



## **Attack or no Attack - Gene expression of host during slavemaker defence depends on success of parasite population not on parasite prevalence of host**

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The geographic mosaic theory of coevolution states that the interactions between parasite and host vary between locales. Depending on who leads the coevolutionary arms race, the effectivity of either parasite attack or host defense strategies will explain parasite prevalence. We compare brain gene expression in host workers of the ant *Temnothorax longispinosus* when defending their nest against an invading *T. americanus* slavemaker. Our cross-fostering design allows us to test whether gene expression varied with parasite pressure on the local host population, or with the success of the slavemaker population as evidenced by parasite prevalence. Albeit previous studies revealed that host responses shifted with local parasite pressure, we found little evidence that parasite pressure on host or host population explained variation in gene expression. Rather our data show that gene expression shifted with the success of the parasite population of the intruder. Behavioral analysis revealed that slavemakers from sites with a high prevalence were less often openly attacked by hosts. Indeed, gene expression in host brains strongly depended on whether hosts recognized the slavemaker and aimed attacks at them. This indicates that hosts are strongly influenced by the behavioral or chemical strategies of their opponents and that variation in parasite prevalence depends on parasite strategies rather than on the efficacy of host defense. In line with preceding behavioral experiments, genes and gene functions associated with parasite success indicated strong neuronal responses in hosts responding to slavemaker intrusion, including more long-term changes in gene regulation, such as histone acetylation, indicating a profound impact of slavemakers on host behaviour.