Ben Maxwell, MD, Associate Professor, UCSD, Department of Psychiatry, USA  
   Tim Brown, PhD, Professor, UCSD, Department of Psychiatry, USA  
   Nim Tottenham, PhD, Professor, Department of Psychology, Columbia University, USA  
   Yoshifumi Mizuno, PD Scholar, Stanford University, USA  
   Shota Nishitani, PD Scholar, Emory University, USA

5. Research Period: From 04/01/2017 to 03/31/2020 (3 years)

6. Abstract, Results, and Research Significance (300 words):  
   To explore the path, mechanisms, and influences on brain development in health and illness by using novel statistical methods optimized for the evaluation of longitudinal developmental data to integrate: (1) cutting edge multimodal image analysis techniques (i.e. structural MRI, functional MRI, DTI); (2) genetics and epigenetics; (3) psychological, cognitive, behavioral, clinical, and physiological measures; and (4) detailed assessments of risk and protective factors, of trauma, adverse events, and other environmental factors from early childhood until adolescent period. Thus, in order to answer to the problem that a diagnosis based on symptoms does not always lead to effective therapy, we have investigated children with reactive attachment disorder (RAD) associated with childhood maltreatment, and other neurodevelopmental disorders such as autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD). We believe our project has sought to create a framework for research on pathophysiology, especially in the fields of neuroscience and genomics, as Research Domain Criteria (RDoC) which the National Institute of Mental Health in the United States launched.

7. Other (Research-related concerns, particular points of note): N/P
The results that have been studied in the Japan-U.S. Brain Research cooperative Program are presented as a paper as follows.


