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Book Review

Drosophila Cytogenetic Protocols

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Methods in Molecular Biology. By Daryl S Henderson. Humana press, Ottawa, Ontario, Canada

Cytogenetics aims to understand the structure, function and mechanisms of transmission of eukaryote chromosomes. Pioneer cytogenetic studies quickly identified *Drosophila melanogaster* as a powerful model organism for studying chromosomes. Even with the advent of sequenced genomes, cytogenetic research is far from over and new techniques to study DNA have emerged. Now, a new methods book, 'Drosophila Cytogenetics Protocols' edited by Daryl S Henderson, can be used as practical guide for the analysis of chromosomal DNA in *Drosophila*.

The book combines classic and new methods for the analysis of *Drosophila* chromosomes. General topics include analyses of nuclei and chromosomes in spermatogenesis and oogenesis, fluorescence-activated cell sorting of ovarian follicle cells, analyses of nuclear division cycles in embryos and analyses of programmed cell death. In addition, there are conventional light-, electron-, and immunofluorescence-microscopic analyses of polytene chromosomes; cytological analyses of larval brains, imaginal discs, and histoblasts; and nonfluorescent and fluorescent *in situ* hybridization (FISH) to both polytene and mitotic chromosomes. The book is arranged with each of the 25 chapters written by experienced drosophilists in the field. Unfortunately, this format makes it difficult to find specific protocols. One example is the analysis of polytene chromosomes for which numerous methods are described in six chapters of the book, but no index of methods is provided.

In the chapter dedicated to cell death visualization, one can learn Tunel, Annexin V and Acridine orange staining. This chapter is brief but clear; it gives useful advice to realize and interpret the experiments, as with a great majority of the protocols in this book. However, a more specific description of the cell death pathways in *Drosophila* as well as a recapitulation table for the source of available antibodies (e.g.: CM1/anti-activated caspase 3) and other reagents would have been helpful. A technique to evaluate DNA damage induced by drugs or irradiation on a living fly is described in Chapter 22. This simple bioassay, also known as the 'wing spot test, provides a rapid means to assess the potential of a chemical to induce loss of heterozygosity, resulting from gene mutation, chromosomal rearrangement, chromosome breakage, or chromosome loss. In Chapter 12, one also can learn how to locate aberration breakpoints onto the salivary chromosome map. This can be very useful to map chromosomal deletions ('deficiencies') generated by mutagenesis or to verify a 'deficiency' stock.

Not all the chapters are of the same standard, although many are excellent and combine the right amount of technical advises and theoretical information. The spermatogenesis chapter is a good example, in which we can find great figures and tables to illustrate each staining proposed and to describe available resources. It also provides a detailed description of well-characterized testes phenotype and the illustration of typical artefacts. This chapter is to my opinion, a great introduction to spermatogenesis and a readily accessible tool for new researchers in the field.

This book covers a large set of procedures to study DNA but a few gaps are noticeable. In particular, while a method for RNAi gene interference is described using cultured cells, none is available for using transgenic flies. In the last few years, many laboratories have put forth a great effort, although not always rewarded, in generating transgenic flies carrying RNAi constructs that interfere with gene expression in the developing or adult fly. A reliable technique and the description of the possible pitfalls for this approach are cruelly missing. Also, *Drosophila* is a powerful organism to perform genetic studies, but problems in culturing *Drosophila* germ cell made targeted mutagenesis impossible. Now, the group of Kent Golic has circumvented this problem by performing targeted mutagenesis of specific genes using homologous recombination in transgenic flies. Such methods could have fit nicely in this book. Finally, the editor could have included a technique to describe genetic mapping using single-nucleotide polymorphisms (SNPs), which seems more and more to be the technique of choice to rapidly clone genes targeted by chemical-induced random mutagenesis.

Nevertheless, this book provides a good collection and description of many of the methods required to study chromosomal DNA in *Drosophila*. However, $125 per copy might appear too expensive for other than chromosome experts.