

Office of Energy Research

Notice 97-10

Microbial Genome Program

**Department of Energy
Office of Energy Research**

Energy Research Financial Assistance Program Notice 97-10; Microbial Genome Program

AGENCY: U. S. Department of Energy

ACTION: Notice inviting grant applications

SUMMARY: The Office of Health and Environmental Research (OHER) of the Office of Energy Research, U.S. Department of Energy (DOE), hereby announces its interest in receiving applications for grants in support of the Microbial Genome Program (MGP). The MGP focus is on developing and using high-throughput microbial genome sequencing that will provide functional genomic sequence and mapping information on microorganisms: with environmental or energy relevance; of phylogenetic significance; and of potential commercial importance and application. Bioinformatics tools relating to complete genomic sequences are also of importance to the MGP.

DATES: Preapplications referencing Program Notice 97-10 should be received by March 24, 1997. Formal applications in response to this notice should be received by 4:30 p.m., E.D.T., June 9, 1997, to be accepted for merit review and funding in early FY 1998.

ADDRESSES: Preapplications referencing Program Notice 97-10 should be sent to Dr. Marvin E. Frazier, Office of Health and Environmental Research, ER-72, Office of Energy Research, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290; e-mail is acceptable for submitting preapplications using the following address: lana.ahalt@oer.doe.gov. Formal applications referencing Program Notice 97-10 should be forwarded to: U.S. Department of Energy, Office of Energy Research, Grants and Contracts Division, ER-64, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 97-10. This address must be used when submitting applications by U.S. Postal Service Express Mail or any commercial mail delivery service, or when hand-carried by the applicant.

FOR FURTHER INFORMATION CONTACT: Dr. Marvin E. Frazier, ER-72, Office of Health and Environmental Research, Office of Energy Research, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-5468, e-mail: lana.ahalt@oer.doe.gov.

SUPPLEMENTARY INFORMATION: Molecular biological research on industrially important microorganisms and on microorganisms that live in extreme environments (including the deep subsurface, geothermal environments, hypersaline environments, frozen environments, and toxic waste sites) is a developing area of great scientific promise that will impact many DOE missions, other federal agency missions, and U.S. industry. The Microbial Genome Program supports key DOE business areas by providing microbial DNA sequence information that will further the understanding and application of microbial biology relating to energy production, chemical and materials production, and environmental cleanup. The exploration of microbial genomic sequence diversity is a natural outgrowth of past and current Biological and Environmental Research (BER) Programs, including chromosome mapping and DNA sequencing from the Human Genome Program, structural biology studies utilizing BER-supported facilities and synchrotrons located at DOE laboratories, and molecular microbiological research supported by BER environmental programs. The MGP benefits directly from capabilities at DOE national laboratories, DOE and National Institutes of Health Human Genome Centers, the DOE and NIH Genome Data Base (GDB), and university capabilities, including the DOE-sponsored Subsurface Microbial Culture Collection and the DOE Genome Sequence Data Base (GSDB). The MGP represents a considerable interdisciplinary effort and will contribute to and draw from a wide variety of public and private programs.

Applications are being sought in three complementary areas: genomic sequencing, functional analysis, and bioinformatics. Each application must clearly state which area is being addressed; if an applicant wishes to address more than one area, the application must clearly describe the expected advantages of an integrated approach.

1. Genomic Sequencing. The DOE intends to continue its support of one or two laboratories that will completely sequence carefully selected microbial genomes. Applicants must demonstrate that they can apply the most recent, high-throughput technology cost-effectively to the production of sequence data and show that they can adequately and efficiently accumulate, store and disseminate those data for future interpretation and application. A commitment to and a plan for making the sequence data publicly available by deposition into an accessible sequence database (GenBank and GSDB) within three months of data acquisition and annotation must be included in the Project Description. Preference will be given to those applicants that demonstrate well developed plans for selecting candidates for DNA sequencing. Candidate microorganisms may include, but are not limited to, bacteria and archaea that mediate or catalyze metabolic events of energy or environmental importance. Strict pathogens or parasites will not be considered. Applicants are encouraged to create process- and cost-effective partnerships that will maximize sequence data production and analysis, data dissemination, and progress towards understanding basic biological mechanisms that can further the development of biotechnology. It is anticipated that one or two major awards will be made to conduct microbial genome sequencing for a total of \$3 to 4 million in FY 1998.

Many microorganisms that are closely related by means of phylogenetic measures (e.g., 16S rRNA comparisons) display dramatic differences in phenotypic characteristics. Such differences can be chromosomal in origin, or they can be due to extrachromosomal genetic elements. DOE is interested in technologies that could exploit the completed sequence of one microorganism to efficiently determine the sequence of a related taxon, without resequencing the entire genome of

the related organism de novo. New technologies up to the proof-of-principle stage are eligible for support, and it is estimated that between two and four awards for a total of \$500,000 to \$1 million could be available in FY 1998.

2. Functional Analysis. It is presently difficult, and in many instances impossible, to predict biological function from genomic sequence data. Better methods are needed to identify open reading frames and predict their function. This is especially true for environmental isolates and for environmental microorganisms that cannot yet be cultured. Accordingly, applications are requested that will address these and related needs in the area of predicting biological function. It is estimated that between two and four awards for a total of \$1 to 2 million could be available for this area in FY 1998.

3. Bioinformatics. It is estimated that by June, 1997, completed genomic sequences of five or six archaea and bacteria (*Mycoplasma genitalium*, *Methanococcus jannaschii*, *Methanobacterium thermoautotrophicum*, *Archaeoglobus fulgidus*, *Pyrococcus furiosus*, and *Aquifex* sp. strain VF5) will be publicly available, as a direct result of DOE Microbial Genome Program funding. In addition, completed sequences for *Haemophilus influenzae*, *Saccharomyces cerevisiae*, and *Synechocystis* sp. strain PCC6803 are also now publicly available, and by June, 1997, *Escherichia coli*, *Helicobacter pylori*, and *Borrelia burgdorferii* genomic sequences should also be publicly available (all funded by other sources). This unprecedented explosion of genetic information, along with the anticipated increase in other genomic sequence data that will occur over the next year, has underscored the need for better approaches and tools for comparing and analyzing this rapidly increasing volume of data. Accordingly, applications are requested that will propose ways in which data from all databases can be accessed, analyzed, compared, updated, verified, and annotated. It is anticipated that between two and four awards for a total of \$1 to 2 million could be available for this area in FY 1998.

Potential applicants are strongly encouraged to submit a brief preapplication that consists of two to three pages of narrative describing the research objectives and method of accomplishment. Preapplications will be reviewed relative to the scope and research needs of the BER Microbial Genome Program, as outlined in the summary paragraph and in the SUPPLEMENTARY INFORMATION. Principal investigator telephone number, FAX number, and e-mail address are required as part of the preapplication. A response to each preapplication discussing the potential programmatic relevance of a formal application will be communicated to the Principal Investigator within 14 to 21 days of receipt.

It is anticipated that approximately \$7 million will be available for all MGP awards, five to ten awards are anticipated, contingent on availability of appropriated funds in FY 1998. Multiple year funding is expected, also contingent on availability of funds and progress of the research. Previous awards have ranged from \$200,000 to \$2 million per year with terms of one to three years.

Applications will be subjected to formal merit review (peer review) and will be evaluated against the following evaluation criteria which are listed in descending order of importance codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project;
2. Appropriateness of the Proposed Method or Approach;
3. Competency of Applicant's personnel and Adequacy of Proposed Resources;
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement and an agency's programmatic needs. Note, external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers will often be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The Office of Energy Research (ER), as part of its grant regulations, requires at 10 CFR 605.11(b) that a grantee funded by ER and performing research involving recombinant DNA molecules shall comply with the National Institutes of Health "Guidelines for Research Involving Recombinant DNA Molecules" (51 FR 16958, May 7, 1986), or such later guidelines as may be published in the Federal Register. The Project Description must be 30 pages or less, exclusive of attachments. It must contain an abstract or project summary, letters of intent from collaborators, and short curriculum vitae consistent with NIH guidelines.

To provide a consistent format for the submission, review and solicitation of grant applications submitted under this notice, the preparation and submission of grant applications must follow the guidelines given in the Application Guide for the Office of Energy Research Financial Assistance Program 10 CFR Part 605. Access to ER's Financial Assistance Application Guide is possible via the World Wide Web at: <http://www.er.doe.gov/production/grants/grants.html>.

Other useful web sites include:

MGP Home Page - http://www.er.doe.gov/production/oher/EPR/mig_top.html

GenBank Home Page - <http://www.ncbi.nlm.nih.gov/>

GSDB Home Page - <http://www.ncgr.org/gsdb/>

Human Genome Home Page - <http://www.ornl.gov/hgmis>

The Catalog of Federal Domestic Assistance Number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

John Rodney Clark
Associate Director

for Resource Management
Office of Energy Research

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