Preface

Cell division may justifiably be described as the most fundamental activity of living organisms. Without cell division there is no 'next generation'; the lineage reaches a dead end. Evolution is essentially about reproductive success of which cell division is a key component. However, it is not quite as simple as these statements imply. Cell division cannot be achieved without acquisition of new material to ensure cell growth. Apart from certain well-characterised exceptions, such as the divisions occurring in early embryonic growth, cell division does not result in an ongoing reduction in cell size. Sex is another complicating factor, with the production of cells with two genomes and a consequent need at some point to reduce them back to one.

The multicellular state adds another layer of complexity, leading ultimately to a situation in which cell division for development and maintenance of the body are clearly separated from those involved in sexual reproduction. However, both are vital for the lineage of the organism. In this volume, the focus is on the former of these two – the somatic cell cycle. Why is this important enough to warrant the production of a book? In unicellular organisms that never indulge in sex or which do so only rarely, it is the main way that the organism reproduces itself. In multicellular organisms cell division is the basic process that provides material for the body and for the repair of that body. In mammals and other vertebrates, malfunctions in cell division have serious consequences, including the development of cancers. The latter feature alone has led to ongoing funding for research on cell division in mammals and in a range of model organisms. Neither have plants been neglected. Perhaps in the 1970s and 1980s there was a tendency to murmur 'plants too' but more recent decades have seen the realisation that cell division in the body of a multicellular plant is used and regulated in ways that differ significantly from those in animals.

This brings us to the book itself. It grew out of a Society for Experimental Biology Symposium on The Eukaryotic Cell Cycle held in Southampton in July 2006. In the symposium we looked at the processes involved in mitotic cell division (and directly related phenomena) and at their regulation in a range of eukaryotic organisms from yeasts to mammals. The symposium was organised not in sessions based on particular types of organism but on processes and phases, thus increasing the interaction between delegates in what became multidisciplinary discussions. The organisers had thus achieved their objective! However, there is not a one-to-one correspondence between the symposium programme and the contents of the book. First, there were too many talks for each one of them to be turned into a chapter; and second, there were in any case several speakers who did not wish to write for the book. We have instead covered the key points of the eukaryotic cell cycle, focusing especially on regulatory mechanisms and in some instances on the consequences of malfunction. As with the symposium itself, the book is process-based rather than organism-based, although authors tend naturally to focus on the organisms on which they work.

Further, we have 'welcomed aboard' quite a few of the younger cell cyclists as authors in this volume.

However, the production of the book has not been straightforward. Some chapters arrived much later than we asked for. Some authors, originally committed to writing for the book, backed out at a late stage (doubtless they had their reasons) which meant that other authors including ourselves had to write rather more than originally planned. Nevertheless, we have tried to produce a balanced volume which we hope is both interesting and accessible. Certainly, the reader will find in these pages plenty of up-to-date research on the key hot-spots in the eukaryotic cell cycle.

Finally we need to express our thanks – and indeed are very happy to do so – to many people. We are grateful to all the symposium speakers who, from the opening to the closing talks, embraced the spirit of the meeting and to those speakers who have written so eloquently for this volume. We thank the Society for Experimental Biology and its Publications Officer, Mike Burrell, for adopting this meeting as one of its symposia and we warmly acknowledge the help and support of the Society's staff at Southampton, especially Nancy Baines and Kate Steel. We are grateful to the Annals of Botany Company and to Beckman–Coulter for additional funding and to Nature Reviews for providing the prizes for the student poster competition. At Taylor & Francis we thank Liz Owen and Kirsty Lyons, our editorial team, especially for their patience as they must sometimes have wondered whether the manuscript would ever reach them, and Simon Hill who has overseen so efficiently the book's production.

Exeter & Cardiff, June 2007. John Bryant & Dennis Francis