J Med Genet 1997;34:438–440

BOOK REVIEWS

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Technologies for Detection of DNA Damage and Mutations. Editor G P Pfeifer. (Pp 441; $95.00.) New York: Plenum Press. 1996. ISBN 0-306-45237-5.

Recent scientific advances have shown conclusively that damage to cellular DNA is the initiating event for many types of human cancer. The ability of cells to repair such damage represents a major form of protection against carcinogenesis. In the "DNA repair syndromes", a genetic deficiency in a DNA repair process results in extreme cancer proneness. Long standing examples are xeroderma pigmentosum and ataxia telangiectasia. More recently, hereditary non-polyposis colon carcinoma (HNPCC) has been shown to be caused by defective repair of DNA mismatches. An important biological consequence of unrepaired or incorrectly repaired DNA damage is the generation of mutations. Somatic mutations in oncogenes or tumour suppressor genes are critical steps in the progression of carcinogenesis. Germline mutations are the basis of genetic disease. In the field of human molecular genetics, as the genes underlying more and more genetic disorders are discovered, the need to identify disease mutations for the purposes of diagnosis, prognosis, and understanding of the disorders is mushrooming.

Technologies for the Detection of DNA Damage and Mutation is in three parts, which will be of interest to three quite disparate groups of researchers. The first part, on detection of DNA damage, covers a range of highly specialised techniques for measuring different types of DNA damage and their repair. Up until 10 years ago, DNA repair methodology was relatively crude, the techniques available being capable of assessing overall levels of damage and repair in populations of cultured cells. Techniques developed more recently have added much greater sensitivity and specificity. Single cell microgel electrophoresis (more commonly known as the comet assay), described by Singh, is a technique for measuring levels of damage in individual cells. Antibodies generated against different types of damage, such as that produced by UV light (Mitchell), alkylating agents (Thomale *et al*), and oxidative damage (Melamade *et al*), have increased the sensitivities of assays and enabled different types of damage produced by complex carcinogens to be measured.

A major advance in the mid-eighties was the development of procedures to measure repair in individual genes. These procedures are described in two chapters by the scientists who devised the techniques (Bohr, and Smith and Hanawalt). A further refinement was devised recently by Pfeifer (the editor of this volume) and Holmquist, who developed methods for measuring repair right down to the level of the individual nucleotides. Three chapters describe variations on this technique. This collection of up to date repair methodologies will be extremely valuable for advanced researchers in the field of DNA repair, but it is likely to be too specialised to be of much interest to medical geneticists. In contrast, part II describes technologies for the detection of mutations, of central importance to modern medical genetics. A variety of techniques has been developed over the last few years, all of them using variations of amplification of the target gene using the polymerase chain reaction (PCR), followed by some kind of electrophoretic separation to distinguish mutant from normal DNA. Each author is naturally a strong proponent for his own chosen technique, and all the methods (for example, denaturing gradient gel electrophoresis, single strand conformation polymorphisms, protein truncation test) are described in detail. It would have been useful to have had an overview of the pros and cons of each technique. For the relative novice, a crucial question will be the selection of the most appropriate technique to use for the problem being addressed.

Despite the similarity of the title of part III, on mammalian systems for mutation analysis, to that of part II, detection of mutations, they in fact address completely different questions and they are of interest to different groups of researchers. The procedures described in part III are used (1) to investigate the mechanisms of mutagenesis in mammalian cells, and (2) in the area of genetic toxicology to determine the mutagenicity of environmental chemicals. The systems used most widely in cultured cells, namely the pS189 shuttle vector and the *hprt* gene, are described by Seidman and by Maher and McCormick. A shortcoming of cultured cell systems for measuring mutations is that they cannot take account of the metabolism and pharmacokinetics of whole animals. In order to overcome this problem, bacterial genes (*lacZ* or *lacI*) have been integrated into mouse genomes. Following exposure of these transgenic mice to mutagens, the bacterial transgenes can be recovered from the mouse genomes from different tissues, and the mutations can be analysed by conventional bacterial molecular genetic techniques. The two systems that have been developed are described by Vijg and Douglas and by de Boer *et al*. These transgenic mouse systems have only been developed recently, and like all new techniques, they have a number of shortcomings, which are addressed by de Boer *et al*, together with future prospects and possible developments.

Despite the diverse specialists to whom the three parts of the book are likely to appeal, it has succeeded in bringing together a wide variety of the latest complex techniques, and will be of considerable value to many researchers. Most of the chapters are carefully written with theoretical backgrounds, detailed experimental protocols, and, in some cases, invaluable sections on limitations, pitfalls, and troubleshooting. It should find its way onto the shelves of many research laboratories.

A R LEHMANN

The Gene Bomb. David E Comings. (Pp 304; $25.00 pb.) Duarte, California: Hope Press. 1996. ISBN 1-878267-6.

This is the sort of book which gets geneticists a bad name. Put briefly, its thesis is easy to state: the sad, mad, bad, and the stupid are outbreeding the respectable, college educated, middle classes.

The cause is education. Ever more clever kids are getting to university where their studies distract their minds from sex (or at least reproduction) whereas the stupid start spreading their genes at a much younger age. Thus, modern society inadvertently selects for the genes associated with stupidity, sadness, badness, and madness. These genes are spreading through the population, explaining the increase in crime, alcoholism, depression, schizophrenia, attention deficit disorder, autism, and so on. This is the "gene bomb" of the title.

We are so lucky that Dr David Comings, a former president of the American Society of Human Genetics and former editor of the *American Journal of Human Genetics*, was keen eyed enough to detect this genetical epidemic, for otherwise it "could occur so gradually as to go unnoticed until it was too late to correct. However, its eventual effect on the human race could be far more disastrous than all the microbial epidemics combined."

This is hyperbole indeed. Worse than smallpox? Worse than cholera? Worse than malaria? One is tempted to ask for a reality check even before one has finished reading the introduction.

Even when the author appreciates that others might dissent from his thesis, he fails to understand why. In his discussion of intelligence, Dr Comings comments, "mention of the possibility that the IQ of the human race is beginning to turn a corner and evolve backwards to lower levels strikes a raw nerve." Not with me: laughter would seem the most appropriate response.

Let us have a reality check. In Britain today, a higher proportion of the population than ever before benefits from university or other forms of tertiary education; general literacy is higher at the end of the 20th century than it was at the end of the 19th; and a substantial proportion of the young people of the country are adept users of one of the most highly sophisticated products of human genius, the home computer.

We might worry that computer literacy is damaging traditional literacy, but that is nothing new. George Orwell complained in one of his essays that in the 1930s an entire generation was growing up intimately familiar with the workings of the magneto but ignorant of the Bible. It is boring and it is obvious, although apparently not to Dr Comings, that none of these things is consistent with a decline in IQ.

Some of his facts are simply wrong. He asserts, based on the evolutionary divide between humans and other primates, that "higher IQ appeared to require over 100 000 years to evolve". Yet our divergence from the other primates can be dated at least as far back as *Homo erectus*, nearly two million years ago. *Homo erectus* was so unintelligent it did not have language, but the point is that the period over which higher IQ developed is arguably 20 times longer than Dr Comings alleges. Consequently, we may legitimately ask for evidence of declining IQ over a time scale somewhat longer than the half century since the end of the Second World War.

ics and to teach principles of anaesthetic management. Each section combines updated information relating to the genetics of each disorder with practical clinical advice. The molecular genetic basis of each syndrome is concisely and well presented; the reader is brought up to date on the key molecular genetic details in a clear, readable, and well explained manner. The combination of the genetic aspects with the pathogenesis and anaesthetic management for each disorder make this a very useful reference text at the teaching level. This book is also a very useful reference text for practical guidance in the anaesthetic management of these disorders. However, given the extent of the material covered in this book, there is not sufficient room to explore the key issues in detail. Thus, this is essentially an exceptionally well written introductory molecular genetic/genetic disorder reference text that will be very useful to the anaesthesiologist for guidance at both the practical and teaching levels.

TOMMIE McCARTHY
MARY LEHANE

NOTICES

British Human Genetics Conference

The British Human Genetics Conference will be held on 15-17 September 1997 at the University of York, England. There will be special sessions on: Reproductive genetics; Insurance and genetics; Cardiac genetics; DNA repair disorders, as well as plenary sessions. The Carter Lecture will be given by Professor Mark W J Ferguson on "Cleft Palate: Developmental Mechanisms, Prevention and Novel Therapies". For further information contact Professor Peter Farndon, Clinical Genetics Unit, Birmingham Women's Hospital, Edgbaston, Birmingham B15 2TG, UK. Tel/fax: 0121 627 2634. email: bshg@bham.ac.uk

The Third International Workshop on Resistance to Thyroid Hormone

The Third International Workshop on Resistance to Thyroid Hormone (RTH) will take place on 12-13 October 1997 at The Given Institute and The Mountain Chalet in Aspen, Colorado, USA before the 1997 Annual Meeting of the American Thyroid Association in Colorado Springs. The Workshop will focus on clinical and basic aspects of RTH, mechanism of thyroid hormone action, and animal models of RTH with brief presentations with ample time for informal discussion and posters. Particular emphasis will be placed on participation by successful young investigators, junior faculty, and minorities. Land transportation from Aspen to Colorado Springs will be available on the morning of Tuesday 14 October. For information, contact The Third International Workshop on Thyroid Hormone Replacement, C/o Dr Samuel Refetoff, The University of Chicago (MC3090), 5841 South Maryland Avenue, Chicago, IL 60637, USA. Tel: (773) 702-6939. Fax: (773) 702-6940.

4th International Symposium on Brain Dysfunction—Neurogenetic Disease: From Molecule to Patient + International Prize for Brain Dysfunction Research

This Symposium will take place on 24-26 September 1997 in Troina, Sicily (Italy) and is sponsored by the Oasi Institute for Research on Mental Retardation and Brain Aging. The Oasi Institute invites the submission of original, unpublished research papers to compete for the 1997 award on the following subject: Neurogenetic Disease: From Molecule to Patient. For further details contact the Organising Secretariat, Mrs H Cerro, 4th International Symposium on Brain Dysfunction, Oasi Institute for Research on Mental Retardation and Brain Aging, I-94018 Troina, Italy. Tel: +39-935-93611. Fax: +39-935-653327. email: hcerro@oasi.en.it

Congress of Molecular Medicine

The Congress of Molecular Medicine, organised by Springer-Verlag Berlin/Heidelberg, will take place on 3-5 May 1997 at the International Congress Centre, Berlin, Germany. For further details contact Sabine Schaub, Springer-Verlag, Public Relations Department. Tel: 030/82787-282. Fax: 030/82787-707.