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BOOK REVIEWS

Chromosome Abnormalities and Genetic Counselling

Gardner and Sutherland. Oxford University Press, 2003

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The third edition of this cornerstone reference book still serves its major purposes admirably: to assist the genetic counsellor in the interpretation and explanation of chromosome abnormalities in clinical practise, and to expand the cytogeneticists' knowledge of the implications of their technical work.

Since the appearance of the first edition in 1989 a massive development in the field of human genetics and cytogenetics has taken place. The 'gap' between molecular genetics and cytogenetics is diminishing rapidly with the advent of more refined FISH techniques coupled with more precise knowledge of the gene content of each chromosome. However, much counselling still relies on empirical knowledge, and the long experience in the field by the two authors guarantees a comprehensive, yet clear and balanced account. The literature references include, as far as possible for a text book, the latest updates, supporting the value. The ethical implications, so important in the genetic counselling situation, are treated as a part of the framework of the genetic information.

New chapters have been added since the second edition in 1996: the complicated genetics of the imprinting syndromes is described in detail in a remarkably clear and educational way.

A chapter on preimplantation diagnosis has also been added, and the chapter on abnormalities found at prenatal diagnosis has been expanded to account in a useful way for the difficulties in connection with for instance mosaicism.

New techniques, for example, comparative genomic hybridisation (CGH) and subtelomeric screening as well as array CGH are mentioned briefly. No doubt these techniques will gain further impact in the coming years leading to new knowledge, but also new clinical problems, that is, the distinction between 'normal variants' and pathological aberrations.

This continues to be an indispensable book laying the grounds for 'good clinical practice' for genetic counsellors, as well as being an asset for the laboratory.

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Genetics of mitochondrial diseases

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Mitochondrial disease used to be thought of as a rare cause of muscle weakness, an area restricted to either specialist neurogenetic clinics, or the preserve of mitochondrial geneticists – a small group of molecular scientists who had an interest in a tiny genome separate from the usual 23 chromosomes that ordinary geneticists study.

Times have changed and increasing recognition that mitochondrial mutations are much more frequent than realised and are the cause of some common diseases necessitates better knowledge of this area for all clinicians and molecular biologists. Recent media interest in the use of mitochondrial gene variation that allows tracing ancestors back to matrilineal forebearers in conjunction with Y chromosome probes for male ancestors has stimulated a popular interest in the mitochondrial genome and websites selling ancestry kits based on mouth swab analysis of your mitochondrial gene are flourishing.

This book is timely in that although it does not yet mention ancestor tracing, it covers the clinical aspects of mitochondrial disease, and has sufficient molecular genetics and mitochondrial pathophysiology to more than satisfy the requirement that this is all you need for a complete work on mitochondrial disease that is concise and readable.

The book is split into five sections – the first on mitochondrial structure and function is excellent with four chapters of mitochondrial function, replication, repair and expression of DNA. The chapters are good for reference and educate the reader on what mitochondria are there for, and can be dipped into and digested slowly on their own or referred back to when needing further basic science detail as more clinical sections of the text are read later. They are preceded by an excellent short glossary of mitochondrial terms.

The next section gives a succinct and understandable account of the clinical aspects of mitochondrial mutations, and how duplications and deletions of mitochondrial DNA cause disease. This section illustrates how mitochondrial disease is present in almost every organ system, for example, hereditary hearing loss may be caused by an A3243G mutation with none of the other clinical features associated with mitochondrial disease such as muscle weakness, or retinopathy. Screening of late onset apparently autosomal dominant families with hearing loss for this specific mutation will give a yield of between 3 and 27% of families depending on the population surveyed. A useful test for the clinician dealing with deafness families.

Paragraphs on 'heart', 'endocrine', 'bone marrow', 'gastrointestinal tract' and others give a quick reference to disorders within organ systems in the body and these sit well for easy reference alongside good clinical descriptions of the more

'commonly' recognised mitochondrial syndromes including MELAS, MERRF and NARP. Terms such as heteroplasmy and risks for offspring of patients carrying duplications or deletions are well explained, along with useful tables of clinical symptoms.

There are good sections on mitochondrial cell function, and how mtDNA mutations lead to cell death and how ageing may be the most common mitochondrial disease of all with paragraphs on why the basal ganglia are susceptible to mitochondrial toxins, and the role of mitochondrial dysfunction in Parkinson's disease, Alzheimer's disease, Huntington's disease and amyotrophic lateral sclerosis is clearly outlined.

The pure scientist will find ample chapters on cell biology and mouse models of mitochondrial disease and clinicians will find these chapters useful also. I particularly found the chapter on prenatal diagnosis of mtDNA disease good with sections on genetic management of disease and estimating recurrence risks. The book ends with a sensible and realistic chapter on the prospects for gene therapy and mitochondrial disease.

There is little repetition and few errors in the book other than some spelling mistakes, and the book is well written and edited. Future improvements could be adding to the four colour plates in the middle, which are excellent, but more colour photographs of some of the complex diagrams and pictures of some of the muscle stains would be easier to interpret than the black and white versions.

Given the rapid pace of research and translation into clinical diagnosis over the last 5 years, this book is timely and will help improve the limited knowledge of most general clinical and molecular genetics in this evolving and increasingly relevant area. This book should be welcomed by basic scientists interested in mitochondrial function, and should be on the shelf of every clinical genetics and neurology department for quick reference to facts and tables that are not easily accessible in other books or by electronic means.

The next edition might well include a set of mouth swabs in the inside cover along with that new chapter on ancestor testing, so that when you have read the book, you will be informed enough to interpret the genealogy report on your long-lost great-grandmother.

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