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## BOOK REVIEWS

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*Alphafetoprotein and Congenital Disorders*. Edited by GERALD J. MIZEJEWSKI and IAN H. PORTER. Orlando, Florida: Academic Press. 1985. 363 pages. \$35.00/£31.00. ISBN 0 12 501630 1.

In 1969 a young medical student, Roger Sutcliffe, decided to take a break from the rigours of the undergraduate curriculum and to intercalate a PhD before resuming his formal training as a doctor. It was in the early days of prenatal diagnosis, and I suggested to him that an appropriate doctoral thesis might concern itself with the origins of the soluble proteins of second-trimester amniotic fluid. He should investigate to what extent these proteins were of foetal origin, and therefore likely to be of use in monitoring genetic disorders in the unborn, and to what extent they were of maternal origin. It was a problem for which genetic variation in soluble proteins was likely to hold the key.

As it happens, the answers turned out to be comparatively simple. Virtually all amniotic fluid protein derives from the maternal circulation and is therefore useless for foetal monitoring. The major exception is alphafetoprotein (AFP), synthesized first in the yolk sac and then in the foetal liver, and passed to the surrounding fluid by foetal urination. The function of AFP remains obscure to this day – the best bet is that it serves as a foetal form of albumin – but to Roger Sutcliffe it appeared to have been put into amniotic fluid as foetal flavouring in an undistinguished maternal soup. Once it was realized how unique this protein was, it became clear that it was going to be very useful in the prenatal diagnosis of a range of foetal abnormalities.

The most important of these are the foetal neural tube defects – anencephaly and spina bifida – where a communicating lesion between cerebrospinal fluid and the exterior surface of the foetus leads to leakage of AFP into the amniotic fluid. AFP is also raised in the presence of other structural abnormalities such as exomphalos, and occasional Mendelian disorders like Meckel syndrome. Measurement of AFP in second-trimester samples is now one of the two routine tests (the other being cytogenetics) carried out on all amniotic fluids, whatever the primary reason for amniocentesis.

But more was to follow. In our original report of raised amniotic fluid AFP and neural tube defects, Roger Sutcliffe and I observed that we would not be surprised if the AFP crossed the placenta and found its way into the maternal circulation. We envisaged a time when the detection of spina bifida and anencephaly would be carried out by measuring AFP in maternal blood, a phenomenon we referred to as 'prenatal screening'. It was an audacious guess, for we had no evidence that AFP could either cross the placenta or survive in the maternal circulation. But it turned out to be right, and within a few years maternal serum AFP screening was being carried out in a majority of academic centres in the United Kingdom. By 1978 even the Department of Health and Social Security had given its blessing to this form of antenatal care.

So why have a conference on such a tired old subject in 1984, and why feel that the proceedings are sufficiently interesting to form the subject material of a book? There is a curious answer to this one; for recently the Americans have discovered AFP and are now going through the process of re-inventing the wheel. To be fair, it is not entirely the fault of American scientists that they are ten years behind Europe in this aspect of prenatal screening. The FDA, an officious and busybody organization – but one which has a track record of having protected the American public from the ravages of thalidomide – has consistently refused to license the reagent kits necessary to measure AFP, and without which most American scientists are lost. Their reasons have been more political than scientific; AFP screening is concerned with the detection of congenital malformations and in turn can lead to termination of pregnancy. In the Reagan era, no public official would risk giving his consent to the licensing of any reagents remotely concerned with abortion. Since the early 1970s the only geneticists working with AFP have been those skilful enough to prepare and use their own reagents. Suddenly, and with little warning, the FDA released its ban and the great American scramble began. There is a lot of money to be made in AFP screening, because in the United States each patient can be charged for every laboratory test he or she receives, and the only limit is

what the market will stand. Whole laboratories can be run on the excess profits of this comparatively simple test. Instant experts on AFP screening have been springing up like toadstools, and conferences earnestly debate the scientific, ethical and organizational aspects of the subject. This book is a record of one such conference.

But one must not be too cynical about the motivation behind the surge of interest in AFP screening. As conference proceedings go, this book is not without merit. The early chapters, concentrating on the biology of AFP, are the best part but unfortunately only constitute about one quarter of the book. Thereafter, it is slow trudge through familiar landscapes, with everyone sounding tired and dispirited, as well they might be. One of the editors does his best by using the opportunity to get some of his collected doggerel into print. Somehow the fatuity of

The fetal proteins are a transient group  
And alphafetoprotein leads the troupe

just about sums it all up.

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*Biotechnology*, volume 6A, *Biotransformations*.  
Edited by K. KIESLICH. Weinheim, FRG: Verlag  
Chemie. 1985. 473 pages. DM425.

This book is a part volume of a comprehensive treatise in eight volumes on *Biotechnology*. It is itself a comprehensive treatment of biotransformations – the chemical reactions, effected by micro-organisms, that lead to products of commercial/industrial significance and which are less conveniently obtained in other ways.

The subject matter of the book is dealt with in eleven chapters, each written by an established expert. Following a general review of methodologies, each chapter then concentrates on a specific product area – steroids, sterols, terpenoids, alicyclic and hetero-alicyclic compounds, natural and semisynthetic alkaloids, antibodies, aromatic and heterocyclic structures, aliphatic hydrocarbons, amino acids and peptides, and, finally, carbohydrates.

In general, the subject matter is treated exhaustively and in an accessible form. As with all (telephone) directories this is not the book to curl up with for a light read, but, as a source of information, it provides a valuable starting point for further studies provided one can afford it.

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*Genetic Manipulation of the Early Mammalian Embryo*, Banbury Report 20. Edited by F. COSTANTINI AND R. JAENISCH. Cold Spring Harbor, New York: Cold Spring Harbor Laboratory. 1985. 320 pages. \$63 cloth. ISBN 0 87969 220 0.

The almost simultaneous report in 1981 from five different groups of the transformation of mouse embryos by direct injection of DNA into eggs – producing transgenic animals – instantaneously introduced a new era which will see a revolution in our approach to mammalian genetics and development. At last mammalian geneticists have a tool which will allow them to perform the type of powerful analyses for so long solely the province of microbial geneticists.

This book provides the state of the art at the Fall 1984 Banbury Conference at Cold Spring Harbor and by the very nature of the publication gap and the rapid progress in the use of transgenics some of the recent exciting advances are not covered; for example the dissection of the regulatory sequences of the elastase gene by Palmiter, Brinster *et al.*, the production of transgenic pigs and sheep by the same group and the production by Leder's laboratory of an allele of a previously known locus (*limb deformity*) by insertional mutagenesis in a transgenic mouse. A more rapid publication of the proceedings of this type of conference would therefore seem desirable. It would also have been valuable to have a record of the discussion after each paper (so useful, for example, in *Recent Progress in Hormone Research*) which would give the reader a clearer idea of where the contributors feel the work is going next.

Most of the major workers with transgenics are represented in section III and IV of the book and they present a comprehensive and exciting picture of the range of uses for the new technology especially in the area of regulation of gene expression. Sections I and II try to broaden the meeting out to Developmental Genetics and, Viruses and Viral Vectors and here some of the papers sit uneasily together with the main thrust of the meeting. Furthermore the exciting prospects of using retroviral and other vectors as a method of efficient transformation are under-represented given the amount of current research in the area.

In conclusion this book is to be recommended as a starting point for geneticists wishing to get a background and see the breadth of what all the excitement is about in mammalian genetics today and from which to peruse the pages of *Cell*, *Nature* and *PNAS* to get up to date in this field.

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