09
JUIL.
2015

de 14h à 15h

SÉMINAIRE

Host phylogeny and diet drive the structure of mammalian microbial communities at different phylogenetic scales

Mathieu Groussin
MIT

Bacterial communities (microbiota) living in Mammal guts are composed of thousands of bacterial species that are essential for host physiology, immunity and diet. It has been shown that host phylogeny (genetics and immune system of the host) and diet are the two major factors driving the composition of gut microbiota. However, major questions remain: (i) the relative contribution of host phylogeny and diet at short and long time scales is highly debated and the two processes are not well characterized, (ii) host phylogeny may drive the composition through co-evolution with bacterial lineages or through niche selection, with closely-related hosts retaining similar bacteria from the environment. Here, we show that host phylogeny and diet are for the most part independent processes and do not drive the bacterial composition at the same taxonomic scale. Diet determines what lineage is present or not at deep bacterial phylogenetic levels through gain or loss of lineages creating nested communities. Host phylogeny, however, selects the lineages at finer scales through true turnover of lineages, consistent with a more stringent selection of tolerated antigens. Finally, it appears that co-speciation between hosts and bacterial lineages plays a minor role in driving the correlation between community composition and host phylogeny, suggesting that environmental filtering by host genetics is the dominant process at selecting bacterial lineages. Our results shed light on the long-timescale evolutionary dynamic of gut bacterial communities, which are multi-layered phylogenetic structures shaped very differently by host phylogeny and diet.

URL of the page: https://lbbe.univ-lyon1.fr/fr/agenda/host-phylogeny-and-diet-drive-structure-mammalian-microbial-communities-different