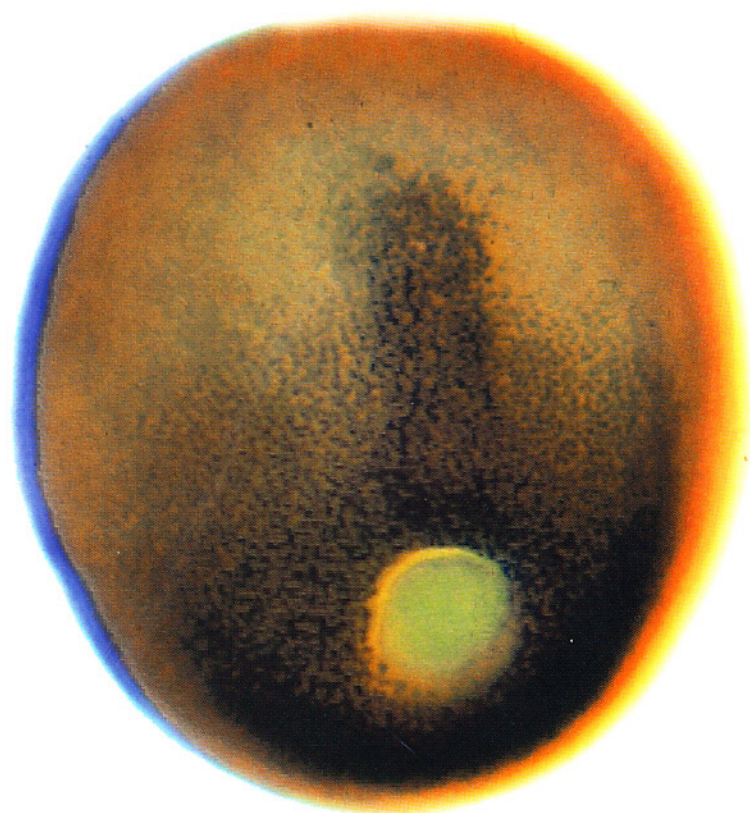


Newsletter

Summer
2002

No 45



T Box genes in Development
and Disease

Autumn Meeting 2002

British Society for Developmental Biology

BSDB Newsletter

Summer 2002

No. 45

Editorial

With only three days to go until we test the strength of Beckham's foot, perhaps the England physios should thinking about attending the meeting organised by Birgit Lane and Cheryl Tickle on "How to Make a Hand". This is just one among the large crop of meetings featured in this issue, which of course features our own Autumn Meeting on T box genes and a preview of next year's Spring meeting, the first in the new experimental format.

Indeed, for those thinking of organising a meeting there probably hasn't been a better time. In addition to all the usual resources and back up that the BSDB can offer, the Biochemical Society have had a major change of policy in which they have introduced a much greater emphasis on supporting small focussed meetings. So if you have an idea and are looking for additional resources, check out their announcement on the inside back cover.

Staying with the meetings theme, it is clear that the York Spring Meeting was a great success, as attested by the two reviews that appear within. Aside from the excellent science, there were a couple of other things to write home about: the food poisoning (we admit no liability) and the excellent Sci-Art show (a photoreport of which appears on the back page). We hope the cries of "give us more" will not go unnoticed.

If you didn't get your image recognised in York, or indeed in Brighton last year, why not enter the competition to provide an image to advertise the 3rd European Zebrafish Conference coming up in Paris next year. The deadline for images is 1st July, 2002, so hurry along and check out the ad on page 11.

Yet again we have an excellent book review section, thanks to all contributors. If you have an idea for a book review, or indeed if you are publishing a book that you would like reviewed, please do contact me well in advance so I can organise a reviewer. It really feels like we have achieved something if we can get reviews out simultaneous with the book's publication (see for example the review by David Jackson on page 15).

Finally, in addition to previous journal discounts (see page 20), it's great to announce a special discount on subs to the Journal of Cell Biology (below). Please make sure we continue to get these offers by actually subscribing!!

More Newsletter contributions please. Send to me, Andy Furley, at a.j.furley@sheffield.ac.uk

The Editor

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BSDB Autumn Meeting 2002 T Box Genes in Development and Disease

Nottingham, 16th – 18th September

See pages 6 & 7 for details of registration and abstract submission

Registration and Abstract Deadline
5th August, 2002

Journal of Cell Biology: Special Rates for BSDB Members.

The special online rate is just \$55 (a \$15 savings off the rate available to individuals), giving BSDB members unlimited access to today's top research through the convenience of any computer without IP restriction. The special print rate is \$170 (a \$25 savings off the rate available to individuals, plus an additional charge for airmail postage).

See <http://www.jcb.org/subscriptions/member.shtml> for details.

Cover Legend: "Expression of Brachyury in a late gastrula *Xenopus* embryo" image courtesy of Jim Smith

From the Chairman

Let me begin by expressing our gratitude to our two retiring committee members this year, **Julie Ahringer** and **Paul Martin**. Both have been great servants to the Society. Julie for instance has done a fantastic job of redesigning and updating our Website while Paul has represented the Society to the wider community through his participation in the UK Life Sciences Forum and through co-ordinating events such as the Sci-Art exhibition at York this year (see below). We wish them both continued success in their “retirement” and welcome in their place **Alicia Hidalgo**, a *Drosophila* developmental neurobiologist, recently appointed a lecturer at Birmingham University and **Alison Woolard**, a *C.elegans* developmental geneticist from Oxford University.

York on the Run

This year's Spring Symposium was again a resounding success, marred only by the outbreak of food poisoning which seems to have afflicted a large number of delegates following the meal on Friday evening. This unfortunate occurrence was reported to York City Council's Environmental Health Department. Despite going to some length to contact delegates and collect samples for analysis, the Department was unable to identify the cause of the infection, a failure they attributed to the length of time that elapsed before samples could be obtained due to the intervening Bank Holiday. I expect this is one Bank Holiday that many of you will want to forget! I can only say how sorry I was to hear about your discomfort – luckily for me the scheduling of the Committee meeting on Friday evening meant I escaped exposure to the contaminated food!

In any event the scientific organisers of the meeting can clearly be exonerated from any blame for the quality of the catering and are to be congratulated for putting together such an excellent programme. The interaction with the Genetics Society was so positive that we have

agreed to their suggestion that we hold another joint Spring meeting in 2004.

Art for Art's Sake

Another successful component of the York meeting was the Sci-Art exhibition staged by **Paul Martin**, **Jenny Whiting**, **Kate Storey** and **Robert Whittle**. This fascinating collection of paintings, high fashion and installation art attracted large numbers of visitors both from amongst the conference delegates and the local community, with visits from several schools. It is very pleasing that the exhibition connected with the general public in this way – but should we always have to portray science as art to make it so accessible? A recent survey of television viewing preferences revealed – somewhat surprisingly – that there is a great appetite for science amongst the general population, with respondents expressing a preference for science and natural history programmes over game shows and soap operas. This should remind us, if we need reminding, that the pursuit of scientific knowledge for its own sake has an intrinsic value for the intellectual vitality of the nation. If the public are prepared to put their hands in their pockets to support the arts or sport, why then should they not be persuaded to support science in a similar way? It's a sobering thought that the gate receipts from a single Premiership football match in England would fund two five year Programme grants, the results of which could probably form the basis of a TV documentary that could entertain millions. We should resist the pressure always to justify our research in terms of its medical or commercial applications. To paraphrase my favourite philosopher: science isn't just a matter of life and death – it's much more important than that!

Phil Ingham

Waddington Medal

The award of the Waddington Medal recognises not only outstanding research achievement by a UK based developmental biologist but also contribution to the vitality of the subject, be it through teaching, mentoring or intellectual leadership. Although relatively few individuals fulfil all of these criteria, the choice is never easy; this year the committee voted by a large majority to confer the honour on **Jonathan Slack**, Professor of Biology at the University of Bath.

Jonathan is best known to most of us for his pioneering work on the early development of the *Xenopus* embryos; but his scientific beginnings were quite far removed from this topic. After graduating in Biochemistry from Oxford University, he chose to study ribosomal RNA for his PhD in the Department of Zoology at Edinburgh. As Jonathan himself records in his highly entertaining book “Egg and Ego”, this proved to be a less than inspiring experience and after two years he “decided to cut my losses and write up my notebook of uninteresting facts” having realised that “the required standard for a British University PhD thesis was not very high”!

Appropriately enough, as the recipient of this year's award, it was the famous man himself who was to provide Jonathan with the inspiration that set him on his new course in research. Having heard Waddington

lecture in Edinburgh and studied his textbook ‘Principles of Embryology’, Jonathan records how he became fascinated by the unexplained mysteries thrown up by experimental embryology. This new found curiosity coincided with a visit of **Lewis Wolpert** to Edinburgh and Jonathan soon found himself working as a post-doctoral fellow in Lewis' laboratory at the Middlesex Hospital Medical School. It was during this time that Jonathan performed a series of studies of limb regeneration in the axolotl, the results of which had a major influence on the elaboration of the morphogen gradient concept and the role of the ZPA by Wolpert and his colleagues.

In the late 1970's Jonathan was appointed to the staff of the Imperial Cancer Research Fund (ICRF), setting up his own research group at their Mill Hill Laboratories, then under the inspirational direction of John Cairns. At first he continued his studies of limb regeneration, but then embarked on the analysis of inductive interaction in the early *Xenopus* embryo. Working first with **Jim Smith** and then **Les Dale**, both of whom were post-docs in his lab, Jonathan used new cell marking techniques to generate accurate embryonic fate maps and re-investigate the properties of Spemann's organiser, studies that led to his framing the famous “three signal model”.

At the age of just 38, Jonathan published from "Egg to Embryo", a slim monograph so erudite and prescient in its vision that it has already achieved the status of a classic in the modern era of Developmental Biology. In it, Jonathan clearly identifies and explains the fundamental concepts and problems of developmental biology while indicating the likely routes to their solution. A key feature of this book was the recognition of the significance of the new discoveries emerging from the genetic analysis of *Drosophila* development, an area of developmental biology still regarded by many at the time as, at best impenetrable and most likely irrelevant to the study of vertebrate development.

In 1985 Jonathan moved to the new ICRF Developmental Biology Unit in Oxford where he embarked upon arguably his most courageous and spectacular experiment. Together with **John Heath**, he purified enough Fibroblast Growth Factor (FGF) from cows' brains to investigate whether such a protein might have the capacity to act as an embryonic inducing factor. Spectacularly, when animal cap explants were treated with the purified factor, they turned into "sausages", indicating that they had acquired mesodermal character and

thus establishing the principle that we now take so much for granted – that embryonic induction is mediated by growth factor like molecules.

As well as publishing a prodigious number of papers building upon this seminal observation, Jonathan found time to produce a second and substantially enlarged edition of 'From Egg to Embryo'. In 1995 he left the ICRF and took up the Chair in Developmental Biology at Bath University. Despite the new demands on his time that came with this appointment, he has managed to write two more books – one an excellent undergraduate text book based on his Developmental Biology lecture course at Bath, the other the highly original autobiographical and sociological account of developmental biology 'Egg and Ego'. He also served as the Secretary of this society from 1993-1998.

A less well known fact is that Jonathan is an accomplished Morris dancer, who has been known to entertain his colleagues with renditions of traditional folk tunes on his squeeze box. A man of many talents indeed!

Phil Ingham

News (& Views)

BSDB Committee changes

With the departure of **Paul Martin** and **Julie Ahringer** we welcome our newly elected committee members **Alicia Hidalgo** and **Alison Woollard**, who will take up their posts from September. Anyone wishing to contact them in the interim should contact Ivor Mason for address details (see back pages).

Developmental Biologists in the New Crop of Royal Society Fellowships

Included among those newly elected as Fellows of the Royal Society is our Chairman, **Phil Ingham**, to whom our warmest congratulations are extended. Others well known for their contributions in the field of developmental biology are **Alan Bradley**, **Nick Hastie**, **David Ish-Horowicz** and **Ian Wilmut**. Our congratulations to them all.

Sci-Art at the BSDB Spring meeting 2002 in York

There was great interest in the Sci-Art exhibit featuring work from **Julia Wilson**, **Marta De Menezes**, **Helen Storey**, **Pete Jeffs**, **Joanna Miller**, **Marcel Hubert** and **Carol Nunes** (see also back cover). The exhibit was arranged by **Paul Martin**, **Jenny Whiting**, **Kate Storey** and **Robert Whittle** who surely warrant our warmest appreciation. Just how popular the exhibit was is illustrated by these extracts from the Visitors Book:

- I see great potential here for new art forms. **De Menezes'** work with butterflies could be expanded with genetic techniques borrowed from *Drosophila* to create new patterns and forms. Great!. The spinal cord dress appeals to those of us with a sick mind who love 'Alien' and sequels.
- Terrific. Demonstrates that imagination is common to art and science.
- Fabulous- I wish there were more exhibits of this type. Both Art and Science can benefit, and the public as well. Loved **Miller's** "DNA"- beautiful inside-the-cell feeling.

- 'Fashion' element was an eye opener. The more we see of this, the more new works will be produced. Artists have been obsessed with life since the year dot. Scientists with artistic skills will do the same. A collision is obvious- so why do we seem to be (or are perceived to be) coming from different directions. Surely this is a myth?
- This works well, and is a welcome mind-broadening relief from the focussed details of the sessions. Please let's do this again.
- I love the work by **Marcel Hubert**. I wish I was rich and they were for sale.
- The fashion is great... what can the men wear? I also really like the stained glass, and find the 'Invisible Body' very thought-provoking.
- Good fun- take it into other spaces now!
- Very nice exhibition- the beauty of developmental biology tends to get a bit lost in the labs nowadays. Events like this bring it back to mind.
- Please keep doing more of these. Apart from the beauty of images, it is a great way of making science accessible to non-scientists.
- Wonderful exhibition. I've wanted for years to see the Storey fashion designs, and a lot of the other exhibits were thought-provoking or beautiful. I especially liked the HeLa cell "Invisible Body" exhibit, and the butterfly exhibit was interestingly disturbing in a very thought-provoking way. I think this sort of art should definitely be encouraged- it would be interesting to see a lay public reaction to some of these- especially the butterfly and Invisible Body pieces, as both raise ethical and philosophical issues as well as scientific ones. I look forward to seeing many more interactions and conversations between scientists, artists and the lay public.

News, Letters and Comments to the Editor
a.j.furley@sheffield.ac.uk

From the Treasurer

Travel Grants

Thanks to the continued generous support of the Company of Biologists, the BSDB awards three types of travel grant to members, with preference given to graduate students and postdocs.

BSDB Spring and Autumn meetings:

These are the only UK meetings for which there is BSDB support, and grants cover basic travel and conference expenses (but not conference dinners!). We are currently able to fund demand but, if numbers increase, preference will be given to members who present posters.

BSDB members based abroad are eligible for a contribution (max £400) towards attending BSDB meetings.

Practical courses: Support of up to £500 is available for these courses and, at the moment, all applicants are funded. If more than about 8 members a year apply, however, a selection procedure will be introduced.

Foreign meetings: This is the category for which there is greatest demand and we cannot fund everyone. BSDB will give members a contribution (max £400). Current policy is as follows: no more than two people from one Department or one person from a group will be awarded a grant to go to a particular meeting. Preference will be given to members presenting work.

Other activities: The Treasurer now has a small additional fund to support other activities eg. travel within the UK, or the USA, in order to visit laboratories. Please email the Treasurer with any appropriate request.

Small Meetings

Members may approach the Treasurer for seed funding to help with organising developmental biology events (eg one-day meetings) that involve other institutions and at which students and post-docs are encouraged to attend and present work. The BSDB currently supports the meetings of

several local developmental biology groups with small (~£250) annual contributions. Any further requests for this type of funding should be made in a letter to the Treasurer.

Louie Hamilton Fund

There is a small amount of money available from the Louie Hamilton Fund to provide travel support for handicapped members. Applicants should contact the Treasurer.

TO APPLY FOR A TRAVEL GRANT:

- Members should first complete the Travel Grant Application form and send it to the Treasurer. (see **Forms** section at the back of this issue or see the BSDB website: www.ana.ed.ac.uk/BSDB/bsdbgrant.htm)
- Application 3-4 months in advance is advised so that the BSDB contribution can be used as a lever to prise the rest of the money from other sources. No grants will awarded in arrears
- **All applications for grants to attend a BSDB meeting must be in the Treasurer's hands a week before the meeting deadline.**

Please note: no-one will be awarded more than one travel grant for an overseas trip per year.

Financial Report see opposite

SUBSCRIPTIONS

****1998 "Student-rate" members should quickly upgrade their subscription to £20 or they will be culled (humanely).**

Ottoline Leyser

Graduate Students

The Graduate Student Representative on the BSDB Committee is **Leigh Wilson**. Her job is to communicate Graduate Student views (good or bad) to the Committee, so please do not hesitate to contact her - see the addresses page at the back. Leigh would like to encourage all students to **apply for the travel grants**, not only to BSDB meetings but for overseas meetings, courses, and workshops as well. The BSDB offers very generous travel grants and students in particular should take advantage of their membership while it lasts! The BSDB is far more generous than other societies in this respect!

Financial Statement 2001

BRITISH SOCIETY FOR DEVELOPMENTAL BIOLOGY

FINANCIAL STATEMENT YEAR ENDING JULY 31st 2001

Balance Sheet

<u>1999/00</u>		<u>2000/01</u>
£		£
<u>107,636</u>	Investments	<u>100,366</u>
	Baillie Gifford Managed Fund (1,2)	
	Current Assets	
26,228	Barclays Bank High Interest Account (2)	27,241
8,393	Barclays Bank Current Account	17,863
2,798	Barclays Bank: Louis Hamilton Account (3)	2,857
37,419		47,962
1,441	Less: Unpresented cheques	8,100
<u>35,978</u>	Net Current Assets	<u>39,862</u>
<u>143,614</u>	Total Funds	<u>140,228</u>

Income & Expenditure Account

<u>Income</u>	<u>£</u>	<u>Expenditure</u>	<u>£</u>
Membership (Standing Order)	15794	Grants (Travel & Courses)	42,693
Membership (Cheques)	465	UKLSC etc	660
Capitation Fee (CoB)	13,180	Newsletter	5,284
Travel grant fund (CoB)	35,000	Small meetings and other DB meetings	4,172
Sale of addresses	2,334	York Meeting	6,872
		Brighton Meeting	- 7,138
Interest and Investment Appreciation:		99/00 meetings and 00/01 meetings	9,546
Barclays High Interest a/c	1013	Committee & administration	2,191
Barclays Louis Hamilton a/c	60	Bank charges	87
Barclays Current Account	406		
	-	Total Expenditure	<u>64,367</u>
		Net Surplus for the Year	3,884
Total Income	<u>68,251</u>	Unrealised Gains on Baillie Gifford Managed Fund	- 7,270
		Fund balance at 31st July 2000	143,614
		Fund balance at 31st July 2001	<u>140,228</u>

Notes

These accounts were prepared under the historic cost convention, in accordance with the applicable accounting standards and Recommended Practice of Accounting by Charities. There have been no major changes to our financial arrangements this year.

1. The Baillie Gifford and Barclay High Interest Account valuations are on 30.6.01 (the 2000/01 BG loss is ~7%).
2. This account includes £25,500, the surplus on BSDB practical courses; this is used to provide grants for members to go on courses, and £6,081 was spent in 2000/01 for this purpose.
3. This is the only restricted account and no call was made on it in the financial year 2000/01

Next BSDB Meeting

BSDB Autumn Meeting 2002 T Box Genes in Development and Disease

University of Nottingham, Monday 16th – Wednesday 18th September, 2002

Scientific Organizers: **Jim Smith, Ginny Papaioannou**

MONDAY 16 SEPTEMBER

Introductory Session

2.00 – 2.15	Jim Smith and Ginny Papaioannou: Welcome
2.15 – 3.00	Bernhard Herrmann , Max-Planck-Institut für Immunbiologie, Germany <i>Brachyury in paraxial mesoderm development in mouse</i>
3.00 – 3.40	Jeremy Gibson-Brown , Washington University, USA <i>Evolution of T-box genes and their functions</i>
3.40 – 4.10	Tea
4.10 – 4.50	Christoph Müller , EMBL, France <i>Structural insight into DNA recognition by T-box transcription factors</i>
4.50 – 5.30	Jim Smith , Wellcome Trust/Cancer Research UK Institute, UK <i>Regulation of T-box targets</i>

TUESDAY 17 SEPTEMBER

T-Box Genes & Development (1)

09.00 – 09.40	Janet Heasman , Children's Hospital Medical Center, USA <i>The interplay between T-box genes and Wnt signaling pathways in Xenopus</i>
09.40 – 10.00	Poster speaker
10.00 – 10.40	Nori Satoh , Kyoto University, Japan <i>T-box genes in the basal chordate, <i>Ciona intestinalis</i></i>
10.40 – 11.10	Coffee
11.10 – 11.50	Gert Pflugfelder , University of Wuerzburg, Germany <i>Drosophila optomotor-blind: one gene - many functions</i>
11.50 – 12.10	Poster speaker
12.10 – 12.50	Deborah Chapman , University of Pittsburgh, USA <i>Generation of an allelic series of Tbx6 mutant phenotypes in the mouse</i>
12.50 – 2.20	Lunch

T-Box Genes & Development (2)

2.20 – 3.00	Malcolm Logan , National Institute for Medical Research, UK <i>T-box genes and limb-type specification</i>
3.00 – 3.20	Poster speaker
3.20 – 4.00	Alison Woollard , University of Oxford, UK <i>T-box genes in <i>C. elegans</i></i>
4.00 – 4.30	Tea
4.30 – 5.10	Colin Goding , Marie Curie Research Institute, UK <i>Regulation of T-box factor function</i>
5.10 – 5.50	Jane Sowden , University College London, UK <i>T-box genes as regulators of eye development</i>
	Conference Dinner

PhDs, Post-docs

We would like a volunteer to write a review of the Autumn Meeting. To encourage you, we are offering **£50** upon publication. Interested?
Contact Andy Furley:
a.j.furley@sheffield.ac.uk

WEDNESDAY 18 SEPTEMBER

T-Box Genes & Disease

09.00 – 09.40	Ginny Papaioannou , College of Physicians & Surgeons, Columbia University, USA <i>Mouse models and human syndromes: Tbx1 and DiGeorge syndrome</i>
09.40 – 10.00	Poster speaker
10.00 – 10.40	David Brook , University of Nottingham, UK <i>TBX5 and heart development</i>
10.40 – 11.10	Coffee
11.10 – 11.50	Jonathan Seidman , Harvard Medical School, USA <i>Tbx5 deficiencies in mice and man</i>
11.50 – 12.10	Poster speaker
12.10 – 12.50	Jacques Drouin , Institut de Recherches Cliniques de Montreal, Canada <i>Role of Tpit in pituitary cell differentiation and transcription</i>
12.50 – 1.00	Jim Smith/Ginny Papaioannou: Summary & farewell

Next BSDB Meeting

BSDB Autumn Meeting

16-18 September 2002, University of Nottingham

T Box genes in Development and Disease

REGISTRATION FORM

Each participant should complete a separate form (photocopy as appropriate)

Name _____ Title _____

Institution _____

Address _____

Postcode _____

Telephone _____ Fax _____

Email _____

I would like to present a POSTER / TALK (circle one)

Please email abstracts to Chris.Gill@nottingham.ac.uk. Print Title using bold and capital letters.

Print Authors and Affiliations (underline presenting author). **Maximum 350 words**. Text should be **1.5 spaced and font size 12** (Times).

The first session starts at 2pm on Monday 16 September and the meeting will end around 1pm on Wednesday 18 September. There will be a poster session at 6pm Tuesday evening prior to the Conference Banquet commencing at 8pm. Registration packages depend on whether accommodation is required and whether you are a BSDB member. The package includes *all* meals (dinner on Monday through to lunch on Wednesday) including the Reception and Banquet and tea/coffee, abstract book and programme as well as the cost of conference facilities and administration. Accommodation is single occupancy.

Please indicate requirements:

	Breakfast	Lunch	Dinner	Accommodation
Monday 16 September				
Tuesday 17 September				
Wednesday 18 September				

Special requirements:

COSTS: (Circle amount enclosed)	BSDB Member	Non-BSDB Member
Resident - registration package	£170	£200
Non-resident - registration package	£110	£135
Late Registration fee (after 5 August)	£25	£25

Delete as appropriate:

I am an invited speaker / BSDB member / student / postdoc / group leader

Abstract & Registration
Deadline
5th August, 2002
Strictly limited number
of places so apply early!

Registration must be accompanied by payment:

Payment (in pounds sterling only) should be sent by cheque, eurocheque or bank draft drawn on a UK bank. Credit cards are not accepted. Cheques should be made payable to **The University of Nottingham** (Please indicate "BSDB" on all remittance)

Please return this form with full payment to: **Mrs Christine Gill, Institute of Genetics, University of Nottingham, Queen's Medical Centre, Nottingham, NG7 2UH, UK.**

Spring Meeting Reports

Evolution of Developmental Mechanisms was the subject of the 2002 BSDB Spring meeting, held jointly with the Genetical Society in York. It was a cracker. The meeting was packed (with a waiting list of late registrants) and had a constant lively buzz about it.

The diversity of subject matter covered during the meeting gave a real sense of the variety of topics encompassed by Evo-Devo, and the vibrancy of the field. During the course of the two and a half days we were treated to choice samples of genomics and genome evolution, gene regulation, phylogenetics, palaeontology, and evolution of development and developmental mechanisms, in organisms as diverse as bacteria and humans.

The fact that we are in the "post-genomic" era shaped the first morning of talks. It is clear though that from a comparative point of view we are actually still in a genomic era. The sequencing of more genomes from organisms around the select few is greatly improving our understanding of those select genomes, as well as showing us how genomes are organised, how they evolve and how there is a surprising amount of diversity amongst them. Nematodes and flies have altered the relative abundances of different gene families, to suit their different needs (Jonathan Hodgkin), and the two yeasts *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*, despite their superficially similar appearances (ie. they are both yeasts!), have hundreds of genes that are unique to one or other of them (Paul Nurse). A particularly impressive achievement is the Japanese *Ciona intestinalis* project (Nori Satoh). Not only is the genome sequenced, but there are thousands of ESTs for five different developmental stages, hundreds of which have already been analysed by embryonic in situ hybridisation. This huge amount of data is being rapidly placed into the public domain (<http://ghost.zool.kyoto-u.ac.jp>), greatly furthering the case for *Ciona intestinalis* as one of the model organisms of choice for developmental biology. Two of the selected talks (Clare Hudson and Jean-Philippe Chambon) actually dealt with brain development and tail regression in *Ciona*. The role of gene and genome duplication in evolution was also a prominent theme, in plants (Virginia Walbot), and chordates (John Postlethwait, Peter Holland and Georgia Panopoulou).

A workshop on Molecular Phylogenetics took place in the middle of the programme, and was both well attended and well received. The crash course on the basics and pitfalls (Sandra Baldauf) was appreciated by the many folk who simply put their sequences into Clustal or PAUP and hit 'Go'! It was also exciting to see that the Acoel flatworms are shaping up to be basal bilaterians much more robustly (Jaume Baguña), thus offering the hope that an even closer examination of these animals should bear fruit in understanding what was there when the bulk of the animals (the triploblast Bilateria) arose. What went before were the diploblasts (hydra, sea anemones, jellyfish and comb jellies). How the axes and cell layers of these basal animals relate to those of the Bilateria is a conundrum which is being clarified by some careful embryology and analysis of such genes as the Hox genes (Mark Martindale). The continued importance and pervasiveness of Hox genes within Evo-Devo was illustrated by their prominence at this meeting (Denis Duboule, Victoria Prince, Sean Carroll, Michael Akam). How morphologies have been pieced together during evolution, rather than how the molecular mechanisms have been assembled, is pre-

dominantly the realm of palaeontology (Simon Conway-Morris). It is clear that we need to keep the findings of palaeontology to the front of our minds when forming ideas about Evo-Devo, as no description or understanding of animal evolution is complete without it.

The interface between what could be viewed as the more traditional face of Evolutionary Biology (Microevolution at the population and species levels) and Developmental Biology, was well represented. We heard about the constraints, or rather their absence, on butterfly eyespots (Paul Brakefield), the evolution of 'naked' flies (David Stern), the domestication of maize (John Doebley), the impact of QTL analysis on the evolutionary development of the classic evolutionary model of the stickleback (David Kingsley), and the difficulty of building a genotype-phenotype map even in such an amenable system as bacteria (Paul Rainey), finishing off with nematode vulvas (M.L. Dichtel). Much food for thought.

Evolution not only effects morphology, but also life history. We were reminded of this by considerations of ageing (Linda Partridge and David Gems) and insect metamorphosis (James Truman). Returning to morphology however the benefits of the candidate gene approach, comparing homologous genes between taxa for which a phenotypic effect is established in more traditional model systems first, is having a significant impact in understanding the evolution of segmentation, particularly in insects (Sarbjit Lall), and the relationships between the eyes and brains of different bilaterians (Detlev Arendt). The approach is also bearing fruit in plants, in understanding the evolution of flower asymmetry (Enrico Coen), and flower and leaf form (Vivian Irish and Jane Langdale).

Other events included the award of the Waddington medal to Prof. Johnathan Slack, and an interesting new feature to BSDB meetings of a Sci-Art exhibition. This was excellent, and certainly stimulating. Unfortunately it was somewhat hidden away in a small side room. Perhaps if such exhibitions are to feature in future meetings a more prominent position might be sought, perhaps in an area where delegates cannot help but wander past. This would increase the number of folk who will have their senses prodded in a different and welcome way from the stimulation of the talks.

No review of the meeting would be complete without a mention of the incredibly virulent stomach bug that seems to have hit the majority of the conference within days of the departure from York, setting us up nicely for all of that Easter chocolate! Hopefully this particular feature of the meeting will never be repeated.

Dave Ferrier, Reading

This year's spring meeting was held at York University with the BSCB and the Genetical Society and included four keynote lectures. The conference opened with the BSCB Plenary Lecture by Hugh Pelham, who described a number of mechanisms cells utilize to sort different membrane proteins from the Endoplasmic Reticulum into different cellular compartments. The Gensoc Bal-four lecture was given by Adam Eyre-Walker who discussed deleterious and adaptive mutations in the human genome; Andrea Brand gave the BSCB Hooke Medal Lecture and talked about asymmetric cell division in the *Drosophila* embryonic CNS and the BSDB Waddington Medal lecture was given by Jonathan

Slack, who gave us an interesting overview of his career.

The BSDB talks focused on Evolution and Development. The first session included a number of genome analysis talks, starting with Jonathan Hodgkin comparing *Caenorhabditis elegans* and *Drosophila* and Paul Nurse summarizing the Fission yeast genome. We heard that nematodes have taken over the world: constituting 80% of all individual animals and 80% of all species; that the fission yeast (*S. Pombe*) genome is the smallest eukaryotic genome sequenced so far; and that 60% of identified human disease genes have homology to *S. Pombe* genes. Both speakers estimated that there are about 3000 genes that encode core eukaryotic functions. Despite the similarities between different organisms there are also some striking differences. For example *C. elegans* does not appear to have a Hh signalling pathway and it has only some components of the Toll signalling pathway. *C. elegans* also has about ten fold more putative nuclear hormone receptors and G protein coupled receptors than *Drosophila*, though *Drosophila* has twice as many C2H2 Zinc finger proteins as *C. elegans*.

Not surprisingly, a number of talks discussed Hox genes. Denis Duboule talked about the Hox D complex and its role in mouse limb development. His lab is undertaking a detailed analysis of the effects of mutating, deleting and duplicating individual genes in the Hox D complex. Their results suggest that a digit enhancer 180-250 KB upstream of this complex, acts in a position specific rather than promoter specific manner, so that the closer a gene is to the enhancer the higher is its level of transcription. In addition, reducing the distance between the Hoxd11 coding region and the enhancer, and hence increasing the levels of Hox d11 transcription, causes extra digits to form, suggesting that the chromosomal position of this gene is important in determining digit number.

Michael Akam discussed the complexities of Hox expression, function and evolution. Particularly striking was his description of how *Drosophila* Ubx represses bristle formation in different ways at different times in development. In one case Ubx represses the pre-pattern stage of bristle development, in another it acts just before the lateral inhibition step, and in yet another it represses bristle development after the parent stem cell has divided.

In the session on Microevolution of Development we heard how influential a previous BSDB Evolution and Development conference had been. Paul Brakefield described "jumping up and down" after Sean Carroll's talk at the 1994 Edinburgh meeting, and how this conference resulted in a great collaboration between himself, Sean Carroll, Vernon French and Antonia Monteiro investigating butterfly eyespot development. This year Brakefield showed that variation of eye spot size in the African Squinting Brown butterfly is not developmentally constrained, despite the fact that certain eye spot patterns are not normally seen.

A common theme emerging from a number of talks was the importance of evolutionary changes in cis-regulatory regions of transcription factors. David Stern told us how mutations in separable enhancers for *Drosophila* shaven baby/ovo have resulted in its function in bristle development evolving separately from its role in germ cell development. He also discussed results from Nipam Patel's lab, which show that there have been

substantial genetic changes in the stripe 2 enhancer region of eve in different *Drosophila* species, but without changing its expression pattern, as assayed in *Drosophila melanogaster*. Chimaeric analysis suggests that these enhancers have acquired complementary changes maintaining the original expression pattern of eve rather than evolving new expression patterns or levels. This raises the question of why some enhancer changes acquire compensatory changes while others cause phenotypic changes that evolution acts on.

John Doebley discussed how the different branch lengths of Maize and its ancestor Teosinte can be explained by different expression levels of a transcription factor, TB1, that normally represses organ growth; and Sean Carroll described how changes in cis-regulatory regions of particular genes have produced different pigment patterns in different *Drosophila* species. Sean Carroll also gave us an example of a transcription factor acquiring different functions through coding region changes: in some insects Ubx has a domain that can repress the distalless gene, and in some it doesn't.

Then the topic turned to aging, that "intrinsic state that leads to an increase in death rate and decline in fertility with advancing age". Linda Partridge described two key theories of aging – Medawar's hypothesis that aging is due to an accumulation of mutations and Williams theory that a mutation that is advantageous early in life, but that causes aging later, will be kept in the population, as early survival and fertility are under more selective pressure than longevity. A lot of the research done so far suggests that early fecundity = early aging, supporting Williams hypothesis. Two mechanisms for slowing down aging are caloric restriction, and reducing signalling through the insulin/IGF pathway. Both act through either the same, or overlapping, mechanisms to slow down normal aging.

David Gems discussed sex differences in longevity in *C. elegans*. In the lab, males normally die earlier than hermaphrodites. However, this is because their life span is reduced by sex: males maintained on single occupancy plates live substantially longer than males maintained with other worms of either sex, and live about 20% longer than hermaphrodites. Blocking neurological functions related to mating (unc mutations) can increase the lifespan even of solitary males, suggesting that self-mating behavior also reduces longevity.

The posters spanned the whole spectrum of cell, evolutionary and developmental biology. In addition, there was the first ever BSDB Sci-Art exhibition. The subject matter and media were amazingly varied, including dresses and hats based on embryonic development; oil paintings; digital media; stained glass; an installation art piece with HeLa cells, *Drosophila* and reflective text; and an exhibit of real butterflies with wing patterns modified experimentally by the artist. It was a great exhibition with some beautiful and thought provoking exhibits.

All in all it was a great conference, though the experience was unfortunately tainted for many by food poisoning the day after it ended. The culprit is rumored to be the prawns at the Friday evening formal dinner.

Kate Lewis, Oregon

Future BSDB Meetings

Spring 2003 Cell and Developmental Biology Annual Symposium University of Warwick, 8th-11th April 2003 Meeting Organisers: Paul Scotting & Robert Kelsh.

The title of this meeting reflects a new format, decided by a clear majority at a recent BSDB Annual General Meeting. Instead of devoting the entire meeting to one theme, as has been the practice in recent years, the Annual Symposium will consist instead of a number of half-day themes. We hope that this will encourage a broader range of researchers to attend, and that it will facilitate the exchange of ideas between fields. Each session will be organized by its own Chairman, who will begin the session by giving an introduction to the topic, and first-class speakers will then present research talks in the usual way. In the 2003 Annual Symposium, the topics will be:

- | | |
|----------------------------------|-----------------------------|
| 1) Induction | (chair: Judith Kimble) |
| 2) Cell Fate and Differentiation | (chair: Ryoichiro Kageyama) |
| 3) Organogenesis | (chair: Jonathan Slack) |
| 4) Disease | (chair: Nick Hastie) |
| 5) Genomic Reprogramming | (chair: Azim Surani). |

Other speakers include (in a few cases, still subject to confirmation) Konrad Basler, Helen Blau, Peter Currie, Caroline Dean, Helena Edlund, John Gurdon, Andy Jarman, Liz Robertson, Cynthia Kenyon, Roger Patient, Drusilla Roberts, Alex Shier, Benny Shilo, Rob Scott, Austin Smith, Andrew Wilkie, Jeff Williams, Ken Zaret.

Autumn 2003 Special joint meeting with French Society of Developmental Biology To take place in Nice, France in September 2003

Organiser: Alfonso Martinez Arias

As a prelude to more European integration, we have reached an agreement with our sister society in France to hold a joint meeting in 2003. This will take the place of our usual Autumn meeting and is scheduled to be held in Nice. Given that the cost of travelling to Nice from Luton and Liverpool is nowadays significantly less than the average rail fare between any two cities in the U.K., this rather more exotic venue should not prohibit attendance at what promises to be a very stimulating and productive meeting.

Further details will be presented in the next Newsletter.

Topics for Future Society Meetings

One of the major tasks of the BSDB Committee is to select topics to be covered in future meetings and then to ensure that these meetings are well organised and successful. It is obviously crucial that meetings are supported by the members of the Society, and we always welcome suggestions for future topics. If you have an original idea for:

- a half-day theme for the Spring Symposium,
- a two day Autumn meeting
- a one day workshop,

please get in touch with the **Meetings Secretary, Jamie Davies** (jamie.davies@ed.ac.uk)

Other Related Meetings & Courses

ELSO 2002

29 June to 3 July 2002

Nice, France

Opening Session:

Tim Hunt, Nobel Prize Laureate, ICRF

Plenary Symposia:

Michael Berridge, Cambridge, UK, Peter S. McPherson, Montreal, Jim Smith, Cambridge, UK, Elaine Fuchs, Chicago, Erwin Wagner, Vienna, Nadja Rosenthal, Monterotondo, Chris Sander, Cambridge, USA, Michael Snyder, New Haven, Peer Bork, Heidelberg, Jennifer Lippincott-Schwartz, Bethesda, Ari Helenius, Zürich, Ilan Davis, Edinburgh, Andreas Engel, Basel, Carlos Bustamante, Berkeley, John Walker, Cambridge, UK, Thomas Jenuwein, Vienna, Maria Blasco, Madrid, Ulf Nehrbass, Paris, Geraldine Seydoux, Baltimore, Carlos Martínez-A., Madrid, Elisabeth Knust, Düsseldorf, Bart de Strooper, Leuven, Leena Peltonen, Helsinki

Minisymposia:

Receptor – Signaling Pathways, Epithelia and Development, In and Out of the Nucleus, Endocytosis, Regulation of the Cytoskeleton, Environmental Signals and Plant Development, New Tools for Post-Genomic Research, Cell Movement, Cell Adhesion and Junctions, Cell Cycle Regulation, Stress and Cell Death, Morphogen Gradients, Glycobiology, Membrane Microdomains and Signaling, Biosynthetic Protein Traffic, Differentiation of Brain Cells, Cortical Cues for Development, Fertilization, Signalling Mediators, Extracellular Matrix, Ubiquitination, Pathogen – Host Interactions, Targeting of Proteins from the Cytosol

Special Sessions:

Cinema of the Cell, Biological Education for All, Career Development Workshop

ALREADY MORE THAN 1500 PARTICIPANTS HAVE REGISTERED!!!!!!

There will also be a large industrial exhibition.
For further information see <http://www.elso.org>

Cell Biology and Neurobiology: A Meeting for Martin Raff

BSCB meeting
rescheduled from Sep 2001

University College London
July 3-5 2002

Martin Raff will retire from laboratory science this year and the scientific programme of this special BSCB meeting celebrates his career and his contributions to science. The programme reflects Martin's broad interests in **cell biology** and **developmental biology** as well as his current scientific interests in the neurobiology of behaviour, psychiatric disease, ethics, and science education.

This July meeting replaces the Sep 2001 meeting that was cancelled because of the terrorist attacks in New York and Washington.

General information, venue and travel

Please visit the web site at: www.bscb.org

Information and registration will be handled by email at lmcb@ucl.ac.uk

Posters are not being invited from delegates: instead the organisers have invited people who have worked closely with Martin over the last 30 years to submit posters giving an overview of their current research. Posters will also be provided by sponsors of the meeting.

Meeting charges

Full delegate£120; Student delegate£75; Meeting Dinner£38; Late registrant - add£35; Day rate£50

The Meeting Dinner will be on Thursday July 4 at the Hotel Russell in Bloomsbury Square.

Accommodation:

Expotel Hotel Reservations are the official hotel and travel agency for this meeting.

Code: BSCB2001.

Tel : + 44 (0) 20 7372 2001

Fax : + 44 (0) 20 7624 4847

Email : events@expotel.co.uk

Best Picture Contest 3rd European Zebrafish Conference (Paris 2003)

The 3d European Zebrafish Conference on Zebrafish Genetics and Development will be held in Paris , at the Pasteur Institute, from June 11 to June 14, 2003.

The conference organizers are opening a contest for illustrations to be used on the meeting web site and on the Conference poster. You are invited to submit your best and most colorful pictures to rosa@wotan.ens.fr.

We look forward to receiving your contributions.

Deadline for entries: 1st July, 2002.

The Conference Organizers:

Laure Bally-Cuif (Munich, Germany)

Robert Kelsh (Bath, UK)

Frederic Rosa (Paris, France)

Uwe Straehle (Illkirch, France)

Jochen Wittbrodt (Heidelberg, Germany)

How to make a hand Anatomical Society meeting at the University of Dundee, 23-25 July 2002

Symposium organisers:
Birgit Lane and Cheryll Tickle

The symposium will consist of an exploration of the developmental biology underlying specification of limb bones, muscles, tendons, nerves, vessels and skin. Speakers include: Ralf Adams (London); Margaret Buckingham (Paris); Carolyn Byrne (Manchester); Don Fischman (New York); Philippa Francis-West (London);

Other Related Meetings & Courses

Bob Hill (Edinburgh); Colin Jahoda (Durham); Irwin McLean (Dundee); Zosia Miedzybrodzka (Aberdeen); Juan-Jose Sanz-Ezquerro (Dundee); James Sharpe (Edinburgh); Cheryll Tickle (Dundee); Andrew Wilkie (Oxford); Rolf Zeller (Utrecht). There is the opportunity to submit abstracts.

Registration, including 3 nights accommodation and all meals, is £200 with reductions for students and members of the Anatomical Society.

The deadline is 21st June 2002.

For further information see:

www.anatsoc.org.uk/dundee2002.htm

Courses at: Brunel University, West London Introduction to Bioinformatics 18 – 19 July 2002

2 day course - price £425

Dr Annette Payne

The course will be aimed at scientists with little or no experience in this novel field and is designed to introduce and familiarise researchers with the many bioinformatic software programmes available in the public domain.

Methods in Molecular Techniques 22 – 26 July 2002

5 day course - price £985

Dr Christopher Parris

This laboratory-based 5-day course provides tuition in preparative and analytical methods of nucleic acid research. The course is suitable for both the experienced worker and the novice, as instruction will be given to meet individual needs.

Fluorescence in-situ Hybridisation (FISH)

**in association with BBSRC
29 July – 2 August 2002**

5 day intensive course - price £1350

Dr Joanna Bridger

This intensive 5-day course provides full training in basic and cutting-edge FISH techniques. Lectures and practical training will be given in visualisation of DNA sequences on metaphase and interphase chromosomes (2 and 3D), fibre-FISH, RNA-FISH and multi-colour FISH.

Enquiries for all Brunel courses please contact:

Brunel Enterprise Centre, Brunel University,
Uxbridge, UB8 3PH
Tel: + 44 1895 816275, Fax: + 44 1895 203099
Email: shortcourses@brunel.ac.uk

Signalling the Future

**The University of Liverpool
3rd – 6th September 2002**

Signalling the Future, a major International Symposium on the theme of Cell Signalling, will celebrate the centenary of the foundation of the first Chair and Department of Biochemistry in the UK at the University of Liverpool in 1902.

The symposium will reflect on the explosion in molecular information arising from genomic and post-genomic technologies and look forward to a realistic description of the full array of integrated mechanisms that cells and organisms deploy in response to external signals. As well as talks by invited speakers in three parallel sessions, there will be poster sessions and a full social programme.

For full details and registration, please visit our website:
<http://www.signal2002.com>

Deadline for registration and abstract submission: 2 July 2002

Keynote lectures

Tom Blundell • Philip Cohen • Alfred Gilman • Tony Hunter • Bob Michell, Dennis Noble • Paul Nurse • George Pitt • Steven Rose

Topics

G-protein-coupled receptors • Tyrosine kinases • Nuclear receptors in endocrine systems • Nuclear calcium signalling • Lipid signals and kinase cascades • Cell proliferation and cell death • Cell differentiation and development • Signalling in host-pathogen interactions • Chemical signalling between individuals

Signalling the Future is supported by the Biochemical Society and several of its Interest Groups, the Society for Endocrinology, The Physiological Society, the **British Society for Developmental Biology** and the Liverpool Centre for Comparative Infectious Diseases, together with several commercial sponsors.

Growth, Death and Morphogenesis

**University College, London, 9th
September 2002**

**A one day meeting sponsored by The
Genetics Society**

Speakers include: John Abrams, Konrad Basler, Nick Brown, Peter Bryant, Natalie Franc, Ernst Hafen, Antonio Jacinto, Eli Knust, Mark Krasnow.

Registration £20 students £30 others (£5 discount on registration fee for Genetics Society members).

For further details contact the organisers:
h.mcneill@cancer.org.uk, paul.martin@ucl.ac.uk,
guy.tear@kcl.ac.uk, j.r.s.whittle@sussex.ac.uk,
pmeier@icr.ac.uk

To register send name, address and email address with cheque made payable to 'London Fly Meeting 2002' to Dr. J.R.S. Whittle, School of Biological Sciences, University of Sussex, Brighton BN1 9QG.

Other Related Meetings & Courses

Quarterly Muscle Development Meeting

Members are alerted to the occurrence of BSDB-sponsored quarterly meetings in which speakers present their work on aspects of cell and developmental biology of muscle tissue in health and disease. These meetings have proved popular, attracting regular attendees from Edinburgh, Paris and many points between.

Meetings commence at 6pm on Wednesday evenings in the impressive Gordon Museum on Guy's Campus of King's College London and are followed by pizza and drinks in the MRC Centre for Developmental Neurobiology courtesy of our sponsors: ICR, GSK, Improvision and BSDB.

Attendance is free and accommodation can frequently be arranged with locals for those from out of town. Email simon.hughes@kcl.ac.uk to be added to the mailing list

Genes and Cancer 2002 UK Molecular Biology and Cancer Meeting 19 9th - 11th December 2002 Warwick University

Chair of organising committee: Tony Kouzarides
Confirmed sessions and speakers include:

KEYNOTE LECTURE:

Tony Pawson (Toronto)

GENE EXPRESSION

Shelley Berger (Philadelphia)
Bob Kingston (Boston)
Peter Becker (Munich)
Steve Gamblin (London)

GROWTH AND DIVISION

Sally Leever (London)
Julie Cooper (London)
Julian Blow (Dundee)
Mary Dasso (Bethesda)
David Barford (London)
Kristian Helin (Milan)

TUMOR BIOLOGY

Gerard Evan (San Francisco)
Rosemary Akhurst (San Francisco)
Maarten Van Lohuizen (Amsterdam)
David Wynford-Thomas (Cardiff)

CANCER GENOME

Ian Tomlinson (London)
Andy Futreal (Cambridge)
Bryan Young (London)
Rene Bernards (Amsterdam)

Registration: £105 (students £45)

Accommodation and meals: £205 / £260

DEADLINE ABSTRACTS: 18th October 2002

REGISTRATION DEADLINE: 1st November 2002

More Information: stefan.roberts@man.ac.uk

Book Reviews

The Developing Brain

Michael Brown, Roger Keynes & Andrew Lumsden
Oxford University Press 2001
ISBN 0 19 854793 5 £24.99

The declared aim of this book, written by three well known British developmental neurobiologists, is to present a synthesis of classical neurodevelopmental literature with recent molecular data on neural development. The production of such a volume is timely, for the pace of discovery at the molecular level has rendered existing texts about developmental neurobiology, such as Purves and Lichtman, seriously out of date. In an era when many texts are produced as high-quality hardbacks with lavish colour illustrations and micrographs, O.U.P. have produced *The Developing Brain* is a flimsy paperback, printed on mediocre-quality paper and illustrated only with monochrome line drawings. The authors are to be congratulated on this choice, because the book is inexpensive enough (£24.99) to be bought by, and to become a constantly-available reference for, its intended readership (senior undergraduates, graduate students and post-docs) instead of being afforded only by libraries. And, if you are at all interested in how the nervous system builds itself, this volume is definitely worth a place on your shelves.

In line with its title, *The Developing Brain* concentrates mainly on the development of the central nervous system, although chapters on the neural crest, on synapse formation and on neurotrophins make

substantial forays into the periphery. It is also dominated by higher vertebrates, and although studies on *Drosophila* are covered in detail in sections on fate determination, eye development and axon guidance, and *Aplysia* makes an appearance when learning is being discussed, I am left with the feeling that the authors regard invertebrates as useful mainly for discovering learning principles that can be applied to vertebrates rather than equally interesting creatures in their own right. The book begins with a description on the most common experimental models, their evolutionary relationships, and with a broad overview of the whole of neural development. Essentially, this chapter provides the tool-kit for accessing the rest of the book, and armed with the information in Chapter 1, a reader can jump to almost any other chapter at once. This is a clever touch from authors realistic enough to know that few people have the time to read textbooks from cover to cover.

The next chapters each concentrate on a different aspect of neural development, and are arranged in approximately the temporal order of those events during development. Topics include neural induction, crude patterning of the CNS into different regions, commitment to neural fate, the neural crest, myelination, cortical development, development of sensory organs, axon guidance, synaptogenesis, neurotrophic factors, programmed cell death, plasticity, learning and repair. Each chapter ends with a list of key points. The emphasis of the text is very much on

Book Reviews

development of the neuroanatomical brain, so there is nothing about development of the “mind”, aspects of the brain; nothing, for example, about the developmental stages that lead from helpless babies to communicative, manipulative and intelligent children, or that make birds of different sexes sing and behave differently. There is nothing wrong with this omission it makes a good deal of sense for the book to remain at the level of hard cellular facts but the title may be misleading in this context.

Part of a reviewer's job is to write about the failings, as well as the strengths, of a book. This is not easy in this case, for as well as being comprehensive this book is written with a lively and seamless style, as if it were a monograph. The two main omissions are technical, and would be easy to correct in a second edition first, a glossary would be useful, and the current index, while fairly comprehensive, does not index diagrams. This is a shame, for the line drawings are a real strength of the book. There is, for example, an exceptionally clear illustration of the flexures that form in the human CNS, yet when I wanted to find this again “flexure”, did not appear in the index; this is a general problem, and really needs to be addressed for the next edition of the book.

Overall, though, this is an excellent book, and students who have borrowed it from me are already buying their own copies when I at last manage to rescue mine. That is as strong a practical recommendation as any.....

Jamie Davies, Edinburgh

Genes & Signals

Mark Ptashne and Alexander Gann
Cold Spring Harbor Laboratory Press, 2001
ISBN0879696338 £28.00

Transcriptional control networks lie at the heart of the processes that generate developmental complexity. Surveying the extensive literature on transcriptional regulation, Ptashne and Gann now distil the essence of how transcriptional control is imposed on prokaryotic and eukaryotic genes. General themes of transcription factor behaviour emerge that transcend phylogenetic boundaries and which reflect the functional modularity inherent in the domain-based architecture of many proteins.

The book begins with an up-to-date account of the mechanisms of gene control in bacteria, exploiting the familiar territory of the lac system and phage lambda lysogeny to introduce a guiding principle of gene control: regulated recruitment. In response to physiological signals, transcription factors are modified to enable physical interactions both with binding sites in target DNA and RNA polymerase, resulting in polymerase recruitment to specific genes. The authors also describe regulatory mechanisms that dispense with this orthodoxy, since some bacterial transcription activators produce direct conformational changes in either RNA polymerase or the promoter itself. Nevertheless, in eukaryotes, the dominant mode of transcription factor function appears to be regulated recruitment, which is exemplified by the GAL4 transcription factor of budding yeast. As with prokaryotic activators, separate protein domains in GAL4 mediate adhesive interactions with DNA and the RNA polymerase complex.

When the book eventually turns to gene regulation in multicellular systems, a few well chosen examples suffice to illustrate the widespread deployment of regulated

recruitment as a basic mechanism of gene activation. These include the events at the promoters of the *Drosophila* hsp70 and human beta-interferon genes, and the behaviour of the alternative enhancers of *Drosophila* eve. Here, the authors emphasise how the increased developmental complexity of multicellular systems results largely from the integration of multiple signalling inputs at target genes, and the combinatorial shuffling of these inputs to diversify the regulatory possibilities. The primary importance of co-operative interactions between components of the transcription machinery is also discussed, as a means of solving problems of target specificity and signal integration.

This book showcases the predominant role of regulated recruitment in transcriptional control, however the very nature of chromatin, in which genes are packaged into nucleosomal arrays, poses the problem of target accessibility. The authors review the role of chromatin structure in this light, and focus on the functions of co-valent chromatin modifications in controlling accessibility to DNA-binding transcription factors. Thus, chromatin structure influences the permissiveness of genes for activation, and instructive, developmental regulatory decisions are implemented by transcription factors on competent target genes via recruitment of RNA polymerase (and in some situations, chromatin modifiers as well). A separate chapter then considers a broader role for regulated binding interactions in controlling enzyme activity in proteolysis, splicing, and intercellular signalling.

In taking a bold, reductionist approach to describing fundamental principles of transcription factor function, Ptashne and Gann succeed in explaining a complicated subject. Whilst this book should appeal to a broad scientific audience, it will be of particular interest to advanced undergraduates, postgraduates and other research workers who wish to put some flesh on the bones of transcriptional regulatory networks.

Vincent Cunliffe, Sheffield

Colbert's Evolution of the Vertebrates. 5th Ed.

Eds: Colbert, E. , Morales, M. and Minkoff, E.
Wiley, 2001
ISBN0471221961 £107

Although this book is a classic text of the fifties it has not passed the evolutionary test of adapting to function for survival with all the demands of the 21st Century. There is great competition in this area of the market with many excellent books on the evolutionary record of vertebrate life. I have to say at the start, it has no useful insights to offer to the developmental biologist hoping to learn more of the historical continuity of vertebrates, against which developmental processes may be understood.

It is essentially unchanged and unmodified, with what I most criticise, an outdated format, poor diagrams in places, many unchanged and in the old style branching trees of life with type silhouettes perched at the ends. The section heads I find particularly difficult to follow as there are no numbers and unbold capitals in two, barely discernible sizes, without any obvious logic to their arrangement. As this is largely an undergraduate text, why are there no boxed sections of text with co-ordinated diagrams for rapid understanding of the salient points? Essentially it is a taxonomic group by group format with no interpretation or discussion of the

controversial issues. One example of this is the concept of transformation of an existing structure by adapting from one function to another, jaws being one example, but there is no critique of the data available. The text is certainly easy to read but I don't feel it will provoke the students into revolution, or to challenge the classic, perceived wisdom and rush off to research into issues surrounding evolutionary theory. A comprehensive factual account it certainly is, but today we do need to challenge the facts behind the basis of evolutionary theory, and consider the developmental mechanisms that are the basis of the evolutionary change.

Moya Meredith-Smith, KCL, London

From DNA to Diversity

S. Carroll, J. Grenier & S. Weatherbee

Blackwell Science, 2001

ISBN0632045116

Price £29.99

In *From DNA To Diversity*, Carroll, Grenier, and Weatherbee have given us a gem: a compact, clearly expressed synthesis of modern understanding of the creation of form. They have strung diverse pearls of knowledge from genetics, molecular biology, systematics, and embryology into the three-dimensional jewel that is body shape in all its variation. At a time when a biologist's experimental work is necessarily concentrated on detail and efforts at integration are clogged with vast quantities of data, this book is an elegant arrangement of individual pieces of data into development's overarching concepts. The text is clearly written and appealingly laid out with colorful photographs and illustrations of data that ground the ideas in fact. A particular delight is the quotes placed at the chapter heads: each highlights the broad ideas to be discussed within the chapter. Collectively, they reveal the ways biologists through the decades have approached the seemingly overwhelming complexity of the evolution of form. This book is a convincing picture of how the animal kingdom may have achieved its vast diversity through the random changes of DNA base pairs, one or two at a time, over millions of years. The role gene regulation in morphology is the common thread that aptly unifies the work.

One of this book's many strengths is the authors' ability to put their collective finger on the pulse of current understanding in biology. The first three chapters are a must read for anyone wishing to think about or write about biology today. Ph.D. students and science journalists should be first in the queue but there is much to recommend it to the established researcher as well. The early chapters introduce the diversity in body plan that has arisen over the millennia, the genes involved in pattern formation and how they interact, and the mechanisms of gene regulation during development. The necessary vocabulary is clearly defined and the key concepts of pleiotropy, gene hierarchies, common developmental tasks, and compartmentalisation are introduced and illustrated. They lay the groundwork on which the ideas presented in the final three chapters are built. Having established the basic concepts, the authors use them in a step by step guide to building the variations in existing body plans or to introducing novel aspects of form. They also use them to look back at the creation of form over evolutionary time. This is a wonderful manifestation of the value of cross discipline thinking between two fields of study which have been perceived as unrelated: systematics and development. Two nice examples of this were integrated into the dis-

cussion of the relationship between existing variation in morphology and gene expression. First, the potential for variation in genetic regulation is demonstrated in the differences in gene activity between closely related species and, second, the similarities in gene activity between distantly related groups suggest the fundamental importance of those activities in building an animal. An added bonus to this multi-discipline approach is the intriguing idea of being able to predict the morphological prototype of the bilaterians: the body plan from which all animal diversity arose. It is a clever use of the observations of what has occurred to illuminate what is possible and, through applying the mechanics of gene regulation to what is possible, they predict what may have occurred.

The overlying emphasis of *From DNA To Diversity* is the central role of gene regulatory regions, not the translated regions, in development of the body shape. The authors themselves say, this is not a new idea, but the recent availability of data to demonstrate this thesis makes its reiteration necessary. This seems to me to be unduly modest. More than reiterating, for the scientist, this thesis integrates, illustrates and inspires. In addition, the book serves a wider purpose. The accessibility of the writing combined with the complexity of the ideas makes this a valuable aide to an understanding of biology for a broader audience. The concepts are explained clearly with little use of the analogies that often hinder rather than promote understanding. The text does not permit the pervasive idea that a gene is an independent determiner but instead shows it, the translated region and regulatory region combined, to be an integrated process within a larger developmental process.

This volume will occupy a handy place on my bookshelf both for quick reference and for a good read.

Emily Gale, KCL, London

Mechanisms in Plant Development.

Ottoline Leyser and Stephen Day.

Blackwell Science, 2002 (in press)

ISBN0865427429

£27.50

Developmental biologists combine careful descriptive studies and mechanistic molecular genetic approaches in an attempt to explain how morphologically complex organisms are created. The central challenge is to understand how diverse morphologies are generated from a basic set of developmental principles and tools. In this new book, Leyser and Day provide a comprehensive overview of plant developmental biology that presents a diversity of developmental strategies whilst carefully distilling the basic principles and mechanisms involved. Its strengths are its breadth, clarity and up to date discussion of developmental studies and concepts.

The book starts off with an introduction to the flowering plants, focusing on the interesting and unique aspects of plant development, such as the alternation of haploid and diploid generations, the indeterminate nature of development and the role of stem cell populations (meristems) in providing this function. Each section is complemented by carefully labeled drawings that orient the reader and make the book readily accessible to newcomers to plant biology. The next chapter details special features of plants and plant cells that are a prerequisite for understanding unique aspects of plant development; the complex extracellular matrix or cell wall, the specialized intercellular channels or plasmodes-

mata, and the larger trends of indeterminate development, plasticity and regeneration.

One commonly misunderstood aspect of plant development is the contribution of cell division patterns in directing pattern formation and morphogenesis. This misconception has evolved from studies of *Arabidopsis* development, where stereotypic cell division patterns are a feature of early embryogenesis. The authors wisely devote a whole chapter ("Cell Intrinsic Information") to carefully review and discuss the role of cell lineage and cell division in development. The strength of this and other chapters is the integration of information from a variety of systems, and the most relevant studies (rather than a few popular model organisms) are discussed. As in the subsequent chapters, an overview of the important questions and concepts is followed by case studies that detail specific experiments or mutants in depth. An example of the diversity represented in the book is seen in the next chapter ("Primary Axis Development"), where one case study details the polarity mechanisms in *Fucus*, a brown alga. These studies are then related to flowering plants, through possible links in cell wall localization of positional determinants.

Subsequent chapters describe axis development, cell and organ positioning by lateral signaling, and the important contributions of environmental inputs to plant development. Again, the most recent molecular genetic studies are described in relation to a framework of classical studies, such as surgical experiments on axis development and phyllotaxy. Each chapter is followed by a comprehensive reference list that directs the reader to the appropriate primary literature and other reviews. The book concludes with chapters on how development is coordinated at the whole plant level, and an insightful comparison of the developmental strategies of plants and animals.

Our understanding of the molecular mechanisms controlling plant development has exploded in the last decade, and this book provides an outstanding and much needed review and synthesis. Whilst primarily directed at higher-level undergraduates, it should be accessible and informative to scientists at all levels. Though the field of plant development is rapidly advancing, this book's strength in highlighting fundamental developmental concepts and principles make it a must have for any student of developmental biology.

David Jackson, Cold Spring Harbor

Embryonic Stem Cell: Methods and Protocols

Ed. K. Turksen

Methods in Molecular Biology series

Humana Press, 2001

ISBN 0-89603-881-5 \$119.50

In the late 1980s, the description, isolation and manipulation of embryonic stem cells from mice quickly revolutionized the field of mouse genetics and provided many animal models for the understanding of human disease. Technical advances made by numerous labs have collectively refined embryonic stem cell (ES) technology such that targeted mutagenesis is now viewed as a routine protocol for describing gene function(s). In addition to simple ablation of gene function, it is now possible to introduce very subtle small changes at the resolution of single nucleotides, specifically delete coding exons, or perform gene substitutions by introducing

heterologous coding sequences under control of endogenous regulatory elements. The recent development of recombinase mediated gene activation extensively exploited in *Drosophila* adds significantly to our current repertoire of available approaches for assessing genetic control of the development and function of the nervous system. These studies also demonstrated that controlled differentiation of mouse embryonic stem cells in vitro could give rise to terminally differentiated cell types such as blood cells, cardiomyocytes and functionally mature neurons.

Embryonic Stem Cells, Methods and Protocols in the series Methods in Molecular Biology edited by K. Turksen, is a compilation of a large number of detailed protocols for the use of ES cells to study various lineages and tissue types. The first half of the volume, consisting of 21 chapters, provides detailed protocols for the isolation, routine culture and lineage directed differentiation of ES cells. The second half describes a variety of approaches for genetic manipulation of ES cells, including directed, conditional and random mutagenesis and tools for molecular analysis of ES cells such as cDNA arrays in gene expression analysis, phage display libraries to identify and characterize protein and protein interaction. Each chapter is written in the same general format of introduction, materials, methods, notes and references, which is always useful for a book that will be regularly consulted. In addition, acknowledged leaders in the field report many of these.

As a whole, the entire book is a valuable reference source for any researcher using and manipulating mouse ES cells. Frequently, multiple protocols are provided for a particular technique. For example, three different variants of protocols are provided for the isolation of neuroepithelial cells from embryonic stem cells. These describe diverse techniques such as combination of cell surface markers, manipulation of culture conditions, co-culture with inducing cells or utilizing tissue specific promoters to isolate lineage restricted progenitors from differentiating ES cells. Thus seemingly different methodologies can be efficiently used to isolate neural progenitors from differentiating ES cells. It remains to be determined if these reflect multiple differentiation pathways in vivo. The book, therefore, provides a good survey of varied current techniques but leaves the investigator with the challenge to determine which protocol to use.

Overall, this book provides a good overview of work being done in the development of protocols for culture, controlled differentiation and manipulation of ES cells.

Larysa Pevny, Chapel Hill

Molecular Methods In Developmental Biology: Xenopus and Zebrafish

Guille, Matt,

Humana Press, 1999

ISBN No: 0-89603-790-8 \$89.50

This book is a guide to many of the fundamental techniques used routinely in zebrafish and *Xenopus* research. It is primarily aimed at newcomers to zebrafish and *xenopus* work, although as a reference I think it may be of use to most labs using these organisms.

A wide range of techniques is covered including tissue transplantation, immunohistochemistry, in-situ hybridisation, animal cap assays, microinjection of RNA and

DNA, footprinting and protein-DNA interactions. Consistent with the rest of the 'Molecular Methods' series, each technique is described in its own chapter with a very clear layout. Every technique has a brief introduction followed by a list of all reagents and equipment followed by the methodology. One of the strong points of the book is the thorough notes section at the end of each chapter, referenced throughout each protocol, which describes changes that can be made in different circumstances, reasoning behind steps, and any additional information that may be of use.

It is worth mentioning that the book is now three years old and some of the techniques have evolved since publication, but for the most part the book appears to be current. An exception to this is the methods describing transgenesis in *Xenopus* which discuss DNA microinjection techniques rather than the more recent nuclear transfer protocols.

The only disappointment is with the illustrations which, despite sufficiently illustrating the necessary point in each case, are in contrast to the high standard of the rest of the book. There is only a single colour plate and many of the photographs throughout the book would have benefited from colour representation. In a few cases the photographs are poorly represented, although I must stress the necessary points are still illustrated.

In summary, this book is a solid introduction to some of the common techniques in zebrafish and *Xenopus* and I think would be of good use to its intended audience of new workers in the field.

Robert Bryson-Richardson, Edinburgh

Molecular Principles of Animal Development

Alfonso Martinez Arias and Alison Stewart
Oxford University Press March 2002
ISBN 0-19-879284-0 £28.99 paperback
General Comments and Description.

This book explains Developmental Biology from a Molecular Biology perspective, starting at the level of DNA and working up to signalling pathways and cell behaviors. It is a visually appealing book written in an accessible style. There is a detailed contents page, listing chapter headings and subsections, and a great index. These all make it easy to find subjects of particular interest and should enable the book to be used as an effective reference.

The text is organized in two easy-to-read columns and there are a large number of colour figures (about 350). There are some beautiful figures of real data and a large number of colour schematics explaining various concepts, developmental processes, signalling pathways and experiments. There are also some figures demonstrating different genome analysis resources, which illustrate both the power of genome wide comparisons, and the extensive information already available about some genomes. Some of the figures that explain more complicated pathways and experiments are busy, but they usually have clear, detailed keys and figure legends. The figures can all be downloaded from the Oxford University Press website which should be very useful for using this book for teaching.

Each chapter has a summary and a further reading section. In addition, the figure legends often reference primary data or review articles – though this is not done

consistently. The summaries are particularly clear and useful, though occasionally they contain additional information not present in the chapter. There are a few typos and minor mistakes in the book (for example in figure 1.1 the zebrafish embryo is the wrong way round) but they don't significantly detract from the content.

The authors divide the book into three major sections. Chapters 2-5 introduce the Molecular Biology of developmental processes; chapters 6-9 describe how molecules are involved in different cellular behaviors in development, and chapters 10-12 discuss the development of selected cell types and embryonic structures. Throughout the book the molecular mechanisms of development are center stage. The authors often compare development to a computer, using the analogy of DNA as software that is read and decoded by proteins (hardware). The computer analogy also permeates the book in its emphasis on mechanisms, or molecular and cellular routines, which can be connected like computer sub-routines to create different programs or achieve different tasks. I did not always find the hardware/software analogy helpful, but it might work well for readers considering some of these concepts for the first time.

This book contains a lot of information on the development of different cell and tissue types but, with the exception of the last three chapters, this information is primarily found in figures and figure legends. The first nine chapters clearly emphasize different developmental mechanisms and basic concepts and principles, rather than the details of specific developmental processes. In addition, as the authors acknowledge on page 17, all of the examples in the book are taken from animal systems or yeast.

Description of Individual Chapters.

Chapter 1 "Introduction: Towards a molecular analysis of development" contains a historical overview of Developmental Biology and the arrival of the "molecular age". At the beginning of the chapter, the authors set the context for the book and describe their rationale for taking this more molecular approach. They set up the main questions of Developmental Biology very well and the history sections are interesting and well written. This chapter also includes a clear and succinct description of basic embryology including embryonic development and gastrulation.

Chapter 2 "Programs and regulatory elements in DNA and RNA" primarily provides an introduction to DNA and its role in development. Chromosome structure and organization are discussed, followed by a description of cloning and a discussion of how cloning experiments have shown that somatic cells generally contain a fully functional genome. Sections on different types of DNA sequence, differences between genomes in different species, and genome sequencing then follow. This chapter also discusses regulatory regions in DNA and RNA, and introduces concepts associated with the control and co-ordination of gene expression. The information presented is very current and conveys the excitement and power of contemporary, and in particular genomic, approaches to Developmental Biology.

Chapter 3 "Decoding the program: Transcription" covers transcription and transcriptional control in depth. The chapter starts with a description of transcription in both prokaryotes and eukaryotes. Enhancers, transcription factors, interactions between transcription factors, the role of chromatin in transcriptional control,

and control of transcriptional elongation and termination are all discussed. Transcriptional regulation is illustrated with a discussion of even-skipped in *Drosophila* and the immunoglobulin m heavy-chain gene in mammals. There is then a smaller section on translation and RNA control, and the chapter ends with a discussion of the role of RNA localization in establishing the AP body axis in *Drosophila*.

Chapter 4 "Cell surface proteins: Receptors, ligands and their environment" discusses different types of signals and receptors and interactions between the two. For example, receptor tyrosine kinases, serine/threonine kinase receptors, receptors associated with cytoplasmic kinases, seven transmembrane receptors and nuclear receptors are all discussed and Patched and Notch are mentioned in a section of their own. This chapter contains an interesting balance of relatively recent discoveries, such as the importance of proteoglycans in signalling, and historical information about how some important molecules were identified.

Chapter 5 "Intracellular effectors of cell interactions: Signalling pathways and networks" discusses how signals are transduced to the nucleus, and effectively connects chapter 4 to chapter 2. The chapter starts with a clear explanation and discussion of epistasis and then goes on to cover protein-protein interaction domains (or adaptor motifs), protein kinases, protein phosphatases and G proteins. A number of different signalling pathways are then described individually and the chapter ends by discussing principles involved in the dynamics, specificity and integration of signalling pathways.

Chapter 6 "Cells and their interactions" starts by describing the extra-cellular matrix, and different components of the cytoskeleton. Cell adhesion, cell junctions and the role of cell adhesion in signalling and tissue and organ formation are then discussed, followed by cell polarity, cell shape and the role of changes in cell shape in cell movement and migration. The figures in this chapter are particularly good.

Chapter 7 "Basic cellular routines: Division, differentiation and cell death" covers the cell cycle in detail and then progresses to a discussion of the processes involved in, and the control of, cell growth and cell death. The chapter finishes by discussing the role of cell death and cell survival in development and the question of how tissues and/or organisms regulate their overall size.

Chapter 8 "The generation of lineages: A developmental routine" discusses lineages and their role in development. It includes a good discussion of stem cells as well as covering asymmetric segregation of determinants, Notch-mediated lateral inhibition, and the importance of cell interactions for correct development even when cells have a fixed lineage.

Chapter 9 "Long- and short-range influences in the generation of cell diversity" deals with the concepts of induction, competence, positional information, short and long range signalling and morphogens. The morphogen section is detailed: starting with the original definition of a morphogen; describing how a number of different signals work in quite complex ways; and discussing how well a number of candidate morphogens fit the strict definition.

Chapter 10 "Cell-type specification: A developmental operation" enlarges on how different cellular mechanisms or "routines" are used in the development of specific cell types, specifically vertebrate and *Drosophila*

muscle cells and neurons. These processes are described in depth, in both the main text and the accompanying figures and figure legends. The chapter ends with a discussion of how the mechanisms described in these examples, for example the role of specific combinations of transcription factors in defining and then maintaining a particular lineage, and the role of binary choices (often mediated by Notch-Delta signalling) in determining individual cell fates, may be general mechanisms used in the development of other specific lineages and tissue types.

Chapter 11 "Patterns in one and two dimensions" and chapter 12 "Patterns in three dimensions" both describe the development of specific structures. Specific examples are used to illustrate different mechanisms and principles. Chapter 11 highlights the role of cell interactions in determining different cell fates. In the first example, the *C. Elegans* vulva, a three dimensional structure develops from a small number of cells, that acquire different identities through a series of long and short range interactions. This is followed by an example where a large field of similar cells are patterned along two different axes (*Drosophila* larva epidermis) and an example where a structure develops through interactions between two different tissues (vertebrate tooth). Chapter 12 then discusses examples of structures that develop and are patterned in three dimensions, starting with vertebrate and *Drosophila* limbs; and following with the vertebrate lung and *Drosophila* tracheal system as examples of branched morphogenesis.

Conclusions

In conclusion, this book provides a lot of up-to-date information about how development occurs and it also manages to convey the excitement and power of current molecular approaches to developmental questions. The authors state that the book is targeted primarily at higher-level undergraduate and lower-level graduate courses, and I think that this would be a good audience. There is a lot of information in each chapter, in both the main text and the figure legends. Some readers will be excited by, and will learn a lot from, reading this comprehensive description of different molecular and cellular mechanisms, but others may be overwhelmed by the amount of information presented. The authors also state that they see their book as a companion to other introductory Developmental Biology textbooks rather than an alternative to them and I agree that this book would work well in that capacity, especially when used for teaching. I imagine that this molecular centered approach will excite and interest some students, but that others might be more inspired by a more embryological description of development. This book would be a good resource for most students and a great introduction to Developmental Biology for those with a Molecular Biology or Biochemistry background or interest. In addition, most of the chapters, and in cases even subsections within chapters, could easily be used individually to cover specific topics.

Kate Lewis, Oregon

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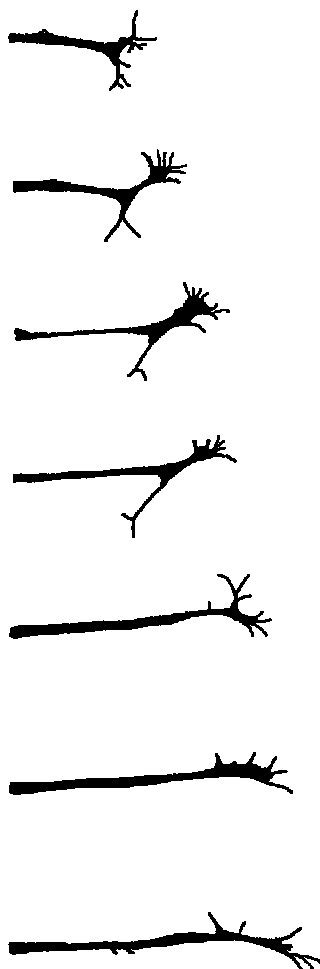
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Please note, the addresses of our two new committee members, Alison Woolard & Alicia Hidalgo, are available from Ivor Mason, the Secretary.



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Projects

Professor Malcolm Maden, malcolm.maden@kcl.ac.uk:

Role of retinoic acid in development and regeneration.

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Dr Jim Cohen, james.cohen@kcl.ac.uk :

Mechanisms of sensory axon guidance in the spinal cord .

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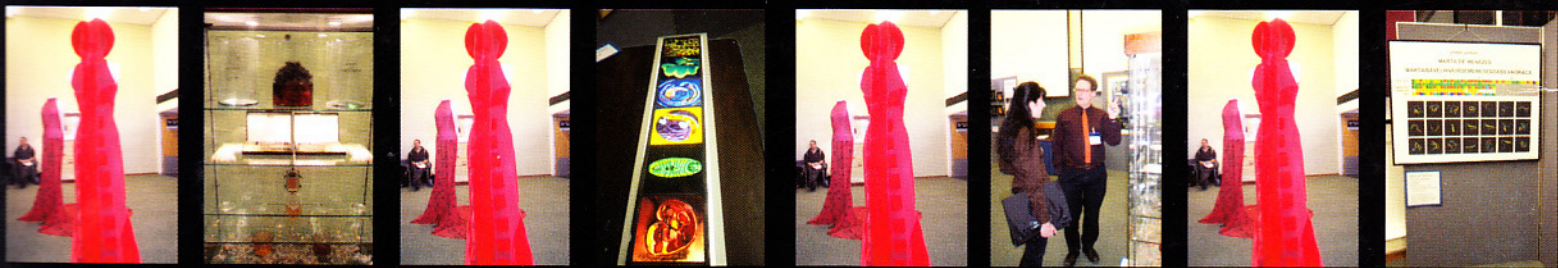
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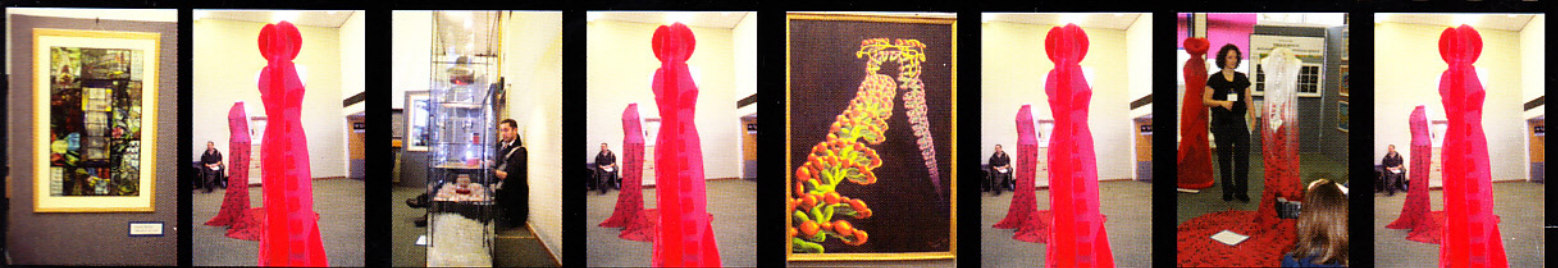
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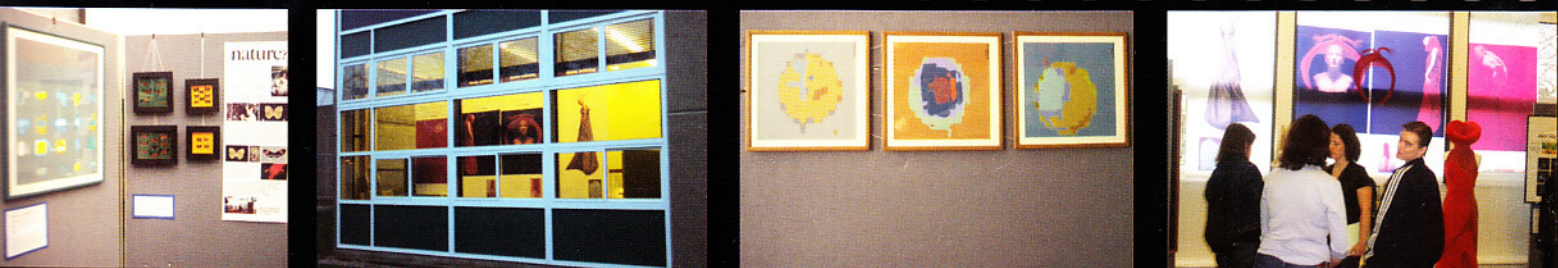
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