

Researchers explore the genetic basis of social behavior in ants

July 18 2008

Understanding how interactions between genes and the environment influence social behavior is a fundamental research goal. In a new study, researchers at the University of Lausanne and the University of Georgia have shed light on the numbers and types of genes that may control social organization in fire ant colonies.

Published July 18th in the open-access journal *PLoS Genetics*, this work suggests that a relatively small number of genes, many of which are predicted to play a role in chemical communication, determine social organization. This research also increases our understanding of how the social environment can indirectly influence the expression of socially relevant traits.

The fire ant *Solenopsis invicta* displays natural variation in the number of queens per colony. While the colony-level phenotype results from the aggregation of individuals' behavior, it seems to be regulated by one genomic region marked by the gene Gp-9. This genetic factor also determines whether workers tolerate a single fertile queen (monogene social form) or multiple queens (polygene social form) in their colony.

The current study found that 39 genes are differentially expressed between workers with different Gp-9 genotypes, including several genes likely to regulate chemical signaling and response. The chemical communication mediated by these gene products is essential to the regulation of colony queen number and social organization.

The study also identified 91 genes that are indirectly influenced by the social environment, including Gp-9 genotypes of nest mates, a finding that demonstrates how specific social environments can modulate individual gene expression in group members. This research hints at the genetic complexities likely to be found in other social animals, and represents an important step in the detailed genetic analysis of social behavior.

Citation: Wang J, Ross KG, Keller L (2008) Genome-Wide Expression Patterns and the Genetic Architecture of a Fundamental Social Trait. PLoS Genet 4(7): e1000127. doi:10.1371/journal.pgen.1000127

Source: Public Library of Science

Citation: Researchers explore the genetic basis of social behavior in ants (2008, July 18) retrieved 25 April 2024 from <https://phys.org/news/2008-07-explore-genetic-basis-social-behavior.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.