

Book Review

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Chromosomes Today, Volume 14. Eds. M. SCHMID & I. NANDA. Springer Verlag. 2004. 274 pages. ISBN 140200091X. Price £76.00 (hardback).

Chromosomes Today contains the conference proceedings from plenary sessions delivered at the 14th International Chromosome Conference held in Wurzburg in 2001 and is edited by the host of the meeting, Michael Schmidt and his colleague Indrajit Nanda. The sections relate to individual sessions of the conference with a number of the speakers from each session providing a paper on their work. Putting together a conference proceedings is notoriously hard since persuading researchers to put their unpublished work into a proceeding publication can be difficult and not all speakers or chairs want to contribute their time to writing proceedings post-conference. Having said this the editors have gathered together contributions from many important and influential chromosome biologists, including J. Marshall-Graves, T. Haaf, W. Schempp, H. Hameister, W. Traut, R. Benavente, H. Schertan, M. Speicher, B. Dutrillaux, H. Cooke and others and the papers collected together in this volume are up-to-date and informative on many levels i.e. technical advances, evolution, chromosome behaviour and theoretical.

The sections cover such diverse topics as sex chromosomes, meiosis, cancer cytogenetics, chromosome structures, and plant cytogenetics. The sex chromosome and the meiosis sections are the most comprehensive and will be good reading for scientists or proto-scientists interested in these fields. Thus, laboratories involved in these topics may consider investing in *Chromosomes Today – Volume 14*. The section on Chromosome Structure is rather more assorted, covering topics such as technical advances in multi-colour FISH, artificial chromosomes to epigenetics.

One of the most pleasing aspects of the sex chromosome section is that it covers a wide range of organisms such as fish, primates, various insects, marsupials and monotremes, other mammals and birds. This gives the reader some useful comparisons between the different organisms, some being classical model organisms while others are a little more diverse.

Indeed, the whole volume is very strong on information and data concerning mammals and birds. For the sex chromosome section Jenny Marshall-Graves and Paul Waters discuss eruditely the rise and fall of the Y chromosome, revealing the probable fate for this chromosome and how evolution may be creating other systems to retain a sex chromosome. I. Nanda *et al.* describe the sex determining mechanisms in the chicken genome, namely the genes *DMRT1* and *WPKCI*. Sex determination in fish is then discussed in the following paper by I. Hornung *et al.* They relate that it has not been possible to study sex determination in the classical fish models such as puffer and zebra fish, however medaka (*Oryzias latipes*), a newer fish model, has a sex determination system more like mammals. Sex reversal is possible in this fish, making it an interesting organism both mechanistically and evolutionarily. Methylation of chicken sex chromosomes is reported in the paper by Teranishi and Mizuno with an informative discussion on the role of non-coding RNA species. Insect sex determination and evolution is covered eloquently in papers by Steinmann and Steinmann and Walther Traut. Kehrer-Sawatzki and Hameister then inform us on the role of the X chromosome in the “last steps of evolution” – speciation.

The next section comprises a number of papers reviewing specific topical aspects of meiosis. Winking *et al.* reveal the behaviour of the nucleolar and chromatin binding protein pKi-67. This protein does not yet have a distinct function assigned to it and is found in proliferating cells. Here the authors reveal how pKi-67 associates with different structures in the meiotic processes in both males and females. The interesting meiosis in *C. elegans* is presented in a paper by Loidl *et al.* highlighting differences to higher organisms. Solari provides an in depth paper on the structure of meiotic chromosomes and the mechanistic processes they encounter while transversing meiosis. Benavente *et al.* and Schertan both discuss the dynamics of telomeres in meiosis, with the former reporting the possible association of telomeres with the germ cell lamin C2 at the nuclear periphery. Schertan's paper describes telomere behaviour

during prophase I of meiosis and is particularly well referenced.

The cancer genetics and plant cytogenetics sections both contain only 2 papers in each and as such under represent the interest in plant genomes and chromosomes and cancer cytogenetics methods. Cancer genetics has a paper on how different molecular cytogenetic techniques are used for cancer study by Koch and an interesting paper by S. Bohlander concerning chromosomal translocations in leukaemia with an informative diagram revealing the different genes involved in leukaemic translocations. Plant cytogenetics contains a paper by Schmidt *et al.* illustrating in detail some of the similarities and differences of the chromosomes of the Sugar beet species with other plants. Organisation of *Arabidopsis* interphase chromosomes is presented by Schubert *et al.*, describing the use of specific antibodies to acetylation on H4 and H3.

The chromosome structure section contains a paper describing the new advances in multi-colour FISH (Fauth *et al.*) and an informative report on artificial chromosomes, discussing many aspects of this important topic from construction to their future as a gene therapy vehicle (H. Cooke). Epigenetics is represented

by papers from Haaf *et al.*, explaining the differential demethylation patterns revealed in early embryos for the maternal and paternal genomes and a paper on DNA methylation and its influence on chromosome compaction and cohesion (Bernardino-Sgherri *et al.*). This latter paper discusses some of the short-comings in former studies on this topic. Garagna *et al.* have produced a very informative paper on the evolution of mouse pericentric DNA and K. Sperling describes the complex organisation of constitutive heterochromatin in the European field vole in mitotic and meiotic cells. Also in this section Yang and Graphodatsky present their high resolution integrated comparative genome maps of a range of carnivores including dog, human, cat, mink, bear, fox and raccoon.

Given the wide diversity of sub-topics and different organisms discussed in this volume of Chromosomes Today it would make an interesting addition to any lab library but would also make an excellent supplement for undergraduate teaching in genetics and chromosome biology and perhaps should be purchased by the libraries of teaching establishments.

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