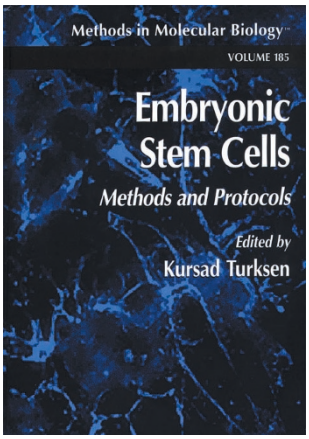
Embryonic stem cell cookery



Embryonic stem cells: Methods and Protocols
edited by Kursad Turksen
Humana Press • 2001
Hardback, £97.50/$119.50

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Reviewing a book of laboratory protocols is a bit like reviewing a cookbook. Does the book make you want to go into the lab/kitchen and try out the recipes? Is it a good mixture of the standard and the innovative? Do the recipes work, or are there places where an extra pinch of salt or β–mercaptoethanol would clearly improve the flavour? Who is the target audience and are sufficient methological details provided for their likely level of expertise? Are celebrity chefs/scientific leaders involved? Would I put this on my bookshelf? The recently released volume in the Methods in Molecular Biology series, entitled *Embryonic Stem Cells- Methods and Protocols* and edited by Kursad Turksen, attempts to be the comprehensive basic cookbook for all embryonic stem (ES) cell researchers. As such, it deserves a place on the bookshelf in the ES cell lab but, in common with most cookbooks, some pages are much more likely to be thumbmarked than others.

ES cells are currently very much in vogue, not just for their use as tools for mouse genome manipulation, but also for their *in vitro* differentiation capacity. The recent derivation of ES-like cells from human embryos has opened up new possibilities for use of ES derivatives for tissue repair. Although we know that mouse ES cells can make all cell types of the body when returned to the environment of the early embryo, knowledge of how to promote and control that differentiative capacity *in vitro* is still incomplete. Consequently, the most useful parts of this book are the chapters on how to make mouse ES cells differentiate into a variety of different cell types. Among the cell types covered are adipocytes, melanocytes, hematopoietic, vascular, muscle, epithelial and neural cells. The chapter by Anna Wobus and colleagues on differentiation into muscle cell types is particularly comprehensive and useful, as it covers most of the basic techniques in ES cell culture and manipulation, as well as the specifics of encouraging ES cells to make cardiac, skeletal and smooth muscle. The technology of using lineage-specific expression of a selectable marker as a means of enriching for appropriate cell types is covered for both neural (Li) and cardiac cells (Pasumarthi and Field). However, ES differentiation into pancreatic cells and hepatocytes is not covered, areas of particular interest for human ES cell application. In fact, there is no explicit reference here to human ES cell culture and differentiation and the cross-applicability of the techniques described here remains to be tested.

Other areas that are well-covered in the book are some of specialized genetic tools associated with ES cell technology, such as the use of site-specific recombinases (Gertsenstein, Lobe and Nagy; Dymecki, Rodriguez, and Awatramani) and gene trap technology, especially the chapter by Floss and Wurst. However, the coverage of new molecular technologies applicable to ES cells is less successful — it is idiosyncratic and often bears no special relevance to ES cells. Genome-wide expression analysis, for example, is dealt with in two chapters describing the use of nylon membrane arrays, but glass-based microarray systems are not covered. Gene transfer into ES cells is covered in several chapters, but then a separate chapter on the use of filamentous phage as gene transfer vectors is included, without any discussion of whether this approach can actually be used with ES cells. A chapter on the very important issue of how to find transcription factor target genes is included, but the approach of using SV40 transformed cells does not make use of ES cells and their special properties. Other chapters are very specific in their description of how to analyse the effect of overexpressing a particular gene in ES cells, rather than providing generic protocols. These last examples exemplify the tendency shown by some of the protocols in the book to regurgitate lab notebooks, with all the local peculiarities still intact. I was particularly interested, for example, to read in one chapter that blastocysts are obtained by setting mice up for mating on Thursdays. A special weekly cycle that I was not aware of!

One of the still unresolved issues in mouse ES cell biology is why it is easier to derive ES cells from some strains of mice than others. Some tricks to improve the efficiency of ES cell derivation have been reported in the literature but are not covered here. Given the apparent impossibility of deriving ES cells in many other species, and the finickiness of cultured human ES-like cells, a chapter detailing the pros and cons of different ES derivation protocols would have been very useful.

All in all, perhaps an overly ambitious attempt to be the Julia Child or Delia Smith of ES cell cookery, but a useful companion volume to other more specialized ES cell books nonetheless. □

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Other stem cell books

The Human Embryonic Stem Cell Debate
edited by Suzanne Holland
MIT Press,
£15.42

Stem Cells and Cell Signalling in Skeletel Myogenesis
edited by D. A. Sassoon
Elsevier Science Ltd,
£46.68 / $68.00

Neural Stem Cells: Methods and Protocols
edited by Tanja Zigova
Humana Press,
£102.50 / $125

Emybyonic Stem Cells
by Martin L. Hooper
Hardwood Academic,
£51.00