It's not who you are, but what you do

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Sea lettuce - home to rich bacterial communities

(PhysOrg.com) -- When you're a tiny creature in a vast ocean it pays to hang out with the right crowd, regardless of whether they are related to you or not, a new study into the amazingly diverse world of marine microbes has found.

For bacteria at least, it seems that what matters more than your species identity is whether you have specific genes that let you work with other species to form a functioning community.

The study looked at the rich communities of bacteria that form on the surface of a common seaweed known as sea lettuce (Ulva australis) and found surprisingly large variations in the 400 or so member species that make up each community.

Despite offering the same habitat, each seaweed played host to many

different bacterial species, with only about 15% of species in common from community to community.

Despite this great variety and high species diversity within them, each community has similar core functions, such as the ability to attach to the seaweed's surface and gather nutrients from the host, says a new study in the journal Proceedings of the National Academy of Sciences, led by Dr Catherine Burke of the UNSW Centre for Marine Bio-Innovation (CMB) and School of Biotechnology and Biomolecular Sciences (BABS).

Genetic studies using high-throughput DNA sequencing confirmed that this likeness in the core functions of the community was not reflected in the identity of the member species of the community. Different species performed the same functions in different communities, because they shared particular genes.

Regardless of whether these genes independently evolved or were swapped between species through a process known as a horizontal gene transfer, possessing them was the key to being able to be part of a particular community.

"I guess this shows that for bacteria it matters less who you are – that is, your species - than what you can do and who you hang out with," says co-author Dr Torsten Thomas, a BABS senior lecturer and CMB member.

For ecologists, the finding challenges long-held theoretical ideas about how communities of organisms are established, says co-author Professor Peter Steinberg, Director of the Sydney Institute of Marine Science and staff at UNSW School of Biological, Earth and Environmental Sciences and the CMB.

"Species are usually the fundamental unit by which communities are

characterised in higher organisms," says Professor Steinberg. "But in these systems the important thing is to know what genes the bacteria have, not what species those genes are packaged in. This flies in the face of a hundred years of studies of the community ecology of higher organisms."

Provided by University of New South Wales