

# Maternal and nourishment factors interact to influence offspring developmental trajectories in social wasps

Jennifer Jandt \*<sup>1</sup>

<sup>1</sup> University of Otago

The social and nutritional environment during early development have the potential to affect offspring traits, but the mechanisms and molecular underpinnings of these effects remain elusive. We used *Polistes fuscatus* paper wasps to dissect how maternally-controlled factors (vibrational signals and nourishment) interact to induce different caste developmental trajectories in female offspring, leading to worker or reproductive ('gyne') traits. We established a set of caste phenotype biomarkers in *P. fuscatus* females, finding that gyne-destined individuals had high expression of three caste-related genes hypothesized to have roles in diapause and mitochondrial metabolism. We then experimentally manipulated maternal vibrational signals (via artificial 'antennal drumming') and nourishment levels (via restricted foraging). We found that these caste-related biomarker genes were responsive to drumming, nourishment level, or their interaction. Our results provide a striking example of the potent influence of maternal effects, both nutritionally and socially, in influencing transcriptional activity and developmental outcomes in offspring.

