OR010

Genome sequencing reveals host specialization in bee gut symbionts

Waldan Kwong, Philipp Engel, Hauke Koch, Nancy Moran

Host specialization occurs in many organisms participating in symbiotic lifestyles. For bacteria, different strains of the same species may evolve to favour the colonization of one host type over others. This has been of considerable interest in the study of pathogens and endosymbionts but little attention has been given to this process for the normal gut microbiota. In this study, we present the first complete genome sequences of two gut symbionts (*Gilliamella apicola* and *Snodgrassella alvi*) found in both honeybees and bumblebees. We found that the strains in the two bees are deeply divergent and possess a large host-specific accessory gene set. Furthermore, there were signs of lateral gene transfer between the two symbiont species, thus suggesting the gut microbial community, as a whole, plays a key role in shaping the evolution of its individual members. We also conducted in-vivo experiments, inoculating lab-cultured strains into germ-free honeybees and bumblebees to show that the bacteria can better colonize and compete in their native hosts, supporting the idea that these symbionts are specialized to living with their particular hosts. As ecologically and economically important insects with relatively simple microbiotas, bees hold great promise as a model for understanding symbiotic gut microbial communities.