Sex Determination in Mouse and Man. Edited by ANNE MCLAREN and M. A. FERGUSON SMITH. London: The Royal Society, 8 Carlton House Terrace, London SW1Y 5AG. 1988. 158 pages. Price including packing and postage £35.00 (UK) £37.60 (Overseas). ISBN 085403 369 6.

This symposium volume presents an excellent discussion of the current status of research on sex determination in mammals, including marsupials and small mammals with aberrant mechanisms as well as mouse and *Homo sapiens*; and in addition it reviews recent studies on temperature-dependent control in reptiles and the genetic control of germ line sex determination in the nematode *Caenorhabditis elegans*.

The mechanisms in mouse and man, where progress has reached a very exciting stage, get most attention, with papers on Somatic and germ-cell sex determination (McLaren), Role of mammalian *Y* chromosome (Burgoyne), Control mechanisms of testicular differentiation (Jost and Magre), H-Y antigen and sex determination (Goldberg), Autosomal genes involved in mammalian sex determination (Eicher), Aberrant chromosomal sex determining mechanisms in mammals with special reference to *XY* females (Fredga), Sex inversion as a model for the study of sex determination in vertebrates (Wolf), Molecular aspects of sex determination in mice (Bishop *et al.*), Mapping the human *Y* chromosome (Weissenbach), Accidental *X*-*Y* recombination and the aetiology of *XX* males and true hermaphrodites (Ferguson-Smith & Alfara), MIC2: a human pseudoautosomal gene (Goodfellow *et al.*) and finally 'Is *ZFY* the sex-determining gene on the human *Y* chromosome?' (Page).

The phenotypic sex of the developing mammal is controlled by the sex hormones produced by its gonads; but primary attention is here directed to the factors controlling the sex of the gonads. This depends on the presence/absence of a small region of the *Y* chromosome, near the *X*-*Y* pairing region in man and on the short arm of *Y* in the mouse. *Y* is now considered to exert its primary effect cell-autonomously, by inducing the supporting cell lineage of the gonad to differentiate into Sertoli cells: these inhibit the germ cells near them from entering meiosis until after birth (at least in the mouse), so that they go on to spermatogenesis. Germ-cells, whether *XX* or *XY*, which escape this inhibition enter meiosis early and develop into oocytes. The mechanism of this *Y* genic switch is still unknown, but it is thought to work by activating sex-determining genes in the autosomes and/or *X* chromosome. An alternative hypothesis previously favoured, that the male-specific H-Y antigen, known to be controlled by the *Y* chromosome, acts as a diffusible inducer to switch the indifferent gonad into the testicular pathway, is now discounted.

Of particular interest, therefore, are the papers on mapping the human *Y* chromosome, using a combination of cytogenetic and molecular analyses of *Y*-chromosomal anomalies and sex reversal syndromes (Weissenbach); on the occasional transfer of *Y*-linked sequences to the *X* chromosome, leading to testis differentiation in so-called *XX* males – which has led to the suggestion that sex determination in man is a quantitative trait (Ferguson-Smith & Affara), analysis of the *X*-*Y* pseudoautosomal region in man and the location and sequencing of the MIC2 gene, which encodes the 12E7 antigen (Goodfellow *et al.*); and cloning and sequencing of the putative sex-determining gene on the human *Y* chromosome (Page). This gene (or genes) has been labelled *TDF* in man, *Tdy* in the mouse, and now *ZFY* in man by Page and coworkers. The *ZFY* region has been shown to code for a protein with at least 13 'zinc-finger' domains, whose presence suggests that it binds to DNA or RNA in a sequence-specific manner. This fits the hypothesis, discussed in more detail by Burgoyne, that the sex determining genes on *Y* act cell-autonomously to induce differentiation of Sertoli cells. However, the plot has been thickened by the discovery that the short arm of the human *X* chromosome carries a gene with sequence quite similar to, and probably homologous with, that of *ZFY*, named *ZFX*. Neither of these two genes is thought to be a pseudogene.

The other papers in this book are also relevant to the main theme and full of interest. Renfree and Short present evidence that some sexually dimorphic somatic characteristics in marsupials develop autonomously instead of under the control of sex hormones, thus setting them apart from eutherian mammals. Deeming and Ferguson-Smith describe studies on temperature-dependent sex determination in reptiles. I find it baffling that high temperatures during egg incubation produce all males in lizards and crocodiles but all females in chelonians; but the authors produce a hypothesis for the reader to shoot at. We must also keep a close eye on the rapid developments in work on *Caenorhabditis elegans* (paper by Kimble) and, of course *Drosophila melanogaster*.

This book is very well edited, the papers are generally clear, well written and give plenty of references, and interesting points raised in the discussions are also printed. I think it will find a wide readership, and should be on the shelves of all biological libraries. It is a book that will help us to avoid getting too intent on our own research specialities to see what is going on in our own front yard. It is also handsomely bound and printed, in A4 format, and the Editors and The Royal Society deserve thanks for its content and appearance.

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