Microbiome research and the fight against AMR

AMERICAN SOCIETY FOR MICROBIOLOGY

Thanks to federal investment in microbiome research, including the Human Microbiome Project (HMP), we now know that antibiotics and other antimicrobials leave their mark on both the microbiome and host immunity. Antimicrobials expand the host-specific pool of antimicrobial-resistance genes and organisms, degrade the protective effects of the microbiome against invasion by pathogens and may impair vaccine efficacy. Researchers are leveraging this developing knowledge of human and animal microbiomes to create new tools in the fight against AMR.

What is microbiome research?

Microbiome research aims to advance understanding of microbial communities and how they interact with the world around us. Understanding of the microbiome has evolved significantly since the concept of the human microbiome emerged roughly two decades ago. Today it is understood that microbial communities exist on, in and around people, plants, animals and the environment and have symbiotic relationships that protect against disease and, in some cases, can be leveraged to treat it.

How can microbiome research combat AMR?

Recent advances in microbiome science have generated a booming demand for prebiotic and probiotic dietary supplements for humans and microbial food additives for animals. With the recent FDA approval of the first microbiome therapeutic to prevent a potentially life-threatening diarrheal disease, policymakers should consider additional support for research and streamlining FDA's approach to the regulation of microbiome-based products.

Looking across species, broader adoption of microbiome research will both support health and treat infections in humans, animals and plants. Understanding plant, soil and animal microbiomes will help inform the spread and persistence of AMR in agriculture and food production systems in addition to providing new tools to address it. The federal government has directed resources to human, soil and plant microbiome research in recent years but lacks sustained support for research on agriculturally important animals, where microbial interventions are an important tool in maintaining livestock health and preventing further spread of AMR.

The need to leverage the microbiome as a tool to promote human, animal and plant health is now greater than ever. A coordinated effort to evaluate human, animal and plant microbiomes could propel the bioeconomy to the next level and address the most pressing concerns in health, food safety and antimicrobial resistance. ASM urges policymakers to create a mechanism for strategic leadership, interagency coordination and support across federal science agencies on fundamental microbiome research.

Policy Recommendations:

- Recognize the integral role of microbiome research in the U.S. bioeconomy and support the infrastructure needed to advance microbiome research.

- Provide robust and sustained funding for fundamental microbiome research.

- Through cross-cutting funding and coordination across federal science agencies, study the impact of antibiotic and antifungal therapy on human and animal gut microbiomes, environmental microbiomes and agricultural microbiomes.

- Streamline the regulatory process to increase clarity and decrease the amount of time needed for new microbiome therapeutics to reach the market.

- Reinstate the Microbiome Interagency Working Group at the White House Office of Science and Technology Policy with a directive to develop a new Interagency Strategic Plan for Microbiome Research.