Title of submission to PLOS journal

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Abstract

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Author summary

One of the central questions of animal behavior is how biological mechanisms mediate and respond to behavior. Successful rearing of offspring involves a shift from aggressive and sexual behaviors to more caring and nurturing ones, but what neural substrates mediate this transition? How flexible are these changes in response to unpredictable environmental perturbations, and how is behavior altered because of them? In a rapidly changing world, understanding how the environment affects the brain and how, in turn, the brain affects the behavioral transition into parental care will shed light on how changes in environment can ultimately affect fitness. Previous discoveries have implicated particular hormones that play a role in the maintenance of parental care behavior in vertebrates, such as: oxytocin and vasopressin (avian homologs: mesotocin and vasotocin), vasoactive intestinal peptide, and prolactin. However, we know very little about when and how the brain transitions into parental care behaviors in any vertebrate, and this knowledge is fundamentally important to our understanding of the mechanisms mediating parental care. Here, we propose to expand our knowledge by using classic offspring replacement and removal manipulations to uncover the role of GnIH during the transition to parental care behaviors. In addition to this targeted approach, we propose a powerful untargeted approach to explore what other changes in the brain may be occurring during this transition. We will use high-throughput sequencing technology and immunohistochemistry to uncover all genetic changes and specific proteomic changes in the brain, along with their relationship with GnIH, which occur during the transition to parental care. Our long-term goal is to understand the interplay of genes, proteins, and parental care. Specifically, we aim to understand the genetic and physiological mechanisms driving parental care behaviors in all vertebrates, and to document this knowledge in a rich, open database. This knowledge would enable manipulation of specific parental care behaviors and their activation using emerging powerful genetic technologies.

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Introduction

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A list

- Item 1
- Item 2

Here are two sample references: [1,2].

Funding Statment

1. Collaborative Research: RUI: The Neural Basis of Becoming a Parent: From Genotype to Phenotype. NSF-IOS:1455957.

References

1. Feynman R, Vernon Jr. F. The theory of a general quantum system interacting with a linear dissipative system. Annals of Physics. 1963;24: 118–173. doi:10.1016/0003-4916(63)90068-X

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