Broader Issues

Several broader issues still must be addressed in the near future, to maximize the impact of the investment in microbial genomics by both the public and private sectors. These issues include:

Access to Biological Resources. Mechanisms are needed to enable access of small research units to current and future Federal resources. The MPIWG believes that to promote scientific progress nationwide, it is essential to capitalize on human resources and provide state-of-the-art technology training for students and professionals at all levels of their careers.

Data release and intellectual property. Some Federal agencies require rapid release of microbial genome sequence data that are generated using public funds, because early release of unfinished sequence has proven useful in accelerating the pace of experimental discovery. On the other hand, the MPIWG recognizes that rapid release policies have to be balanced with other concerns, namely scientific fairness (allowing time for those who sequenced the genomes to do a first analysis of the information contained therein) and intellectual property, and recommends further discussion of these issues.

Implications of genomics with respect to pathogens and genetically modified microbes. Genomic sequence data is essential for enhancing our understanding of microbial life and for developing beneficial technologies such as rapid diagnostics, new therapeutics and vaccines. The MPIWG recommends that U.S. agencies support research on the scientific, environmental and ethical issues associated with the use of genetically modified microbes and engage in frank and open discussion about the ethical, legal and social implications of making public the complete DNA sequences of pathogens. With respect to the latter, the MPIWG notes that the White House Office of Science and Technology Policy has initiated such discussions, in the context of the security implications of fundamental biological and biomedical research.

Industry. Despite a significant private sector investment in microbial genomics, there are at least two compelling reasons for a strong public sector investment. First, industry's interests in microbial genomics are focused, understandably, on commercial value, including targeting of genes related to pathogenesis, possibilities for acquired pathogen resistance, industrial and food-grade enzymes, and probiotics (to encourage beneficial microbes) for animals and humans, all for wide-scale distribution and use. Public access to genome sequences and functional genomics data held by industry is expected to be limited. Thus, for some microbes, the MPIWG considers it necessary, in the public interest, to support research that will add to the data in the public domain. Second, industry itself is supportive of a more enhanced role for the public sector in microbial genomics. Many small biotechnology companies do not have the resources to do the critical basic research needed in microbial genomics. Without a strong public research base, many of these companies will not be able to receive the financing necessary either to get started or to survive.

International collaborations. International foundations, as well as private and publicly supported institutions are active in the field of microbial genomics. These are found in Belgium, Brazil, Canada, China, the United Kingdom, France, Germany, Japan, Norway and Sweden. U.S. scientists, supported by Federal agencies, have international collaborations with a number of these institutions and organizations to do microbial sequencing and functional genomics, primarily for microbes associated with human, animal and plant diseases. These efforts include microbes of public health and bioterrorism concern that are not being addressed by the private sector. It must be recognized that different governments have differing views on which microbes should be addressed, by whom and what resources to allocate. Nonetheless, international collaborations have already shown themselves to be very fruitful for other genomics efforts (e.g., the Human Genome Project and international plant genome projects including Arabidopsis and rice), and should be encouraged in the microbial genomics arena as well. International conferences and workshops regularly serve as fora for enhancing interactions among the public, non-governmental organizations, and private sector.