MAPPING AND SEQUENCING THE HUMAN GENOME

Board on Basic Biology

Background: On August 5, 1986, the Board on Basic Biology held a meeting to discuss mapping and sequencing the human genome (see attached list of participants). At this meeting, the feasibility of undertaking these projects, the costs, the outcomes, the organization, the value, etc., of such a set of efforts were discussed. The consensus of the invited participants was that if the project were to proceed, an appropriate goal at this time would be to obtain a physical map of restriction fragments of the human genome and possibly the genomes of other organisms. It was felt that a large sequencing effort was not wise at this time. Concern was expressed that if a large-scale project in physical mapping were undertaken that it be well coordinated and organized.

Proposed Plan of Action: It is proposed that the BBB appoint a committee to organize two or three workshops and write a report that proposes answers to questions such as the following:

- Should we analyze just the genome of man or other organisms as well?

- Who should do the project? Should it be done in separate labs or in a single institute? What will be the disposition of personnel and facilities after the project is completed? Who will manage the project and maintain the 60,000 clones generated?

- What is the required new technology and what is the best way to develop it?
o How will quality control be maintained to guarantee that clones are complete and errors are detected and corrected?

o How will data be acquired, stored, and disseminated?

o How should the project proceed? Should the effort begin with one chromosome?

o How can the physical map be integrated with the genetic map?

o How will polymorphisms be handled?

o How should the project be funded? What are the estimated costs? What will be the effects on funding of other scientific projects and on training? What is the role of governmental agencies, private foundations, and industry?

o How can international cooperation be facilitated?

o After the physical map is obtained, would sequencing of the whole human genome, or selected parts, be a goal?

o What are the societal implications of the project?

A committee of approximately 10 individuals will oversee the organization of the workshops and the writing of the report. This committee will be comprised of molecular biologists and geneticists - representing the two most relevant fields of expertise, but will also include biologists from other fields such as clinical medicine, population genetics, evolution, physiology, cell biology, etc.

Anticipated Results: This report will provide guidance to federal agencies and private foundations that are interested in a project on mapping of the human genome.
Expenditures and Sources of Funding: It is expected that this report will take six months and costs $125,000. Possible sources of funds include NIH, NSF, DOE, and Howard Hughes Medical Institute.

Requested Commission Action: It is requested that CLS approve this proposed activity.

Responsible Staff Officer: Dr. John E. Burris, NAS 353, 334-3282.