The Microbiome Protocols eBook (MPB) Initiative: Building a bridge to microbiome research

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The microbiome is an research area that studies the omics of the microbe1 with rapid development in the past decades, making breakthroughs in the microbiological studies in human2, animals3 and plants4 as hosts, and the environments5. The concept of microbiome has been extended to various fields. Thousands of microbiome articles are published every year, changing our conventional understanding of the microbes in medicine, agriculture, and industry. At present, a series of standardized analysis software and protocols for microbiome studies have been published. More specifically, QIIME26 is an integrated pipeline for microbiome data analysis, Minimum Information about any (x) Sequence (MIxS) is the standard of submitting microbiome sequences7, Critical Assessment of Metagenome Interpretation8 provides the standards of assessing metagenomics software. However, systematic protocol references for wet-lab experiments and data analysis are still lacking. Many problems impede the progress of experiments or analysis in this area, such as the need to optimize the experimental system, the difficulty to compare the results produced by different methods or protocols. To solve these problems, we initiative the Microbiome Protocols eBook (MPB).

The MPB was launched by Bio-protocol editorial office China and WeChat subscription "meta-genome", one of the largest microbiome communities with more than 118,000 members (June 2021). The Bio-protocol journal provides peer-reviewed and open access publication free of charge. The MPB aims to promote the communications and cooperations between researchers and research teams to summarize, share, and dissemination the protocols in the microbiome area. We hope this project will bridge the gaps in microbiome protocols to solve the problems of wet experiments and data analysis, and to prepare for the accumulation of standard data for big data integrated analysis in the near future. In summary, the MPB will greatly facilitate the development of the microbiome area. All protocols are hosted in Bio-101, a sister website of the Bio-protocol Journal. The project homepage link is <https://bio-protocol.org/bio101/mpb>.

The topics of MPB are the protocols of microbiome, including culturome9, amplicon10, metagenome11, metatranscriptome12, virome13, metaproteome, metabolome, microbe genome, related molecular biology and microbiology experiments, and the upstream and downstream related experiments and analysis of microbiome (Figure 1). According to the research objects, it mainly includes the microbiome in humans, animals, plants, and the environment (Figure 1). According to the research methods, it mainly includes sample preparation, nucleic acid extraction, protein and metabolite extraction, sequencing library preparation, microbial culture and identification, synthetic community, axenic system, data analysis, and general microbiology experiments and analysis (Figure 1).

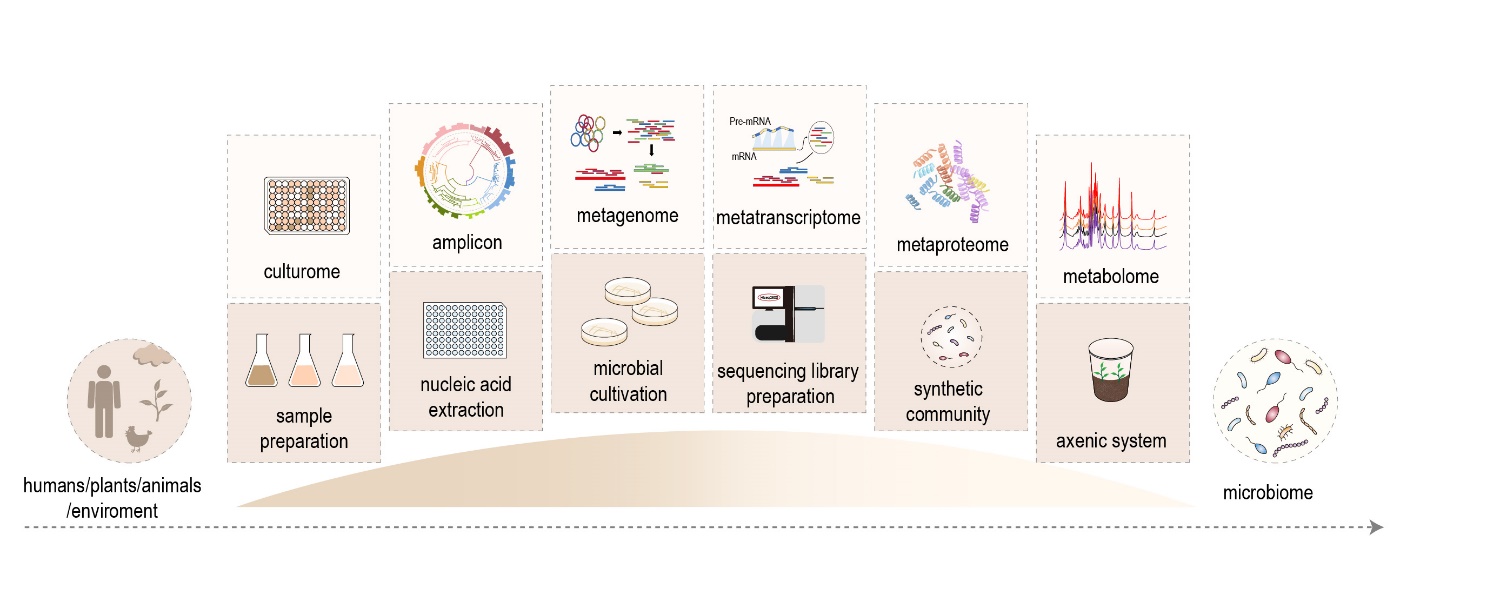


Figure 1. Microbiome Protocols eBook—Building a bridge to microbiome research.

Since the first announcement of MPB in July 2020, more than 200 researchers from more than 100 institutes or universities have been involved in the MPB, including the Institute of Genetics and Developmental Biology, Institute of Soil Science，Institute of Microbiology, Research Center for Eco-Environmental Sciences, and Institute of Urban Environment of Chinese Academy of Sciences, Chinese Academy of Agricultural Sciences, Peking University, Tsinghua University, Zhejiang University, Sun Yat-sen University, China Agricultural University, Shandong University, Yangzhou University, Westlake University, Nanjing Agricultural University, etc. At present, MPB 1st edition has published more than 120 protocols and the collection will be released in August 2021. MPB is open-access, and anyone can access it through various channels such as the Bio-protocol Journal, WeChat, CSDN, etc.

To keep the quality, diversity, and timeliness, the MPB is set up as a long-term project and plan to update biennially. The published protocols can be found on the project homepage. We sincerely invite more researchers to participate in this project. Any protocols related to the microbiome are welcome, especially for the commonly used or cutting-edge protocols. We hope MPB becomes a protocol encyclopedia and helpful tool for microbiome researches.

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