Science Watchers

Cancer, The Genome Project and HUGO

P.N. Goodfellow

WHEN the first links were made between retrovirus encoded oncogenes and human cancer a framework was provided for understanding cancer aetiology: cancer is a genetic disease of somatic cells. In the euphoria of the early experiments it was hoped that cancer was a simple genetic disease. This hope appeared to be well founded when RAS mutations were discovered in about 30% of all carcinomas. Unfortunately, recent experiments suggest a more complex story involving many different genes and multiple genetic changes often in the same tumour. For example, in small cell lung carcinoma cell lines, alterations are found in both *RB1* and *TP53* (retinoblastoma and p53 genes) as well as the specific deletions in the short arm of chromosome 3. Similarly, multiple genetic alterations have been documented in colon carcinomas. Two classes of genetic alterations can be discerned; those which are common to many different tumour types and those which are found only in specific tumours. Examples of the former type include changes in *RAS*, *RB*1 and *TP*53; an example of the latter class is the 8;14 translocation found in Burkitt's lymphoma. Documenting the common alterations may or may not prove to be straightforward: finding the tumour specific changes for the hundreds of different tumours is a formidable task. This is where the Human Genome Project is important.

The goal of the Genome Project is to sequence the whole human genome. Inherent in this goal is the production of detailed genetic and physical maps which identify the positions of all the human genes. These maps will be invaluable for investigators studying all aspects of human biology and will greatly simplify attempts to define the genetic changes associated with cancer. Consider a hypothetical carcinoma associated with an interstitial deletion of the short arm of chromosome 4. Cloning this gene is currently an arduous task requiring the isolation of DNA probes from chromosome 4, the construction of long range restriction maps, the identification of chromosomal breakpoints, the cloning of all the sequences between flanking markers and searching the cloned region for expressed genes. If the Genome Project is successful it would only be necessary to identify the breakpoint on the physical maps and to ask a computer for a list of all the genes in this region. This dream will only be possible if an enormous amount of work is done; the human genome contains 3×10^9 bp and 50,000 genes (give or take one or two). The task is so big and so important that it must be an international undertaking; this is where the Human Genome Organisation (HUGO) is important.

HUGO was formed as a forum and channel for promoting genome research. Its constitution is a body of self elected members, a council, an executive, vice-presidents and a President. The first President was Victor McKusick (Johns Hopkins, Baltimore) and the current President is Walter Bodmer (ICRF, London). The biggest challenge facing HUGO is to prevent the Genome Project becoming a competition along political or national boundaries. Cooperation, with free access to all the data, is the quickest way to finish the Genome Project. It is also the most effective way forward for cancer research.

Correspondence to P.N. Goodfellow.
Imperial Cancer Research Fund, Lincoln's Inn Fields, London WC2A 3PX, U.K.

News

EORTC

On behalf of the European Organization for Research and Treatment of Cancer (EORTC) we express our gratitude to Professor Michael Peckham, Editor in Chief, and his editorial team for accepting the challenge to continue a tradition of scientific excellence in a time of change that includes the new technologies in communication and education. We wish them every success and offer the continued support of EORTC through its branches and groups. It is appropriate to express our sincere gratitude to our publisher, Pergamon Press, and to its chairman, Mr Robert Maxwell, for their support and faith in the realization of our dreams: a common, updated, truly European journal in collaboration with our sister societies. This new venture was only possible because of the dedication of many, including Dr Sue Marsden of Pergamon. We hope that many others will join this cooperative endeavour.

EORTC aims to lead the way towards a collaborative European effort against cancer by exchange of expertise and information about scientific and clinical progress as well as by subjecting, with the national cancer leagues, all research to quality control. We receive most of our financial support from the national cancer leagues through the EORTC Foundation and it is fitting that we share and distribute acquired knowledge with this vast forum of scientific energy. Our new Central Office intends to serve European and international organizations, as well as national and monodisciplinary groups. We hope you will share the commitment that we feel and help us where you can.

Louis Denis
President EORTC