
A new imperative for the life sciences not to be ignored by ecotoxicology

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Abstract

Increasingly evidence is accumulating that microbial communities form an integral part of the physiology, ecology, and evolution of animals. Using next generation sequencing, our knowledge on microbial diversity associated with animals is rapidly growing. Over the last years, life sciences have acknowledged that (1) microbes associated with animals are much more diverse than previously thought, (2) microbes communicate with their host in many different ways, (3) microbial communities support essential host functions, and (4) microbial pathogens play an important role in the population dynamics of both vertebrates and invertebrates. It is interesting though, that interactions with microbes are rarely considered in ecotoxicology. If microbial communities form an integral part of the ecology of an animal, and if, as some have said, it is imperative to include them in any study on animal functioning, they cannot be ignored by ecotoxicology. It is useful to consider the interaction between environmental pollution, animals and microbial communities as a triad. In some cases, microbial species act as symbionts providing essential nutrients to their hosts, in other cases, the role of microbes is unclear, even though their association with animals is sometimes quite specific. Regarding the assessment of toxicants, the important question is whether microbes make the host more vulnerable to toxicants or may protect the host from intoxication. The latter seems to be the more common phenomenon, arguing from the very limited evidence available to date. Environmental management should be aware that preserving ecosystem health requires consideration of animal-microbe interactions. EU's 7th Environment Action Program aims to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing. A one-health perspective including humans, animals and plants, plus microbial communities and all the interactions between them and the environment is the best way to achieve this aim.

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