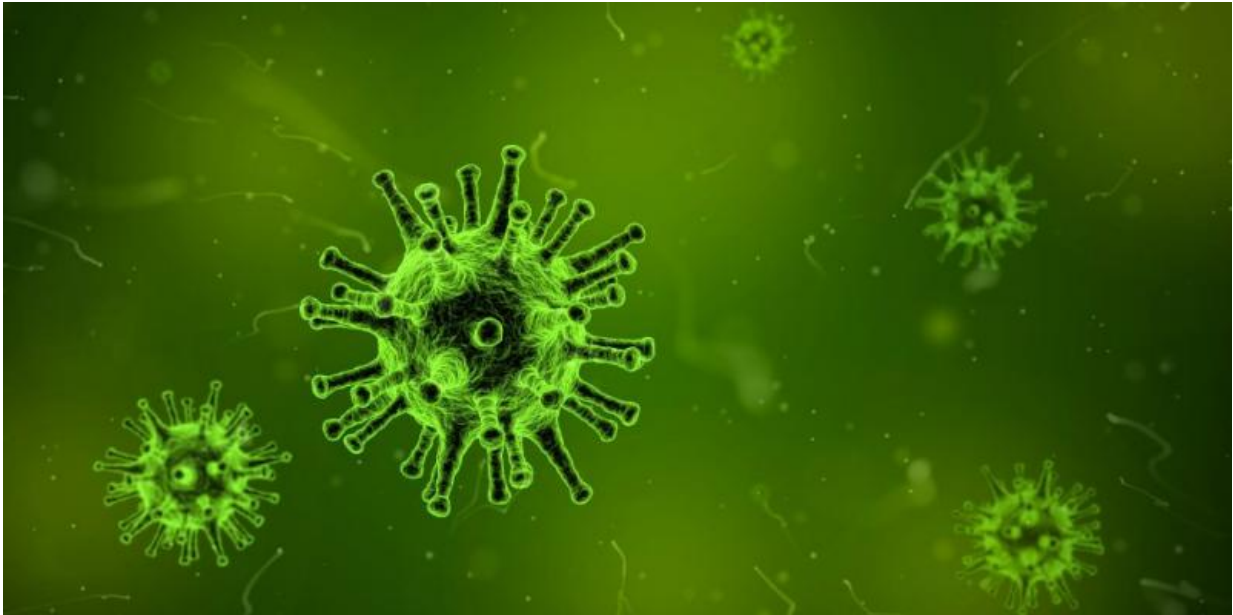


# The global transport of microbes

September 15 2017

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Wastewater, tourism, and trade are moving microbes around the globe at an unprecedented scale, a group of international researchers, including Professor Michael Gillings from Macquarie University, have argued. The editorial article, published in the premier journal *Science*, voices the concerns of the scientists, who warn that as we travel the modern world we leave billions of bacteria at every stop, with potentially hazardous consequences for human health.

As with rats, foxes, tigers and pandas – all species whose survival has

greatly benefitted from the practices and actions of humans – some microbes are winners, spreading around the world into new ecological niches we've created. Others are losing, and might face extinction. These changes are invisible, so why should we care? According to the article, "our survival may depend on these microbial winner and losers".

"The oxygen we breathe is largely made by [photosynthetic bacteria](#) in the oceans (and not by rainforests, as is commonly believed)," explains Macquarie University biologist Michael Gillings.

"Over 95 per cent of the faeces in the world comes from humans and the animals we farm. And our poo is travelling around the world with a billion tourists, spreading microbes and [antibiotic resistance genes](#)," he adds.

The problem lies not only in the unprecedented amount of travel by humans this century, but also in our modern agricultural practices, transport systems and other trade practices.

"Until 100 years ago all the nitrogen in our food came from bacteria we nurtured in our crops. Now more than half comes from artificial fertilisers," says Professor Gillings.

"We're moving trillions of ocean microbes around the world in [ballast water](#). Some one hundred million tonnes of ballast water – carried in ships to help improve stability – is dumped in US waters each year. We know they're introducing foreign starfish, sea snails, and seaweed. But we don't know what invisible changes they're making to ocean microbes as well."

The team of researchers is calling for urgent action to help monitor and model the changes we're making to the microbial world and improve waste water and manure treatments to reduce the spread of microbes and

resistance genes.

"Microbes usually perform their essential ecosystem services invisibly, but we ignore them at our peril. Current models which track the movement of genes through microbial communities are unable to do this with an overarching global perspective, leaving us open to potentially dangerous [microbes](#) that could impact [human health](#) – an issue that molecular and environmental scientists need to keenly focus on in the near future," concludes Gillings.

**More information:** Yong-Guan Zhu et al. Microbial mass movements, *Science* (2017). [DOI: 10.1126/science.aao3007](https://doi.org/10.1126/science.aao3007)

Provided by Macquarie University

Citation: The global transport of microbes (2017, September 15) retrieved 25 April 2024 from <https://phys.org/news/2017-09-global-microbes.html>

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