BSDB

NEWSLETTER

Autumn 1985

No: 12

N.B. "THIS ISSUE CONTAINS THE BOOKING FORM FOR THE APRIL 1986 SYMPOSIUM MEETING"

IN THE PAST WE HAVE HAD SEPARATE MAILINGS TO MEMBERS FOR THE NEWSLETTER AND THE BOOKING FORMS FOR MEETINGS. STARTING WITH THIS ISSUE WE ARE TRYING TO AMALGAMATE THE TWO. SO, IF YOU WISH TO COME TO THE SPRING BSCB/BSDB SYMPOSIUM MEETING AT EAST ANGLIA, PLEASE FILL IN THE BOOKING FORM STRAIGHT AWAY, AND SEND IT WITH YOUR REMITTANCE TO THE LOCAL SECRETARY (RICHARD WARN) WHOSE ADDRESS IS ON THE FORM.

C.C.W.

Meetings

Spring 1986 — University of East Anglia
6th - 9th April, 1986

FULL PROGRAMME, GENERAL INFORMATION AND BOOKING FORM, ACCOMPANY THIS NEWSLETTER.

This will be the joint meeting of 1986 between the BSDB and BSCB. It will consist of two major symposia:-

1) The BSDB/Company of Biologists Symposium on "ANALYSIS OF GENE EXPRESSION IN DEVELOPMENT BY TRANSFER OF MACROMOLECULES". Organizers - J.B. Gurdon, Azim Surani & C.C. Wylie.

This symposium will be published as a supplementary volume to JEEM in October, 1986.

2) The BSCB/Company of Biologists Symposium on: "THE CYTOSKELETON: CELL FUNCTION AND ORGANIZATION" Organizers - C.W. Lloyd, J.S. Hyams & R.M. Warn.

This symposium will include a joint BSDB/BSCB Session on THE CYTOSKELETON IN DEVELOPMENT, and will be published as a supplementary volume to Journal of Cell Science in Autumn 1986.

3) BSCB Symposium on "COATED MEMBRANES" Organizer - C. Ockleford.

4) THE INTERNATIONAL XENOPUS GROUP will meet from mid-day on Wednesday 9th April to Friday 11th April. All BSDB/BSCB members are welcome to attend (this is not in any sense a closed meeting, the "group" referred to above includes any interested person!). Most major groups working on Xenopus will be represented. Further details and BOOKING FORMS from:- Prof. J.B. Gurdon, Department of Zoology, Cambridge University, Downing Street, Cambridge, CB2 3EJ.

POSTERS

THERE WILL BE A LARGE JOINT BSDB/BSCB POSTER SESSION AT THIS MEETING, ON THE EVENING OF MONDAY 7TH APRIL. BSDB MEMBERS ARE URGED TO SUBMIT ABSTRACTS FOR POSTERS (ON ANY ASPECT OF DEVELOPMENTAL BIOLOGY, AS WELL AS THE MAIN SUBJECTS OF THE MEETING). POSTER BOARDS WILL BE 2 METRES TALL BY 1 METRE WIDE. PLEASE SEND SHORT ABSTRACTS TO MIKE SNOW, MRC MAMMALIAN DEVELOPMENT UNIT, WOLFSON HOUSE, 4 STEPHENSON WAY, LONDON, NW1 2HE.

ABSTRACT DEADLINE 20th December, 1985

Autumn 1986 — University of Sussex
4th & 5th September, 1986
Local organizers: J. Bacon & Chris Ford.

This will be a workshop style meeting, emphasizing current research rather than review style presentations, on the following subjects:-

"DEVELOPMENTAL NEUROBIOLOGY IN INSECTS AND VERTEBRATES" Organizers - J. Bacon, Vernon French & Nigel Holder.

"PHYSICAL APPROACHES TO SPATIAL ORGANIZATION IN DEVELOPMENT" Organizers - Brian Goodwin and R. Ransom.

There will also be an additional subject yet to be arranged.

Spring 1987 — University of Oxford
23rd - 26th March, 1987
Local organizer - Gillian Morriss-Keay.

This will be a joint BSDB/BSCB Symposium meeting. Symposia will be:-

BSDB/COB Symposium on "SEX CHROMOSOMES" Organizers - Peter Goodfellow & J. Wolfe.

BSCB/COB Symposium, the "ABERCROMBIE MEMORIAL MEETING ON CELL BEHAVIOUR" Organizers - Adam Middleton & Joan Heaysman.

Other sessions to be announced later.

Society Business

1) MEETINGS - FUTURE PLANS

The pattern of meetings over this year, and planned for the two coming years, is to meet in the Spring with the BSCB at a major academic centre in Britain. This joint meeting consists of two published symposia both sponsored by the Company of Biologists, one organized by BSCB, one by BSDB. There will also be other major sessions of mutual interest. The style of these meetings will be mostly review and current research platform presentations. A lot of money is spent on these meetings, which have now reached the status of major international meetings. In the Autumn, the societies meet either together or separately to hold more informal workshop style meetings. These are intended to involve the younger members of the society rather than established international figures, and to focus on short platform presentations.

If anyone would like to suggest a symposium topic for the Spring meetings of 1988, would they please write to Chris Wylie, enclosing a short outline proposal. A decision will be made at the April 1986 Committee Meeting in Norwich. People who would like to suggest topics for workshops or major sessions at Spring or Autumn meetings please write to Nigel Holder. It is essential that the subject matter of our meetings reflects the interest of members. This will only come about if members respond to these appeals.

"Current Awareness" Sessions

It has been suggested that we should hold sessions specifically aimed at teachers of developmental biology, journalists, and scientists in industry. These would contain reviews of fields of current interest, suggestions for experiments, films and videos, descriptions and demonstrations of experimental protocols. Would members please express their views on this proposal - to Nigel Holder please. There is a strong possibility of financial support for this scheme from a grant-awarding body.

---

2. TRAVEL AWARDS

Remarkably, for the first year since their inception, the budget for these was not exhausted last year. Perhaps our graduate student members are getting richer, or have stopped going to meetings! Applications from graduate student members for BSDB meetings are given priority, though others are welcome to apply. Application forms are available from Mary Bownes.

---

3. INCREASED SUBSCRIPTION TO BSDB

As you probably know, the membership fee is now £10 per year. Many of you filled in the new bankers order forms which accompanied the last Newsletter. Those who didn't will have received another one, and are urged to fill it in.

The reason for this increase is primarily to avoid registration fees at our meeting, which is the only other source of income for running the Society. There will be a registration fee of £20.00 at the joint BSDB/BSCB Symposium meeting in Norwich, for those who are not fully paid up members.

Remember what you get from your £10.

1. This fine Newsletter!
2. More seriously, free attendance at meetings. Most meetings of the calibre of ours charge large registration fees.

3. Symposium volumes at considerably reduced prices (around £15, detailed price will be available soon).

4. JEEM at a considerably reduced price (£25 per annum) which includes the symposium volume free.

5. Your membership subscription, and subscriptions to JEEM and/or the symposium volumes are tax deductable. This gives an actual cost of JEEM including the symposium of around £18. This is astonishing value, and something members are urged to take advantage of.

New Books

Biology of the Reptilia Volume 14 (Development A) and 15 (Development B). Eds. C. Gans, F. Billett & P. Maderson. Academic Press. 1985. ISBN 0-471-81358-3 & 0-471-81024-8. (No UK price given by publisher.)

It is remarkable how few of the developmental community choose to work on reptile embryos. Linnaeus got such work off to a very bad start, when in 1776 he described reptiles thus:- "These foul and loathsome animals are distinguished by a heart with a single ventricle, a double auricle, doubtful lungs and a double penis. Most are abhorrent because of their cold body, pale colour, cartilaginous skeleton, filthy skin, fierce aspect, calculating eye, offensive smell, harsh voice, squalid habitat, and terrible venom; and so their creator has not exerted his powers (to make) many of them". This delightful quote is taken in full from the editors' introduction to a massive account in two volumes on the development of reptiles. This first attempt to collect together all aspects of reptile development is necessarily as diverse in nature as the animals described. However, a heroic effort has been made by authors and editors alike to collect often fragmentary data into a cohesive account. The 17 chapters are divided into two groups; "general" chapters, each describing the development of a reptile group (turtles, marine turtles, crocodilians, sphenodon, squamata) and more specialized chapters each dealing with some specialized aspect of developmental biology drawn from work on several different groups (e.g. oogenesis, limb development and regeneration, the genital system, parthogenesis, viviparity and placentation in reptiles, immunity in reptiles, pituitary development, and skin development).

These two volumes should provide an invaluable source book for all those who wish to extend the range of their teaching as well as those wishing to do some much needed research into mechanisms of reptile development and their evolutionary diversification. An essential library purchase.

Chris Wylie.

Langman's Medical Embryology By T.W. Sadler. 5th Edn. Williams & Wilkins 1985. ISBN 0-683-07490-3.

This highly successful medical embryology text has now passed into a 5th edition. This is accompanied by a change in author, though the original author ahs been immortalized in the title.

This remains an excellent textbook of human medical embryology. Its treatments of normal organogenesis and common congenital abnormalities are clear, well illustrated, and concise. There has been some text revision and inclusion of new photographs and developmental charts, but the overall format of the book, and most of the content, is similar to the previous edition.

If I have a quibble about this text, it is that even the most traditional embryology courses are beginning to incorporate some foetal physiology, and mechanisms of developmental processes. I feel that a great service will have been done to medical embryology teachers when these are incorporated into the student texts.

C.C. Wylie

"Study guide and self-examination review, for Langman's Medical Embryo. 5th Edn. by T.W. Sadler. Williams & Wilkins. £9.00.

This useful volume can be bought as an accompanying volume to Langman's text. It consists of practice answers of various types, including MCQ, and the answers, together with the appropriate text references. Despite its usefulness to students, it is difficult to know how many will buy it at the price. It is an essential library purchase though, for medical schools where human embryology is emphasized.

C.C.Wylie

"From Gene to Animal: An introduction to the molecular biology of animal development." D. de Pomerai. (1985) Cambridge University Press. ISBN 0-521-27829.

Writing a book of this title is not easy. We know much about both subjects but rather little about the involvement of the one in the other. The result, in this case, is that a good deal of space is devoted to the basic mechanisms of gene expression in cells of adult animals and rather less to

its involvement in development. The book is divided into two parts; the first discussing the basics of molecular genetics (3 chapters) and animal development (1 chapter), the second discussing specific systems, erythrocyte development, egg production and insect development.

This book is for undergraduates and, as in many texts at this level, it is assumed that students won't have read anything else. Hence, the first three chapters (covering the essentials of DNA structure, function and techniques of analysis) comprise a resumè of what is known of molecular genetics in higher animals and, importantly, how it was found out. These chapters are excellent; any reader will understand not simply what C - values are, but how we know about them and why they are hard to explain. Facts and techniques are introduced in a steady progression, so that the reader's understanding is encouraged and enhanced throughout.

Chapter 4 "Molecular strategies in Development" explains how we can try to apply molecular genetics to the study of animal development. This is a difficult task. Doubtless differential gene expression contributes to cellular determination, however, we have little evidence to suggest how this occurs. Virtually nothing is known about the control of gene expression in undifferentiated cells, or how this is modified during development. Known strategies for cellular differentiation - gene amplification, deletion and rearrangement - are described, but these almost certainly don't operate during cellular determination. What we are left with is evidence for modulation of gene expression during differentiation and the expectations that somethng similar, but perhaps less final, happened earlier when the cells became determined. All this is explained, albeit briefly, and this chapter also covers oogenesis and the mechanics of early development, explains concepts of mosaic and regulative development and the idea of cytoplasmic determinants, and describes the Britten and Davidson model of eukaryotic gene regulation and how it may be applicable to developing systems. The chapter crams a huge subject into just over 50 pages, but, like the rest of the book, the text is well referenced allowing easy access to further reading.

Chapters 5 and 6 are overviews showing how powerful this technology is, when applied to an amenable system. They describe the study of genetic control of differentiation and control of gene expression in differentiated cells respectively. The final chapter about insect development covers alot of ground in a little space and will be hard going for beginners. However, this is bound to be justified as long as insect systems remain our leading hope for understanding how gene expression influences cell determination and pattern formation.

The book explains how genes can influence cellular differentiation and control adult function. What isn't explained is how, or indeed whether, molecular genetics is going to contribute to our understanding of cellular determination, particularly in animals other than Drosophila. But then, as most teachers wouldn't claim to know the answer, they're unlikely to expect it of their students. On the plus side, the book is extremely readable, the diagrams really do illustrate the subject matter and the price ensures it a well deserved place on many undergraduate bookshelves.

David Stott.

The physiological development of the fetus and newborn.
Eds. C.T. Jones and P.W. Nathanielz. Academic Press. 1985.
ISBN 0-12-389080-2. £49.00

It is all to easy to neglect fetal physiology in teaching of development. This applies to both scientific and medical developmental biology courses. With the explosion of interest in cell and molecular biology of development, and the necessity of teaching developmental anatomy in medical courses, time constraints too often mean that the physiology gets left out. This is a shame, because quite apart from its inherent scientific interest, medical students must be aware of the fact that the fetus is a viable organism during its development with complex checks and balances of its metabolism and physiology. In many aspects of its physiology, the fetus is not a miniature adult, due to the complicating features of maternal effects via the placenta. The changes at birth to post-natal physiological controls can often cause peri-natal problems for the paediatricians.

This huge (837pp) multi-author (35 contributors) volume is a very useful source-book, not only for scientists working on fetal physiology but also for teachers of developmental biology and human embryology. It is the published proceedings of a meeting held in 1984 in Oxford, and covers the following general areas: control of fetal growth (19 contributions), endocrine development of the fetus (19 contributions), development of lung function (17 contributions), causes and consequences of birth (27 contibutions), fluid and electrolyte balance (9 contributions), functional development of the CNS (17 contributions) peri-natal physiology and clinical cases (27 contributions).

The volume is truly international, with contributors from all parts of the world. Altogether a fascinating and useful volume.

C.C. Wylie

Regulation and development of membrane transport processes
Edited by James S. Graves. Vol. 39, Society of General Physiologists Series, Wiley Interscience: USA.

This book brings together papers presented at a meeting of the Society for General Physiologists held in WoodsHole in 1983. Superficially there would seem to be little of interest to the developmental biologist, since only one paper addresses events during early development. The involvement of membrane transport mechanisms has yet to be established for most events during development, but papers relating alterations in potassium flux to differentiation of pro-myelocytes (Gargus, Adelberg & Slayman) and of intracellular Na during erythroid differentiation (Roscoff and Cantley) hint that approaches of this kind to developmental problems could be informative. Study of sodium-hydrogen exchange has lead to a much greater understanding of serum stimulation of quiescent cells (Villereal, Owen, Vicenti & Mix) and regulation of the sodium pump in response to different growth conditions is now well documented (Cook, Karin, Fisman, Tate, Pollack and Hayden). The advantage for the developmental biologist is that the physiology and biochemistry of a number of ion transport mechanisms is now fairly well worked out, making the task of manipulating these systems much easier.

Benos, Biggers, Balban, Mills and Overstrom present a comprehensive review of sodium transport processes in the pre-implantation rabbit blastocyst, particularly focussing on blastocoel formation, when the first fluid filled cavity appears in the embryo. This is a useful compendium of some years of work and demonstrates clearly that the mechanisms used by the early embryo closely parallel those operating in differentiated systems, particularly transporting epithelia. Sherman & Caterall, and Famborough, Wolitzy & Pumplin focus on relatively late events in the differentiation of excitable cells. The first two authors deal the regulation of tetrodotoxin sensitive sodium channels in rat muscle. Famborough and his colleagues present an impressively comprehensive study of developmental changes, both appearance and disappearance, in the Na-K ATPase in avian nerve and muscle. This study particularly demonstrates how informative a combination of physiological, biochemical, structural and molecular techniques can be when applied to a particular problem.

In the last ten years the view of that ion transport processes may be of fundamental importance in cellular regulation and growth has received impressive experimental support. This book provides an informative and useful window on a world which is likely to become of increasing importance as we improve our understanding of cellular events during embryogenesis.

Anne Warner

The epigenetic nature of early chordate development. (Inductive interaction and competence.) P.D. Nieuwkoop, A.G. Johnen & B. Albers. C.U.P. £40.

As its subtitle suggest, this book is intended to extend and update Saxen and Toivonen's 1962 monograph "Primary embryonic induction". The authors believe that inductive interactions, those "which enable a developing system to make a choice from among different potential pathways of differentiation" are fundamental to many different stages of chordate development.

Development is treated chronologically, and the term "induction" is taken to include intracellular interactions in the oocyte and uncleaved egg, as well as interactions between cells. Thus the early chapters cover oogenesis, maturation, fertilization and cleavage, with special reference to those processes such as sperm entry and vitelline wall formation which may lead to polarization of the future embryo.

The central part of the book consists of comprehensive reviews of the classic examples of induction, meso-endoderm, and neural induction, and the last three chapters cover the early stages of organ formation.

Since most work in this field has concentrated on amphibian development each chapter first presents the process under discussion as seen in amphibians, and then reviews relevant data from the other chordate groups. At the end of each chapter there is a summary or 'evaluation' and the book ends with a general evaluation in which the authors discuss the universality of the inductive interaction as a guiding principle in development.

This book contains over 1,500 references, and overall provides a useful review of chordate (especially amphibian) development from oogenesis to the establishment of the embryonic organ anlagen.

Alison Snape

"Growth and Maturation Factors, Volume 3". Ed. G. Guroff, John Wiley and Sons, 1985. £86.15. ISBN 0-471-09707-1.

No doubt many BSDB members are interested in the molecular nature of the signals between cells that coordinate development, of which some by definition will be growth and maturation factors. This is volume 3 of a

continuing series. In this one, the editors aim "to complete the coverage of the major growth factors". Most of the topics are specialist ones (B-cell growth factors; glia maturation factor). Of more general interest to developmental biologists is the careful review by Thorburn et al. on "growth factors in fetal development". The little that is known makes stimulating reading. In principle recommended to biomedical libraries for reference, but in practice only to very wealthy ones.

Dot. Bennett.

"Gene Expression During Normal and Malignant Differentiation". Eds. L.C. Anderson et al. Acadmic Press, 1985. £26.50. ISBN 0-12-059490-0

Even for a symposium volume this book is extraordinarily titled. Perhaps, you think, it will shed light on the way gene expression during differentiation diverges between normal and malignant cells? in fact, four of its eighteen articles are primarily about cell differentiation (haemopoiesis, actually). Two of these are on gene expression in any restricted sense, and then only in malignant cells. In short, not essential reading on differentiation. As something like "Current topics in mammalian cell biology and retroviral oncology", the book makes an interesting collection. There are some useful reviews and some prominent contributors, not least among those of the eight retrovirus papers. There are morsels for the embryologist, on theoretical morphogenesis and on glycolipoid antigens, which include stage-specific embryonic antigens (SSEAs). But only oncologists (or rather their libraries) are likely to want to buy the book.

Dot Bennett.

Growth factors and stem cells Antony Burgess and Nicos Nicola. Academic Press (1983). ISBN 0-12-143750-76.

This book is intended as an introductory text for graduate students and beginners in the field of growth factors and stem cells. The first two chapters, "general concepts" and "molecular regulation of cell production" are a basic introduction to the production of differentiated cells from a stem cell population. Following chapters deal more specifically with different cell lineages, haemopoietic cells, epithelial cells, mesodermal cells and nerve cells. The final chapter, "perturbing proliferation" discusses some of the mechanisms whereby tumour cells escape from normal growth control. The book is written in an easily readable style and each of the chapters is well referenced and illustrated.

A number of stem cell populations are dealt with in detail, starting with the establishment of lineage restricted stem cells during embryogenesis. The regulation of cell production from the stem cell pool is discussed with regard to factors which control growth and factors which influence differentiation. We still obviously know very little about how some cells become committed to differentiation whilst others remain in the stem cell compartment. Studying the perturbation of normal development (during tumour formation) has proven to be very rewarding. The role of oncogenes in cell transformation is discussed as are the roles of the gene products of their normal cellular counterparts (c-onc). The mechanism of action of some growth factors (e.g. EGF) are described. The rapid develoments in the field will probably ensure that some of this material will be rapidly outdated but this book will still be a valuable text for those for whom it is intended.

Peter Donovan

Some Useful Addresses

BSDB Officers

Martin Johnson (Chairman), Dept. of Anatomy, University of Cambridge, Downing Street, Cambridge CB2 3DY. (0223-68665).

Nigel Holder (Meetings Secretary), Dept. of Anatomy, King's College London, The Strand, London, WC2. (01-836-5454 Ext. 2626).

Chris Ford (General Secretary), Dept, of Biology, University of Sussex, Falmer, Brighton, BN1 9GC (0273-606755 Ext. 969).

Mary Bownes (Treasurer), Dept. of Molecular Biology, University of Edinburgh, King's Building, Mayfield Road, Edinburgh, EH9 3JR. (031-0667-1081 Ext. 2706).

Chris Wylie (Publications Officer, Newsletter Editor), Dept. of Anatomy, St. George's Hospital Medical School, Cranmer Terrace, London, SW17 ORE. (01-672-1255 Ext. 4623).

Richard Warn (Local Secretary for Spring 1986 Meeting), Dept. of Biology, University of East Anglia, Norwich, NR4 7TJ. (0603-56161).