

Large-scale sequencing: The future of genomic sciences?

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Scientists can gain insights into new ways to use microorganisms in medicine and manufacturing through a coordinated large-scale effort to sequence the genomes of not just individual microorganisms but entire ecosystems, according to a new report from the American Academy of Microbiology that outlines recommendations for this massive effort.

The report, "Large-Scale Sequencing: The Future of Genomic Sciences?" is based on a colloquium convened by the Academy in September 2008. The report outlines recommendations for large-scale microbial sequencing efforts directed toward cultivated isolates and single cells, as well as a community-scale approach to characterize a set of defined ecosystems of varying complexity.

Until recently, sequencing entire microbial genomes was laborious and expensive, and the decision to sequence the genome of an organism was made by researchers or funding agencies. This ad hoc approach to gathering sequence data has resulted in an unbalanced and highly biased sampling of microbial diversity. Now, thanks to new technologies, the cost and effort of sequencing is within reach for even the smallest labs, and the ability to sequence the genomes of a significant fraction of microbial life may be possible. Systematic genomics efforts, like the ones outlined in the report, would significantly broaden our view of [biological diversity](#) and have major effects on science.

"A consensus rapidly emerged during the meeting that a taxonomically driven approach to gathering microbial [genome](#) information will provide

the greatest impact on our view of microbial diversity, the potential to find novel [genes](#) and proteins, and our understanding of the complexity of the microbial consortia that maintain the health of this planet," says Margaret Riley, Ph.D., colloquium chair.

The report outlines a five-pronged, coordinated initiative to exhaustively describe six different microbial ecosystems, designed to describe all the gene diversity across genomes. In this effort, the report says that sequencing should be complemented by other experimental data, particularly transcriptomics and metabolomics data, all of which should be gathered and curated continuously.

"Systematic genomics efforts like the ones outlined in this document would significantly broaden our view of biological diversity and have major effects on science," says Riley.

More information: A full copy of the report and further recommendations can be found on the Academy website at [academy.asm.org/index.php?opti... &view=article&id=260](https://academy.asm.org/index.php?opti...&view=article&id=260)

Provided by American Society for Microbiology

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