

OR376*Socially-mediated changes in brain epigenome in the fire ant***Oksana Riba-Grognuz**, David DeWayne Shoemaker, Laurent Keller

Ants exhibit complex social behavior and organization, but little is known about how individuals respond to their social environment. The dimorphic social organization of the fire ant *Solenopsis invicta* provides a unique opportunity to study the effects of social environment on gene expression and social behavior. In the monogyne (single-queen colonies) social form all females have two copies of the SB variant of the social chromosome. By contrast, polygyne (multiple queen) colonies contain a mix of SB/SB and SB/Sb workers (i.e., workers which also have a copy of the b variant of the social chromosome). Experiments showed that SB/SB shift behavior and accept several queens when colonies contain more than 5% of SB/Sb workers. This change in behavior is associated with changes in gene expression. To investigate the role of epigenetic mechanisms, such as DNA methylation and histone modifications, in modulating gene expression we performed RNA-seq, BS-seq and CHIP-seq assays on the brains of two week-old SB/SB and SB/Sb workers introduced at the late pupal stage in host colonies of both social forms. These results should reveal the implication of DNA methylation and chromatin modifications in brain behavioral response to changes in the social environment, and uncover the contribution of these mechanisms to transcriptional regulation in a neural context.