perspective of their own company. There is always a danger that the contribution of biotechnology researchers will reflect specific company interests and that is the case here. A more objective overview of how antibody and scaffold reagents can be produced by library methods would have been welcome.

There is a chapter on glycoprotein analysis from Packer and Keatinge. This highlights the importance of post-translational modifications and a more comprehensive coverage of this important area (such as that given on phosphoproteins) could be very useful. There is an interesting contribution from Cahill and Nordheim on the pros and cons of carrying out proteome research in an academic setting, and a final chapter by Thiellement *et al.* addresses proteomics in plant genetics. The overall content of the book is technology focused and I would like to have seen more on the applications of proteomics, especially in medical research.

The chapters are mostly well referenced, generally to 1999 with a few references in 2000. The index is basic and not particularly helpful — there is no mention of 'post-translational modification', for example. As often occurs in an edited monograph, there is quite a lot of repetition, particularly as many of the chapters cover inter-related aspects of protein separation, detection and identification. Moreover, proteomics is a field which is very well and frequently reviewed and has its own dedicated journals. A lot of the information has therefore been published (more than once) in similar form elsewhere, often by the same authors; reviews on proteomics are very plentiful and have the advantage that they are continuously updated.

Is this book worthwhile? The answer is strongly in the affirmative. The writing style is good, the chapters assume little previous experience of proteomics and would bring the reader well up to date in 1999. This is, of course, the problem: how to keep a book such as this current in a rapidly changing world. I have pointed out some omissions of recent developments. A lot of the information here is fundamental and will remain useful for some time to come, but there is going to be a need for new editions at quite frequent intervals. The editors have done a very good job in obtaining contributions from first-rate authors and it is hoped that they will continue the effort.

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Transgenic Models In Endocrinology

Edited by Maria Castro
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Major advances in the field of endocrinology have frequently been driven by the application of new technologies, and transgenic technology is no exception. The capacity to introduce new genes, altered genes or even to 'knock out' genes in whole mammalian organisms has had an enormous impact on our understanding of how specific components of the endocrine system influence physiology. The editor of this book has aimed to show how transgenic technologies and models have been used for the study of a wide range of endocrine systems, including reproduction, the stress axis, control of lactation, water and electrolyte balance, appetite control and therapy for pituitary tumours. Unquestionably, the focus of the book is biomedical which has meant that the scope of the book is limited largely to a discussion of murine transgenic models. The book, however, is very topical and the editor has brought together an impressive number of experts from very diverse fields, which is reflected in the

quality of the chapters and which makes the book an important addition to any endocrinologist's library.

There are 11 chapters in the book which can be grouped approximately by subject, although there are no cross-references between chapters, which sometimes leads to an overlap in chapter contents. Chapter 1 by Murphy and Wells is very ambitious and gives a general overview of rat transgenics and functional genomics. The opening sentence of this chapter rather dates the book, as it refers to the '. . . recently sequenced human chromosome 22. . .', although it also gives the reader a notion of just how quickly information becomes dated in this fast moving field. The authors of this chapter give a useful overview of rat transgenics, the hypothalamo-neurohypophyseal system (HNS), the way in which comparative genomics can contribute to advances in endocrinology and the problems with rat transgenesis and alternatives to knockouts. The inclusion of an extensive reference list allows the reader to extend their understanding of the numerous themes considered. Chapter 2 by Gainer and Young presents murine transgenic models for studies of oxytocin (OT) and vasopressin (VP). The biology of OT and VP has largely been studied in rats and the authors point out the inherent advantages of generating rat transgenics. The difficulties of generating transgenic rats means that studies of this system have generally been carried out with transgenic mice. This chapter is well structured and the authors put the transgenic studies into context by first describing the use of the HNS as a model system to study OT and VP. The 'search to understand the mechanisms for cell-specific gene expression' is clearly presented, as is the background leading up to the generation of diverse transgenes. Finally, a consideration of other approaches used to study gene function in the HNS, such as knockout mice and comparative genomics, is presented. All the work discussed is supported by ample citations.

The next two chapters are loosely associated and describe the impact of transgenic models of gonadotrophin-releasing hormone (GnRH) and lutenising hormone (LH) on the field of reproductive physiology. Chapter 3 by Herbison presents the various strategies attempted to characterise the GnRH phenotype. The contribution of immortalised murine cell lines inadvertently produced in GnRH promoter transgenes is described and followed by a more extensive consideration of how transgenic models have been used to examine GnRH gene expression *in vivo* and *in vitro*. Finally, the future perspectives of GnRH transgenics are briefly considered. The following chapter by Owens *et al*. is about LH hypersecreting mice that display a number of ovarian pathological responses, including the development of ovarian granulosa cell (GC) tumours. This is the first chapter of the book in which a link between the transgenic models and their potential impact on our understanding of a human disease is presented. A brief overview of the hypothalamic–pituitary–gonadal axis and the mouse ovary provide the background necessary for understanding the subsequent transgenic models of LH hypersecretion and the resulting reproductive phenotypes. The results from non-transgenic mouse models of GC tumours are compared with the results from the transgenic model. Finally, the authors summarise what is know about the development of ovarian GC tumours in women and it is evident that, although transgenic models have failed to explain the molecular pathogenesis of GC tumours in women, they have provided compelling evidence for the role of gonadotropins and should be useful for studies aimed at understanding the genetic basis of the disease.

Chapters 5, 6 and 7 of the book all consider different transgenic models for various members of the growth hormone (GH)/prolactin (PRL) and placental lactogen (PL) gene family. Chapter 5 by Cattini and Duckworth focuses on the use of transgenics, in combination with

hybrid reporter genes directed by homologous and heterologous promoters, to study spatial and temporal transcriptional control of the human pituitary GH gene and the rodent PL gene family. Initially, the use of cell lines for *in vitro* analysis of promoter activity is presented, followed by a consideration of the limitations of cell lines and the rationale for the use of transgenic mice. The disadvantages of transgenics, cost and the specialised technical skills required has led the authors to explore the use of 'F_o' transgenics. The rest of the chapter comprehensively considers homologous and heterologous promoters and F_o transgenic mice. An added bonus of this chapter is that it highlights the experimental considerations that need to be made with this type of system. The extensive list of references provided should be helpful for anyone considering using this approach in their own research.

Chapter 6 by Chandrashekar *et al.* continues on the pituitary theme, but takes a very different approach from the preceding chapter. Neuroendocrine and reproductive functions in transgenic mice with altered GH secretion or GH receptor genes are reviewed. Initially, the authors present an overview of the evidence that established a role for GH in the reproductive physiology of both males and females. The role of spontaneously occurring mutants in this field is considered and acts as an introduction to the engineered transgenics. The subsequent pages concisely present the results arising from transgenic mice with excess GH secretion or mice in which the GH receptor gene has been disrupted. This chapter is short but very concise and contains 99 key references for those readers who want to pursue this subject. Reproduction is also the theme of Chapter 7, but, in this case, the role of PRL is presented. This chapter by Binart and Kelly is well organised, providing essential information about PRL, the PRL receptor (PRLR) and the signal transduction pathways that are activated as a result of ligand–receptor interactions. This is followed by an in-depth consideration of the way in which reproductive function is changed in transgenic mice in which PRL or PRLR is knocked out, and the chapter finishes with a consideration of future research perspectives.

The next two chapters continue the trend with the pituitary gland and present, respectively, the effect of mutations on the corticotropin pathway and the proopiomelanocortin (POMC) system. In Chapter 8, Murray *et al.* give a general consideration of the hypothalamic–pituitary–adrenal (HPA) axis that includes the main hormonal elements (corticotrophic-releasing hormone [CRH], adrenocorticotropic hormone and glucocorticoids), the CRH receptors and the regulation of this pathway. Subsequently, human disease states manifesting dysregulation of the CRH pathway are presented and this is followed by an exhaustive consideration of the 11 mice transgenic models that have so far been generated. This chapter provides a very thorough overview and deals with this complex system and numerous animal models in a clear and concise manner. Chapter 9, by Smart and Low, discusses the role that spontaneous and induced genetic mutations of the POMC system have played on the analysis of gene regulation and biological function. The biosynthesis and post-translational processing of POMC are briefly presented, followed by a description of the role of POMC peptides in energy homeostasis. The contribution of studies with spontaneously arising mutant mice models to the generation of a hypothesis about the way in which POMC peptides are implicated in obesity is outlined. POMC gene regulation using promoter analysis in transgenic mice and the generation of novel POMC-expressing cell lines are presented, followed by a discussion about transgenes carrying mutated POMC. A range of different phenotypes are generated by transgenics carrying POMC gene mutations; this reflects the diverse functions of the

peptides arising from POMC. Some of these transgenics have provided essential data to support the energy homeostasis hypothesis arising from observations of spontaneous mutants. A final summary presents the future prospects for transgene technology in this field.

Chapters 10 and 11 are very topical and present the advantages of using viral vectors to transfer genes to endocrine tissue and also for gene therapy. These last two chapters of the book are rather more experimental than all of the preceding chapters and are of considerable clinical interest. Chapter 10 by David *et al.* is a useful introduction to Chapter 11 as it reviews the characteristics of different viral vectors and then considers the approach used for target gene delivery. The problems associated with the viruses currently available are highlighted, as are the targeting strategies for their use. The chapter concludes with an overview of the transient transgenics that have so far been produced using viral vectors. Chapter 11, by Castro *et al.*, considers the use of viral vectors for creating transgenics in specific organs and tissues and considers in more depth this technique as applied to the anterior pituitary gland. Gene delivery is discussed, as well as the potential benefits and difficulties associated with the generation of cell-specific transgenes by designing hybrid promoter/enhancer units using viral vectors. Subsequently, the use of such techniques for gene transfer/therapy applications is discussed and the key studies and their results summarised. The desirability of being able to regulate transgene expression and the engineered expression systems that have been used with greatest success *in vitro* and *in vivo* are presented, with particular emphasis on the mechanisms that underlie the tetracycline gene regulatory system. Finally, systems combining both regulated and cell type-specific transgene expression are discussed, together with a discussion of the duration of transgene expression. This final chapter is an excellent ending to an interesting book as it conveys the enthusiasm of the authors for their subjects and gives a flavour of the exciting new avenues of experimental research opened up by transgenic technology.

The range of subjects and techniques presented in the book make it of interest to a wide audience — for example, some chapters would be useful for undergraduate teaching, while others are rather specific and would be of greater interest to researchers and members of the medical profession interested in updating their knowledge about specific endocrine systems.

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