

Preface

Mouse models of disease are used extensively in biomedical research with many hundreds of new models being generated each year. In addition, global consortia are working to knock out every gene in the mouse genome. Full phenotypic analysis of mouse models requires the morphologic analysis of tissue samples, which, in turn, requires an understanding of the basic histology and common background variations in the histology of mice. However there is a global shortage of pathologists trained to evaluate mouse tissues and many researchers have to attempt this analysis themselves. While it would be most appropriate to have guidance from an experienced pathologist, in reality this is not always possible.

This book is therefore aimed at veterinary and medical pathologists who are unfamiliar with mouse tissues, and scientists who wish to evaluate their own mouse models. It aims to provide practical guidance on the collection, sampling and analysis of mouse tissue samples in order to maximize the information that can be gained from these tissues. Getting the most information from each individual animal is good practice scientifically, financially and from a welfare point of view, as a contribution, by reduction, to the 3Rs.

As well as illustrating the normal microscopic anatomy of the mouse, some of the common anatomic variations, artefacts associated with tissue collection and background lesions are described and explained to help the observer distinguish these changes from experimentally-induced lesions. Methods for recording and analysing the data gained from the pathological analyses are also described. Histology is a relatively old discipline and there are many adjunct techniques (for example special stains and immunohistochemistry) over and above the standard haematoxylin and eosin (H&E) stain, which can be used to add value to the

information gained from fixed tissues. In addition new histological techniques are emerging all the time. It is not possible to cover all these techniques comprehensively in this book but examples have been given where appropriate. There are also often many alternative methods for achieving similar end points and this book does not aim to be comprehensive but rather to present tried and tested methods that the authors know to work, particularly in a high throughput environment.

Inevitably, in a book of this kind there will be some omissions, some points for debate and some errors. The first two are unfortunate consequences of a book where space is limited and the nature of pathology is subjective, but we apologize for the errors. The authors would welcome constructive comments and suggestions for future editions. Readers may find some additional books helpful to fill in some of the omissions. A basic primer in mammalian histology, of which there are many, will be useful for complete novices and a recently published, comparative atlas of mouse and human histology (Treuting and Dintsiz 2011) is recommended for more detailed coverage. Although this book attempts to point out some of the common artefacts and background findings in the mouse, it is not possible to cover all of the common spontaneous pathology seen in mouse strains and additional books will also be useful in a library (Maronpot 1999; McInnes 2012).

It is important to acknowledge that this book has come about from the knowledge distilled from the numerous histologist and pathologist colleagues with whom we have worked with over the years. These colleagues are too numerous to mention individually but they know who they are and we thank them for their training, advice and wisdom. One person who does deserve a special mention is the artist from Veterinary Path Illustrations who

produced the beautiful drawings for this book. Finally we must thank our current colleagues, friends and family for supporting us in this effort over the last few years.

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References

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