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The gut microbiome

For more on the microbiome visit nature.com/collections/gut-microbiome-outlook

We are not alone in our bodies. Living inside every person are trillions of microorganisms — bacteria, viruses, fungi and other life forms that are collectively known as the microbiome. Various organs have distinct microbial inhabitants, but the group that has attracted the most attention in biomedical research is the one in the gut.

To better grasp the part that gut microbes play in health and disease, researchers from around the globe are investigating what makes a 'good' gut microbiome (see page S6). There are, after all, hundreds of distinct bacterial species in the gut — some pathogenic and some beneficial. Computational biologist Eran Segal argues that collecting microbiome data would allow a 'deep phenotyping' approach that could transform drug discovery (S19). And the study of some health-promoting probiotic species is yielding biological insights that might promote drug development (S9).

Several diseases are now thought to be influenced by processes in the gut microbiome. Those include cancer (S16), autoimmune disorders such as multiple sclerosis (S12) and autism spectrum disorder (S14). The gut microbiome also strongly interacts with certain drugs, including some mental-health therapeutics, and influences their effects (S10).

With evidence mounting of the gut microbiome's health significance, synthetic biologists are looking to engineer the microbiome — both at the individual-species level and as an ecosystem — to thwart the development of disease (S20). There is also growing public interest in how the gut microbiome can be influenced — often focused on personal dietary choices. Microbiologist Peter Turnbaugh reframes this as a question not of which foods will benefit our health, but rather what medical insights might be gleaned from the interactions between our gut microbes and what we eat (S23).

Much more research is under way on the gut microbiome than can be covered in this Outlook, but this supplement gives a taste of the breadth of this robust field (S24).

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Herb Brody
Chief supplements editor

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On the cover
Scientists study the microbiome to work out its role in health and disease. Credit: Antoine Doré

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