Form 2-4-2

Japan-U.S. Brain Research Cooperation Program
Group Joint Study Project Program FY2010- FY2012: Report

Field: _____2_____

1. Principal Researcher
   Name Tomomi Shimogori
   Title Team Leader
   Affiliation Brain Science Institute RIKEN

2. Project Title:
   Genomic analysis of mouse hypothalamus and nuclei specific gene expression.

3. Japanese Group
   Tomomi Shimogori
   Team Leader
   Brain Science Institute RIKEN

   Asuka Matsui
   Collaborating Research Members
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   Miyako Hirabayashi
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   Aya Yoshida
   Collaborating Research Members
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4. U.S. Group
   Seth Blackshaw
   Associate Professor
   Johns Hopkins University School of Medicine

5. Research Period, from/to (mm/dd/yyyy) and total number of years.
   Apr. 1. 2010 To Mar. 31. 2013 (3 Years)

6. Abstract, Results, and Research Significance (300 words):
The mammalian hypothalamus controls a large range of physiological processes, but the mechanism by which it is patterned during development is poorly understood. We have used microarray-based expression profiling and large-scale two-color *in situ* hybridization to conduct a detailed characterization of gene expression during mouse hypothalamic neurogenesis. We have determined that a combination of transcription factors define unique domains along the anterior-posterior axis of the developing prethalamus and hypothalamus, implying that these diencephalic regions form a single developmental compartment patterned by common differentiation factors. Furthermore, we have determined that developing hypothalamic nuclei selectively express different Lhx family transcription factors, which are known to direct cell fate specification. Using both targeting *in utero* electroporation and knockout mice, together with the large collection of nuclear and cell subtype-specific molecular markers identified in our screen, we will investigate whether candidate morphogens such as Shh and Wnt3a control anterior-posterior patterning of the prethalamus and hypothalamus, and investigate whether the transcription factors also directly regulate this process. We will likewise use similar techniques to determine whether more transcription factors direct development of the dorsomedial and posterior hypothalamic nuclei.

7. Other (Research-related concerns, particular points of note):

*Please attach any reference materials as necessary.