

Book review

Glycoanalysis Protocols

2nd ed., edited by E. F. Hounsell, Humana Press, Totowa, NJ, USA,
1998, ISBN 0-89603-355-4, hardbound, 262 + x pp, US \$64.50

The 1990s have seen the appearance of a number of books devoted to the analysis of glycoconjugates, such as *Glycobiology: a practical approach* (1993), *Methods in Enzymology* vol. 230 (1994) and *Glycoprotein Analysis in Biomedicine* (1993). Indeed, the book under review is the revised and renamed version of the latter volume; however, the new version has a slight difference in bias since it covers not only glycoproteins, but also has a couple of chapters on glycolipids as well. Overall, Elizabeth Hounsell as Editor had the declared aim of translating experts' "life's works into easy-to-follow recipes". In general, this appears to have been well accomplished with many basic protocols set out point-by-point, annotated as deemed necessary with various "competing" technologies for analysing oligosaccharides described. A number of stylistic changes are to be noted: the book is now hard bound rather than spiral bound (which may or may not be an advantage) and benefits from, in my view, clearer typesetting. More practically, the "materials" sections are now generally split by method rather than being given in one long list per chapter, but "materials" still remain divorced from their companion "methods".

Chapter 1, written by the book's Editor herself, is a revised version of the previous edition's first chapter and offers an overview of various ways of analysing a protein's glycosylation status, from periodate oxidation to NMR analysis, while again the succeeding chapters cover more specialised topics. Chapter 2 by Greis and Hart describes methods for detection of the presence of O-linked GlcNAc residues and is a development of the previous edition's chapter on glycosyltransferases as tools in cell biology, while the chapter on lectin

affinity chromatography (Chapter 3) has been slightly revised by Yamamoto, Tsuji and Osawo. On the other hand, the chapter on the reagent array analysis method (Chapter 4) by Prime and Merry is new and appears to be a replacement for the "old" chapter by Mizuochi on hydrazinolysis, P4 gel filtration and exoglycosidase sequencing. Unfortunately the new chapter's protocols rely heavily on one company's equipment and reagents and so does not give a laboratory new to the field the opportunity to build their own systems based on the Kobata methodology. Chapter 5 (Weitzhandler and colleagues) details an HPAEC-based methodology for determining the monosaccharides released by exoglycosidases, while Chapter 6 (Davies and Hounsell) offers a number of HPAEC, HPLC and GC-MS methods for analysing oligosaccharides. For those who favour pyridylamination over 2-aminobenzamidation for fluorescent labelling, Natuska and Hase (Chapter 7) give a revised account of their laboratory's relevant labelling and chromatography protocols.

The completely new, and excellent, chapter (Chapter 8) on electrophoresis by Klock and Starr is sufficiently detailed so as to allow readers to not have to rely on kits. Rider has revised his previous glycosaminoglycan chapter (now Chapter 9), while the coverage of the analysis of mucins has been completely revamped. Corfield and colleagues (Chapter 10) have added material on analysis of mucins from apoptotic and differentiating cells and even cover a bit of molecular biology, while Chapter 11 by Campbell and Rhodes appears to replace four "old" chapters and gives protocols for mucin sample preparation all the way to HPAEC separation and analysis of released O-glycans.

Completely new are the two chapters on glycolipids; Muthing discusses thin layer chromatographic techniques (Chapter 12), while the analysis of amphoteric glycolipids from invertebrates is the subject of Chapter 13 by Geyer and colleagues. Following on from this, Ferguson and colleagues (Chapter 14) have significantly revised their “old” chapter on the analysis of glycosylphosphatidylinositol anchors. This chapter contains a good number of figures and detailed protocols describing means of analysing both the “glyco” and “lipid” parts of these anchors. The final chapter (Chapter 15) by Lee and colleagues is a new-comer and highlights a new method for conformational analysis using double fluorescent-tagging of glycopeptides. Indeed, overall, this book does indicate a shift from radioactive to fluorescent methods for labelling oligosaccharides, although the latter does have its drawbacks (quantitation) as well as its advantages (safety) over the former.

No book can be exhaustive in terms of methods or applications; however one criticism is that (except for a discussion of invertebrate glycolipids and parasite glycolipid anchors) this book is, like its rivals, “mammalocentric”. The drawbacks of using enzymatic release for non-mammalian glycans are given one sentence, but it is undoubtedly the case (well certainly from my perspective!) that a

fair amount of structural determination in glycobiology today centres on either unusual oligosaccharides from, say, parasites and plants or in biotechnologically-related searches for the differences between mammalian, insect and yeast expression of glycoproteins. Also, more importantly and disappointingly the new book lacks any “stand-alone” replacement for the two “old” chapters on FAB and GC mass spectrometric techniques, probably because these are covered by another book in the series, vol. 17 edited by Jones, Mulloy and Thomas. Similarly the glycobiological applications of MALDI-TOF and electrospray mass spectrometry are not extensively described here, even though it would seem that these techniques are now gaining an important place within the portfolio of glycoanalysis methods.

To summarise: the Editor should be commended on bringing together these contributions making this new book probably the currently most modern account of many methods in the analysis of glycoconjugates; at a cost of US \$64.50 it is competitively-priced and will prove a useful addition to the bookshelf of any laboratory where these molecules are studied.

Iain Wilson
Department of Biochemistry
University of Dundee, Dundee, Scotland