

# Welcoming a global microbiome initiative proposal for precision dentistry

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## Editorial

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Periodontal diseases are the outcome of the interactions among microbes, hosts, and environments, in which the microbial factor is implicated in inducing inflammatory responses leading to tissue destruction. Hence, identification of the periodontal microbiome is a key to understanding the pathogenesis and treatment of periodontal diseases. To investigate the periodontal microbiome, several study methods including classic culturing, denaturing gradient gel electrophoresis, and next-generation sequencing have been introduced, none of which has yet succeeded in fully explaining the entire set of mechanisms involved.

Success of the recent proposals to launch the Unified Microbiome Initiative (UMI) and the International Microbiome Initiative (IMI) from renowned scientists would provide a breakthrough. These scientists first acknowledge that microbiomes have grown in prominence, with several important studies presently being conducted. Scientists have further discovered the importance of numerous microbes residing inside the human body, whose functions range from fighting against diseases to maintaining a balanced immune system. The profound diversity of microorganisms has also been addressed: 40 major groups in the animal kingdom and upward of 1,000 phyla are recognized by microbiologists.

Dr. Jeffery F. Miller, corresponding author of the UMI proposal paper in *Science* (DOI: 10.1126/science.aac8480), and his colleagues insist that the UMI could uncover fundamental explanations of the microbiome. The areas of emphasis they propose include decrypting microbial genes and chemistries, cellular genomics and genome dynamics, and modeling and informatics, among others. Considering the importance of international collaboration in microbiome research, Dr. McFall-Ngai of the Pacific Biosciences Research Center at the University of Hawaii and her colleagues urged through their paper in *Nature* (DOI:10.1038/526631a) that the United States initiate the IMI because the UMI is conceived as a US initiative and stated that the IMI would work to develop guidelines, set priorities, identify tools, and establish forums.

These proposals will one day be remembered as a monumental step toward launching a focused program of microbiome research that transcends national borders. We enthusiastically anticipate the microbiological discoveries that will result from this broad international collaboration, and we look forward to incorporating these new approaches in microbiology into dental research, which could lead to making personalized dentistry a reality.

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