

## IMS-3:

# Evolution of vertebrate symbiotic gut microbiota: the story starts from tadpoles

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Vertebrate hosts have close symbiotic relationship with their gut microbiota. Bacteroidetes and Firmicutes are the two major bacterial groups in mammalian gut, while Proteobacteria dominate the gut in most fishes. We hypothesized that amphibian have gut microbiota in a transition state between the piscine type microbiota and the mammalian type microbiota, and would like know (1) the relative importance of heritage and environment as source of gut microbes, (2) whether gut bacteria can be transferred from frog to tadpoles, (3) whether amphibians have mammalian gut symbionts.

We analyzed the gut microbiota from tadpoles of 5 sympatric species, and found that these species shared unique gut bacterial species, which were likely picked up from the environments. We used the foam nest-building tree frog *Polypedates braueri*, to compare the relative importance of heritage and environment. Fertilized eggs from the same nest (same parents) were raised in different environments, and their gut microbiota were more similar among nestmates, compared with tadpoles from different nests but raised in the same environment. This indicates that although environment can influence gut microbiota, the heritage influence has bigger influence. We analyzed gut microbiota of the stump-dwelling treefrog *Kurixalus eiffingeri*, and showed that gut bacteria could be passed on from adult frog to tadpoles. Firmicutes and Bacteroidetes are the two most dominant bacterial groups across amphibian species. Firmicutes were abundant in all tadpoles, Bacteroidetes were found in almost all tadpoles, but their abundances varied. *Akkermansia* species closely related to human gut symbionts were also detected in many treefrog species. Despite constantly invaded by environmental bacteria, tadpole gut microbiota were composed of bacterial groups known to be associated with mammalian gut, and these bacteria are likely to be transmitted from generation to generation.

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