

SCIENCE AND INNOVATION NETWORK SPOTLIGHT ON MICROBIOME RESEARCH



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Foremost, informatics is an area of critical need for research. Microbiome datasets, often from the same study, reside in different databases, are inaccessible or too vast to access and process. Because there is a large amount of data analysis in this field, there is a need to train microbiologists as informaticians and vice versa. Secondly, a multidisciplinary approach is necessary to further research. Scientists studying the earth's microbiome should be sharing information with researchers focusing on gut health, for example. Most importantly, exploring functionality of the microbiome is critical. Funding bodies are currently biased toward descriptive rather than mechanistic studies which detract from the importance in understanding how microbes function. Solving these issues will benefit the development of therapeutics that will target our most dreaded diseases.

Currently hailed as "the holy grail of health and wellness", the microbiome is the ecosystem that lives in, on and around us. It includes all bacteria, viruses,

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and fungi that we carry with us on our skin and throughout our digestive system. In recent years, our microbiome has been linked to many diseases, such as cancer, depression, and Parkinson's. There has been a lot of buzz about our microscopic partners; however, in order to understand the complexity of the relationship between humans and microbes, we must first address some issues that microbiome researchers face.

Many are already addressing these problems. At a UK Science and Innovation Network (SIN) led workshop in Cambridge, researchers from the US and UK discussed the possibility of collaborations between the two countries. The UK is well positioned as a resource based upon its extensive NHS health data which could be leveraged for global collaborations. Sharing data will result in more significant discoveries in this field. The SIN workshop also

informed the Research Councils about the challenges that microbiome researchers currently face, which could stimulate interest in funding more multidisciplinary and mechanistic studies. Discussions like this are valuable to the scientific community due to their influential effect on future work.

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Because the microbiome changes from person to person, there is no "one size fits all" solution for the future of treatment in this field. Not only does it differ between people, but it also changes as a person

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ages, changes their diet or alters their environment. This is where precision medicine could be a "game changer". Doctors could use the microbiome to custom tailor medical treatments to specific ailments. And even before illness creeps in, doctors could check for imbalances in the microbiome to hone in on tricky diagnoses before the patient realises there is a problem. Moreover, scientists are working to engineer

work is human nutrition. The UK is taking a lead in this field with its newly announced Centre for Food and Health in Norwich Research Park. This centre will explore the complex interaction between the microbiome and nutrition. As we understand more about our bacterial partners, views on human

nutrition will be disrupted. This will catalyse efforts to integrate agricultural policies and practice, food production and distribution with nutrition. For example, infants who are not able to breastfeed could have their

formula supplemented with the microbes from breast milk that are known to shape a healthy infant gut.

The implications for the microbiome are vast. Some researchers believe our microbes are a powerful and effective alternative to antibiotics. This might be the solution to the growing problem of antimicrobial resistance (AMR). There are many other scenarios that could

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microbes that will combat invading pathogens, diagnose early stages of cancer, correct digestive issues, and regulate mood.

The most obvious application for the future of microbiome

be altered by advances in this field, such as alleviating Parkinson's or treating behavioural disorders. Quite possibly the cure to many dreaded diseases has been residing within us this entire time.