Microbes on fish skin display distinct evolutionary patterns

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Abstract

Microbiomes share an intimate relationship with the organisms they colonize, even across evolutionary timescales. That's the basis of a theory called phylosymbiosis. Phylosymbiosis holds that microbial communities evolve as their host evolves and has been confirmed to exist for certain insects and mammals. Researchers recently tested whether that relationship holds among fish. Approximately 420 million years ago, fish made an epic evolutionary split into elasmobranchs – creatures with all-cartilage skeletons – and bony fish. Since then, the two have accumulated vast differences in anatomy and physiology, most notably in their skin. That's where the researchers zeroed in. For a small sample of fish, they used metagenomics to compare the makeup of microbial communities living on fish skin. Between fishes considered closely or distantly related in evolutionary terms, findings revealed that elasmobranchs displayed patterns of phylosymbiosis, while bony fish did not. A difference that might be linked to alternative processes of microbiome assembly. Scaling up to a larger sample size could offer researchers further insight and help explain the skin microbiome dynamics of marine fishes.