EDITORIAL

Research Prospectus: Climate Change and Microbes

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ABSTRACT

The greatest threat to humanity is climate change. Carbon dioxide, methane, and nitrous oxide are the three main greenhouse gases that microbes make and consume. Some microbes can cause diseases in humans, animals, and plants that can be made worse by climate change. To reduce the warming trajectory and cascade consequences brought on by heat, drought, and severe storms, microbial research is required.

Keywords: Climate change, microbes, research, evidence

The data supporting the role of bacteria in climate change is substantial. The oxygenation of our atmosphere during the early epochs of Earth's geologic history is perhaps the best illustration of how microbial life contributes to atmospheric changes. Microbes are still the main cause of current atmospheric changes at all scales, including the terrestrial, oceanic, and urban. Microbial metabolism is creating and absorbing gases that can affect climate anywhere from the warmth of cow rumen to the melting soils of permafrost zones, the symbiotic coral system in the oceans, and the carbon wastes of our cities. Therefore, microbial contributions to carbon fluxes into and out of the atmosphere must be taken into account in all climate change models. Since it should be possible to encourage changes in microbial activities in some or perhaps many environments to consume more and produce less gases that contribute to the warming of the atmosphere, the microbial world could become a crucial ally in the efforts to ameliorate the effects of human emissions of GHG.

To address complicated concerns, more research is required on the three interrelated topics of microorganisms, climate change, and human well-being. Because of altered patterns of host-microbe interactions, altered microbial biogeography, and altered terrestrial, marine, and urban microbiology, microorganisms' adaptation to a warming environment may have a direct impact on human health. We must advance our understanding of microbiomes beyond descriptive and correlational research. To increase our understanding of the roles played by microorganisms in climate change and their reactions to environmental forces, whether they be natural or caused by human intervention, the field instead requires more statistically sound, hypothesis-driven, mechanistic investigations. Perhaps this should be considered when determining the research priorities because the GHG have various atmospheric residence times, heat-trapping capacities, and susceptibilities to (microbial) treatments (1). To enhance knowledge, the research community needs creative tools, resourceful research networks and infrastructures, integrated climate models, and cooperative data and framework (2). Additionally, in order to raise awareness and win support, efforts must be made simultaneously to educate the public and inform policies (2). For instance, the American Academy of Microbiology is in charge of developing a five-year scientific portfolio that will concentrate on the critical challenges indicated above. In order to ensure that the contributions of microbial life to these processes are discussed in all conversations about climate change, microbiologists must step up their efforts on a number of fronts.

REFERENCES

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