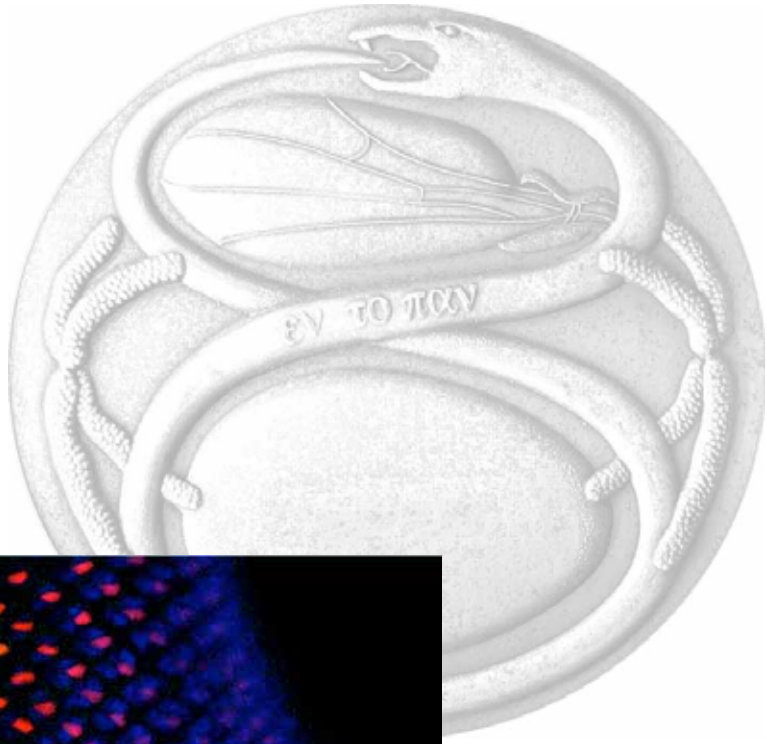
BSDB Newsletter

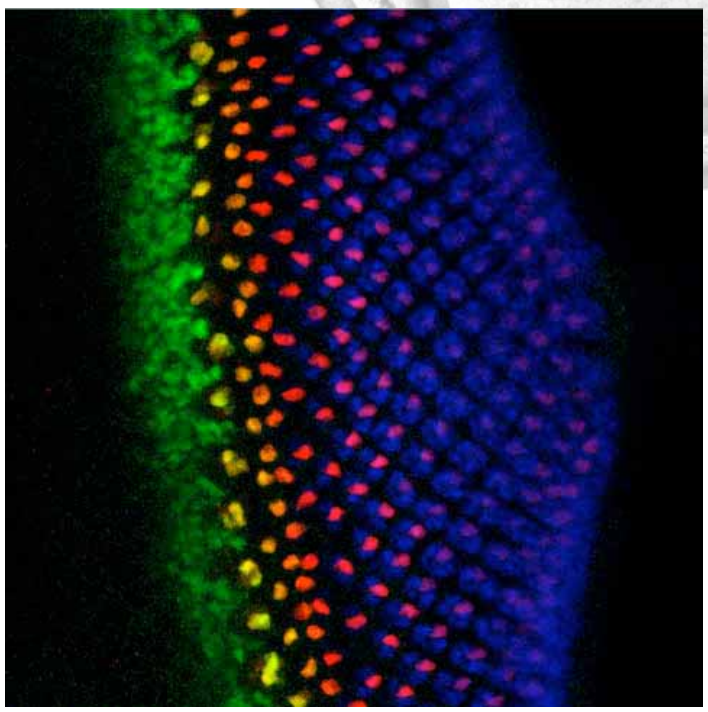
Winter 2005

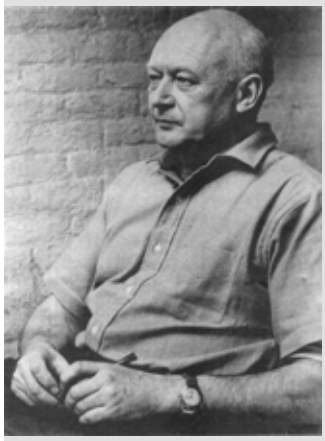
Vol. 26, No. 2

British Society for Developmental Biology

www.bsdb.org







Waddington Centenary

Developmental Biology Down Under

Also in this issue:

Confocal laser scanning microscopy with its superior scanning rate, outstanding resolution and exceptional sensitivity lets you experience the fundamental mechanisms at work in the living cell. At 120fps or more, without loss of resolution or sensitivity, you get more information than ever before. Whether recording live cell motion, metabolic pathways, growth processes or other physiological activities, LSM 5 LIVE adds life to your research in ways that you never thought possible.

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Editorial

So here it is, at last. My first newsletter as editor. Only now do I fully appreciate Andy Furley's heroic efforts in this job.

Andy's is a truly tough act to follow, and I don't have any particular agenda, apart perhaps from making sure this newsletter continues to be interesting (entertaining even) and informative, which is all any editor can hope for. For this first issue, I'm content with just getting the beast out successfully, having struggled with coercing long promised pieces from contributors (delinquent book reviewers please note – you know who you are!) and wrestled with Word and Acrobat.

I greatly appreciate those who did actually contribute articles. In this year of the centenary of Waddington's birth, we have a superb, succinct summary of his contribution to developmental biology from Jonathan Bard. Even though BSDB members are familiar with his name through the Society's Waddington Medal, I'm sure most of us are surprised to learn that he coined some of the key phrases and concepts that are now in everyday use (such as 'competence' and 'pattern formation').

This issue also contains some great meeting reports, including one for the this year's ISDB congress in Australia. Clearly the science was outstanding, which provides another reason to envy those who managed to go (*surely I meant to say 'the main reason'?*). On the subject of meeting reports, I aim to commission future reports from those students who received travel grant funding from the Society. Seems a small price to pay.

Andrew Jarman, Editor

andrew.jarman@ed.ac.uk

Contents

Help us spread the word

Please print out a copy of this newsletter and leave it in a strategic place, such as your coffee room or staff room.

From the Chairman

We have recently said farewell to three prominent members of the BSDB committee and I would like to thank them for all their work. This is the first newsletter for a long time that has not been put together by **Andy Furley**. Any of you with editing experience will readily understand that it can be a thankless task to attempt to squeeze promised copy out of busy people who, while full of goodwill, nevertheless have a habit of procrastinating (chairmen included). It is a difficult job with real deadlines and Andy performed it with an efficiency that hovered somewhere between graceful and ruthless. The newsletter is the main way in which the committee can communicate with the membership and his work has been an essential factor in the relative health of the BSDB. Andrew Jarman has now taken over (as well as managing the website) and Andy has given him a tough act to follow.

"We hope and plan that [the ISDB Congress] will be a major boost for the UK developmental biology community"

It feels absurd to describe **Alfonso Martinez-Arias** as an 'ordinary' committee member but this label refers solely to the fact that he was not an officer of the society. Alfonso's engagement with the BSDB, his deep knowledge of great swathes of the field and his strongly-held opinions made him an excellent and stimulating member of the committee. He was also one of the people instrumental in putting together the first joint meeting with one of our sister societies in continental Europe, when we held the 2003 Autumn meeting in Nice with the Société Française de Biologie du Développement. This was a popular and successful event – rest assured that other sunny locations are being planned for future Autumn meetings.

The third retirement from the committee has been **Caroline Parkin**, the Graduate Student Representative. One of the fundamental goals of the BSDB is to support and encourage new developmental biologists so this is an important post on the committee. For most of the rest of the committee, our PhDs are a rather distant memory and it is key to have someone to represent graduate students. Caroline made a big effort to develop a community amongst student members, as well as being an energetic and imaginative member of the committee. I know that her successor, Raphaëla Kitson-Pantano, is keen to build on this.

Remember the excitement of London winning the Olympic bid? You will be just as thrilled to know that the BSDB has just been awarded the 2009 Congress of the International Society of Developmental Biology. Although of possibly less global significance, the Congress is the principal international event in developmental biology, and is held – Olympics-like – only every four years. Nancy Papalopulu, the BSDB Meetings Secretary, and I presented our bid at the Sydney ISDB meeting in September and, despite a competing bid from Helsinki, the BSDB was selected by the ISDB committee. The Congress will be in September 2009 in Edinburgh, and will probably be the biggest and most prestigious developmental biology meeting ever held in Britain. You will hear much more about it over the coming years and I am sure that all BSDB members will want to attend. We hope and plan that it will provide a major boost for the UK developmental biology community and be a memorable meeting. Although four years away, quite intense planning is already underway.

If that seems too long to wait for a spectacular festival of all that is best in UK and international developmental biology, don't worry. The BSDB Spring meeting in York next year should do very well instead. For 2006 we are sticking with the winning formula of a joint meeting with BSCB. Register early – it's cheaper and these meetings tend to sell out – and if you are a student or postdoc, remember that travel grants also have a strict application deadline. The meeting details are later in this newsletter. See you in York.

Matthew Freeman

Society news

Visitors to the Society's website will have noticed that it underwent a makeover earlier this year. Apart from looking 'cleaner', it should be easier to navigate. Important news items will always be flagged on the welcome page, so members should aim to visit the site regularly.

David Wilkinson and Corinne Houart (our Education Officers) are making good progress with producing resource material on developmental biology for school teachers. A draft document should be posted on the BSDB website soon as the first step in creating an Education Section on the site. The document looks like it will be useful not only for school teachers, but also for anyone trying to explain developmental biology to early year undergraduates!

Any feedback, suggestions, extra material will be greatly appreciated by David and Corinne. In particular, there will be a need for good quality, striking images and movies that illustrate concepts across all models of developmental biology.

David will also make a presentation at the annual meeting of the Association for Science Education (ASE), held in Reading this coming January. The ASE website is well worth a visit (http://www.ase.org.uk).

Have your say

If you have news, letters, or comments you would like aired to the developmental biology community, please write to the Editor (andrew.jarman@ed.ac.uk)

Delivering the newsletter

Unless you are reading someone else's printout, you will know already that for the last few issues the BSDB newsletter has been distributed electronically, with no print version being made. Clearly there are pros and cons with this arrangement. A major advantage is the freeing up of funds for extra travel grants. Very little feedback has been received as to whether this arrangement was convenient for members. During this year's Spring Symposium views were solicited from those members who attended the Society's AGM. The results were somewhat surprising to us: the majority of those polled seemed positively to prefer the electronic version. Still, we feel that many individuals (including committee members) hanker after a print version (perhaps reading it in the bath or in bed?), and we're looking at creative ways for reinstating it. If you have a strong view on this either way, then the Committee will be very pleased to hear it (via the Editor).

What you told us

Comments made by members at the last AGM: "I prefer e-mail to print" "I much prefer electronic to hard copy to save money" "Absolutely no need for print version"

BSDB to host ISDB Congress in 2009

After the success of this year's ISDB Congress in Sydney (see report on p13), it is very exciting to be able to report that the BSDB has been charged with organising the next Congress in 2009.

It will be held in Edinburgh at the Edinburgh International Conference Centre (EICC), which has outstanding facilities for large, prestigious meetings. It may seem a long way off, but the date has already been set for 6-10 September 2009. This coincides with the end of the Edinburgh International Arts Festival and so delegates will be able to arrive in time to see the spectacular fireworks display that marks the end of the festival.

The meeting is likely to be huge (by developmental biology standards) — delegate numbers well over a thousand are anticipated. This is a great opportunity for showcasing the quality of UK developmental biology to the world. No doubt your diaries don't extend to 2009, but don't worry, you'll get plenty of updates in future newsletters.

What is the ISDB?

Perhaps some of you aren't aware that the BSDB has 'corporate membership' of the International Society of Developmental Biologists. You are all members! Visit: http://www.niob.knaw.nl/isdb/"

INTERNATIONAL SOCIETY of DEVELOPMENTAL BIOLOGISTS

Financial report

You know who you are…

"…can I please ask those recalcitrant members to do the honourable thing and increase their subscriptions"

Our financial statement for the year ending 31 July 2005 is presented below. I am pleased to report that we were able to fund a considerably increased level of awards to members to attend BSDB meetings. We spent £20,578 on funding these awards, a sum almost double that awarded last year. We were able to do this in part due to our increased membership fees. I am pleased to see that members are upgrading their standing orders but can I please ask those recalcitrant members to do the honourable thing and increase their subscriptions. This is needed to keep the Society healthy and allow us to continue providing Travel Awards to our meetings. The continued generous support of the Company of Biologists also allows us both to subsidise the costs of our meetings and to support members to travel to meetings or courses overseas. Happily we finished the year showing a slight surplus sufficient to maintain our assets at an appropriate level.

Guy Tear

Subscription information

The future…

"The Society is pushing forward plans to collect your membership fees by Direct Debit…"

Full members **£35** per annum

Student members **£15** per annum

Currently BSDB members pay their subscription to the Society through a standing order. This means that it is the member's responsibility to instruct their bank to increase their standing order. Please take the time to update your standing order. A form for you to complete and send to your bank is available on the Membership page of the BSDB website: http://www.bsdb.org.

The Society is pushing forward with plans to collect your membership fees by Direct Debit in the future which will allow us to more efficiently collect your subscriptions from your bank accounts.

Student members

Student members that joined the Society in 2001 are reminded that they should now upgrade their subscription to the full member rate of £35.

FINANCIAL STATEMENT YEAR ENDING JULY 31st 2005

Balance Sheet

2003/04 £		2004/05 £
	Investments	
93,489	Baillie Gifford Managed Fund	114,328
	Current Assets	
10,258	Barclays Bank High Interest Account (1)	10,383
26,255	Barclays Bank Current Account	19,895
2,899	Barclays Bank: Louie Hamilton Account (2,3)	2,533
39,412		32,811
1,415	Less: Unpresented cheques	5,771
- 16,038	Debtors – Creditors	- 2,828
21,959	Net Current Assets	24,212
115,448	**Total Funds**	**138,540**

Income & Expenditure Account

Income	£	Expenditure	£
Membership (Standing Order)	21792	Grants (Overseas & Courses)	21325
Membership (Cheques)	1035	Grants (BSBD Meetings)	20578
Block Grant (CoB)	25000	Small meetings and other DB meetings	1199
Travel grant fund (CoB)	20000	Autumn Meeting 2004 (Birmingham)	19580
Sale of addresses	200	Spring Meeting 2005 (Warwick)	11289
Autumn Meeting 2004 (Birmingham)	15084	Prizes	1905
Unpresented cheques	540	Committee & administration	5602
		Bank Charges	79
Interest and Investment Appreciation:			
Barclays High Interest	126		
Barclays Louie Hamilton	33		
Total Income	**83,810**	Total Expenditure	**81,557**
		Net Surplus for the Year	**2,253**
		Unrealised Gains on Baillie Gifford	20,839
		Fund balance at 31st July 2004	115,448
		Fund balance at 31st July 2005	**138,540**

Notes

These accounts were prepared under the accrual basis 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 Barclay High Interest account valuation is at 30.6.05

2. The Louie Hamilton account valuation is at 14.6.05

3. This is the only restricted account held by the Society.

Travel grants

BSDB Spring and Autumn meetings

These are the only UK meetings for which there is BSDB support. Grants cover cost of registration and basic travel if funds permit. Currently we are receiving more applications than we can fund in full and preference is given to members who present posters. BSDB members based abroad are eligible for a contribution (max. £400) to attend our meetings. All applications for travel grants to attend BSDB meetings MUST be in the hands of the Treasurer by the published deadline.

The deadline for Spring Symposium 2006 is 31 December 2005

Overseas meetings

There is considerable demand for funds to travel to meetings overseas. Applications are collected each month and a decision on awards made at the end of the month, with funds awarded according to the remaining budget. To allow us to fund as many applicants as possible we are currently limiting awards to a maximum of £400. The total amount needed is taken into account when deciding the amount of the award; however those artificially inflating their request will be penalised. Preference is given to members presenting work at the meetings.

Practical courses

The BSBD will also provide funds up to a maximum of £500 for members to attend courses or to visit laboratories overseas. These applications are considered alongside those for overseas meetings.

Applying for a travel grant

Members should complete a Travel Grant Application form and send it to the Treasurer. Forms can be downloaded from the BSDB website: www.bsdb.org **.**

Applications for overseas meetings are advised to be submitted 3-4 months in advance so that the BSDB contribution can be used as a lever to prise the rest of the money from other sources. Grants will NOT be awarded in arrears.

Please note: Nobody will be awarded more than one travel grant per year for an overseas trip. No more than two people from one department or one person from a group will be awarded a grant to a particular meeting.

Deadline for Spring Symposium

If you want a travel grant for the Spring Symposium 2006, you MUST apply by 31 December 2005

Warning!

Only members paying the correct subscription to the Society will be eligible for a Travel Grant

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.

Seed funding for small meetings

Members may approach the Treasurer for seed funding to help with organising developmental biology events (e.g. one-day meetings) that involve other institutions and at which students and postdocs 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.

Easier payment option for overseas members

Overseas members of BSDB sometimes have difficulty paying their subscription. As a result BSDB will be setting up a PayPal account for use by overseas members. Details from the Treasurer.

Welcome to the Graduate Students' Section

It's up to you!
Please, please submit something. If you wish to remain anonymous about tips and stories let me know but in all cases could you please give me your name, the name of your institution and your year of study!

Dear Student, my name is Raphie and I am your new student representative for the British Society of Developmental Biology. Among other things, I am responsible for organising this graduate student page. This page is our chance to write about and share experiences associated with our PhD life. Send me your nice and easy tips about any protocol you have carried out and your fun and unusual stories. You can also write a short article about your experience as a PhD student, or about any topic in science. Beyond this, if there is anything you would like me to raise for you at committee meetings or anything you would like to discuss, don't hesitate to e-mail me. I look forward to hearing from you soon.

Raphaela Kitson-Pantano, 2nd year PhD, University of Edinburgh, s9902690@sms.ed.ac.uk

A graduate student's first conference

Tip of the day
To keep your virgin flies alive as long as possible: mash up their food beforehand.

Unbelievable, but true
The last time I tried to melt some agar, I forgot to unscrew the bottle cap and the microwave exploded! (Siarhei Manakou, 1st year)

Back in March this year I attended my first major conference in San Diego, California (46th *Drosophila* Research Conference, Genetics Society of America). Luckily, there were also three other people from my lab going — all conference veterans and all armed with PhDs already. We arrived in the 27 degree heat the afternoon before the opening session, the heat being a welcome change from the freezing Scottish weather we had come from. The conference was 4 days long, and was attended by over 2000 people so it took some planning to sort out all the talks and posters I wanted to see and when I could see them, as well as standing by my own poster for 2-3 hours a day. I had a good chance to talk to other students and post-docs during coffee breaks and lunchtime by the pool — one of the major advantages to conferences in warm climates, but tricky to explain to your supervisor why there are photos of us sunbathing!

The conference was quite intensive, starting at 8 am and running until 11 pm most days, so there wasn't much of a chance to leave the complex except for the first afternoon, when we conducted a whirlwind tour of downtown San Diego, then went back for the opening session with sunburnt shoulders…

Joanna Young, 2nd year PhD, Edinburgh University

Nominations for the Beddington Medal

Don't forget to get your supervisor to nominate you for the Beddington Medal!

Nominations should be for a thesis submitted between 1 September 2004 and 31 December 2005. Send your supervisor the weblink for nomination details:

http://www.bms.ed.ac.uk/services/webspace/bsdb/BSDBbeddington.htm

Nominations need to be sent to the Secretary (Robert Kelsh) by 31 December 2005. Please note that your supervisor needs to follow the nomination format strictly (particularly regarding number of pages), or you risk the nomination being bounced. The judges don't want to read the whole thesis! See the website for full details.

Go on! You know you're worth it!

Conrad Hal Waddington (1905-1975)

This is the centenary of the birth of Conrad Hal Waddington, the most important and interesting developmental biologist this country has produced. He is still important and interesting, partly for the range of his experimental work, partly for his being the first major *Drosophila* developmental geneticist, but mainly because of the depth and subtlety of his thinking about development. Even though this thinking has shaped our perception of embryogenesis for more than 60 years, I am not sure that even now, almost 40 years after his death, the rest of us have caught up with him!

The story begins around the early 1930s when the developmental zeitgeist was to untangle the tissue interactions that underpinned early amphibian development. The particular problem of the day was to find the inducing molecule(s) secreted by the dorsal lip mesoderm responsible for eliciting the formation of a secondary neural tube. Waddington, who had made his name discovering the tissue interactions underpinning avian development, worked on this with Joseph Needham and Albert Brachet (1936). Once the disconcerting discovery that almost anything from methylene blue to chicken soup to wood extract could induce a new neural tube, it became clear not only that the problem wasn't formulated properly but that the technology wasn't up to the job.

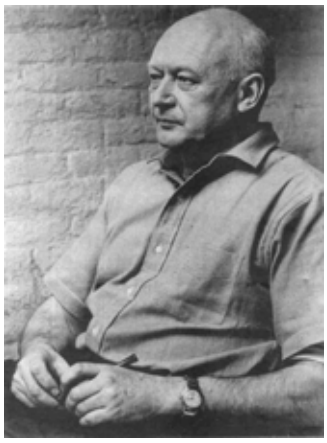
Most embryologists just moved on, but Waddington, if I read between the lines of literature correctly, thought very deeply about what had to be going on and came to several conclusions. First, and most important, that the solution to the induction problem had to be genetic; second, that the only way to access genes, whatever they were, was through mutations; third, that what was needed was a theoretical edifice to guide work on how genes controlled development; and finally that he had better become a geneticist (his initial training was in geology). Unlike Salome Gluecksohn-Schoenheimer, who was working on mouse developmental mutations, Waddington decided that *Drosophila* would be easier, faster, and cheaper and more accessible to investigation. He therefore went to T H Morgan's laboratory to study developmental mutants – and, although Sturtevant had spent time looking at developmental mutants, and Poulson was looking at early *Drosophila* embryogenesis there, Waddington was the first person to study *Drosophila* organogenesis through the systematic analysis of mutations.

The genetics of development was not at that time of much interest for reasons that, as Lien Van Speybroeck (2002) has pointed out, seemed persuasive. First, the ambiguities of development did not mesh with what genes, whatever they were, were then thought to do, which was to control traits such as eye colour. Second, although amphibian embryos were good for studying tissue interactions, they lacked mutations and so were not amenable to genetic investigation. Third, there was no conceptual framework within which genes could be seen as providing the infrastructure of development.

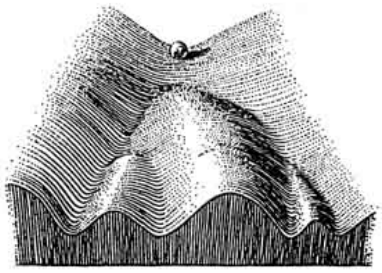
What Waddington did between about 1933 and 1940 was to provide that framework and a new language in which to express it, together with an experimental methodology that was not fully exploited until the 1980s. His approach was summed up in his portmanteau word, *epigenetics*, the conflation of *epigenesis*, the view that development is a gradual process of increasing complexity, and *genetics*, the science of heredity. In other words, understanding development required integrating the genetic endowment with tissue interactions — and both had to be studied if we were to elucidate the two bases of development: differentiation and pattern formation (a phrase Waddington invented in 1962).

Waddington looked for mutations that affected *Drosophila* cell differentiation and used them to show that the terminal point of a cell lineage depended on a series of binary differentiation choices under genetic control (see Gilbert 1997, Wilkins 2002 for details). He summarised

"Even though this thinking has shaped our perception of embryogenesis for more than 60 years, I am not sure that even now, almost 40 years after his death, the rest of us have caught up with him."

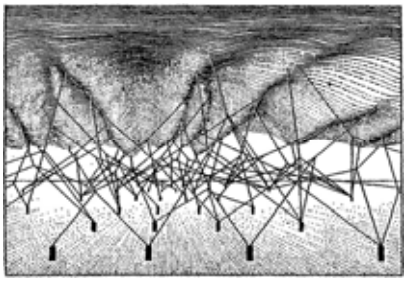


"…Waddington was the first person to study Drosophila *organogenesis through the systematic analysis of mutations."*



The epigenetic landscape as a representation of how the fate of a cell becomes fixed and stable as developmental time proceeds (from Waddington, 1956, with permission).

"Waddington was an old fashioned intellectual… and was, as Jonathan Slack has called him, the last renaissance biologist."



A later drawing of the epigenetic landscape showing how its every feature is pegged to sets of underlying genes — the fate of cells depends on the system, not a single gene (from his 1957 book, "The Strategy of the Genes, with permission). This is what we now call "Systems Biology."

this view in his picture of the *epigenetic landscape*, which was illustrated first as a surface representing phenotypic fate and then as a surface whose every detail was controlled by genes (see right). Here, it is worth noting that the landscape integrated concepts of time, cell fate, early developmental flexibility, and phenotypic stability.

Waddington paid less attention to pattern formation (a word he invented), but did produce a long (and, for him, dull) paper in which he set out to investigate the process of *Drosophila* wing formation. He first gave a careful description of its development and then analysed all known wing mutants to demonstrate how the steps identified by these mutations defined mechanisms underpinning the spatio-temporal development of the wing. He was 50 years ahead of his time here as the technology was not up to the task. It is however worth noting that his was exactly the approach later used by Nusslein-Volhard and her colleagues in their unravelling of the genetic basis of *Drosophila* segmentation.

Perhaps the deepest perception that Waddington had was the realisation that following a single developmental mutation was not enough: one had to appreciate how genes behaved co-operatively if one was to see how embryogenesis proceeded. This is really the message of the epigenetic landscape and today we would call this a systems approach to development. There are many other aspects to Waddington's thinking about what was going on in development, and his books on the subject (e.g. 1940, 1956, 1962), still resonate today with anyone who wants to think about the broader aspects of our subject. It is also worth mentioning that he worked on many other aspects of biology, particularly evolution, as well as on poetry and painting. Waddington was an old fashioned intellectual (more than 20 books!), and was, as Jonathan Slack (2002) has called him, the last renaissance biologist.

The highest achievement of any scientist is to open a gate to a new field that they and others can explore. Waddington was the first person to realise that development hung on genetics and the first to appreciate that understanding development requires understanding how genes work cooperatively – and this was in the 1930s. He opened the gate to contemporary developmental genetics, but it took 50 years and the invention of molecular biology for others to follow — and I am not sure that current work has yet to come to terms with Waddington's systems approach to our subject. I am, however, absolutely certain that there is no one else whose name should grace the BSDB medal.

Jonathan Bard, University of Edinburgh, j.bard@ed.ac.uk

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SPRING MEETING

of the British Societies for Developmental and Cell Biology University of York, 20-23 March 2006

BSDB

BSCB

BSCB (Stem Cells)

Utpal BANERJEE (USA)
Yann BARRANDON (France)
Dominique BONNET (UK)
Alan CLARKE (UK)
Ana CUMANO (France)
John DICK (Canada)
Tariq ENVER (UK)
Brian HUNTLY (USA)
Sten-Erik JACOBSEN (Sweden)
Gordon KELLER (USA)
Ron McKAY (USA)
Shinichi NISHIKAWA (Japan)
Roger PATIENT (UK)
Liz ROBERTSON (UK)
Janet ROSSANT (Canada)
Takashi SHINOHARA (Japan)
Austin SMITH (UK)
Barry STRIPP (USA)
Andreas TRUMPP (Switzerland)
Martin VAN LOHUIZEN (Netherlands)
Fiona WATT (UK)

BSDB

Richard ADAMS (UK)
Ethan BIER (USA)
Enrico COEN (UK)
Charles EMERSON (USA)
Scott FRASER (USA)
Isabel GUERRERO (Spain)
Kat HADJANTONAKIS (USA)
Richard HARLAND (USA)
Peter HOLLAND (UK)
Dan KIEHART (USA)
Ottoline LEYSER (UK)
Andy McMAHON (USA)
Nipam PATEL (USA)
Scott SELLECK (USA)
Pat SIMPSON (UK)
Didier STAINIER (USA)
David STRUTT (UK)
Cheryl TICKLE (UK)
David TOSH (UK)
Jerry TURNBULL (UK)
Tanya WHITFIELD (UK)

Early registration and abstract deadline: 20th January 2006.
BSDB travel grant deadline: 9th December 2005.
BSCB Honor Fell travel awards available on application.
For meeting registration and infomation visit: www.bscb.org *or* www.bsdb.org

BSDB/BSCB Spring Symposium 2006

Further details

For up-to-date programme details and links to the registration form:

http://www.bsdb.org

http://www.bms.ed.ac.uk/services/webspace/bsdb/meetings/BSDBmeeting11.htm

University of York
20–23 March 2006

BSDB organisers: Betsy Pownall (mep4@york.ac.uk) and Corinne Houart (corinne.houart@kcl.ac.uk).

The next BSDB annual Spring Symposium will be held together with BSCB in York. The scientific programme for the BSDB includes sessions on imaging, signalling in development, evolution, human disorders and HSPGs in development. The BSCB sessions will also be of interest to development biologists as their focus is on the biology of stem cells. There is an outstanding line up of international and UK speakers, the full list of which can be found at www.bsdb.org (see also advert opposite). There will also be workshops, a student mixer, and a unique Conference dinner that includes the opportunity to learn about harsh prison life in the 18th century! (visit www.yorkcastlemuseum.org.uk). This year, we are planning to take advantage of the University Nursery at York to provide a crèche for children aged 1-5 years, subject to availability. Please contact Betsy Pownall (mep4@york.ac.uk) if you are interested.

- Plenary speakers: Cheryll Tickle, Ron Mackay.

- Workshops on getting your paper published and getting your research funded

- Medal Lectures

- Mixer session for student members

- Eight short talks selected from abstracts

Travel grant deadline: 31 December 2005.

Sessions (and Chairs)

Imaging and temporal understanding of development (Richard Adams)
Developmental signals (Richard Harland)
Developmental biology solving human disorders (Didier Stanier)
HSPGs and development (Charles Emerson)
Evolution and development (Peter Holland)
mES and mouse embryo germ layer specification (Gordon Keller)
Out of the niche (Austin Smith)
Epithelial stem cells (Fiona Watt)
Haematopoietic stem cells (Sten-Erik Jacobsen)
Cancer stem cells (Tariq Enver)

BSDB Autumn Meeting 2006

Latest meetings news

Check the BSDB website for latest meetings updates and to submit details of meetings to be advertised to members. http://www.bsdb.org

Signal transduction and integration in embryonic development

Apex City Quay and Spa Hotel, Dundee.
13–15 September 2006

Organisers: Cheryll Tickle and Kate Storey.

The aim of this meeting is to explore how the understanding of signal transduction pathways illuminates developmental mechanisms: in particular, how different signalling modes and patterns can influence cell responses and how different signals are integrated. The sessions will focus on specific developmental systems in embryos from a wide range of organisms with the aim of drawing out general principles. The conference will bring together developmental biologists, biochemists and mathematical modellers.

This meeting will not be held as usual in an academic venue, but in the Apex City Quay Hotel & Spa(!) which is a recently built, very modern hotel on the waterfront. Sounds posh but don't worry, thanks to the negotiating efforts of the organisers, registration will remain within the range of our usual BSDB meetings. So mark the date in your calendars now and look out for registration details in the coming months (www.bsdb.org).

Confirmed speakers include:

Dario Alessi, David Harel, John Heath, Ravi Iyengar, Steve Keyse, Julian Lewis, Nick Monk, Andrea Munsterberg, Mary Ann Price, Liz Robertson, Ariel Ruiz i Altaba, Meera Sundaram, Jose Vilar, Jeff Williams.

Future BSDB meetings

BSDB Spring Symposium 2007

Herriot-Watt University, Edinburgh
29 March–1 April 2007

Joint meeting with BSCB and Genetics Society.

BSDB organisers: Alison Woollard and David Wilkinson.

Autumn 2007

Sheffield

Theme to be finalised. Possible theme: Modelling and/or Systems Biology.

Organisers: Andrew Fleming, Nick Monk, Alfonso Martinez-Arias.

Autumn 2008

Seville, Spain

Joint meeting with Spanish Society for Developmental Biology.

Organisers, James Castelli-Gair, Acaimo Gonzales-Reyes, Alicia Hidalgo, Robert Kelsh.

2009

Edinburgh. 6-10 September 2009

The Spring and Autumn meetings will be subsumed in the ISDB 16th International Congress of Developmental Biologists.

Ideas for a meeting?

A major task of the BSDB Committee is to host high quality scientific meetings. We welcome suggestions for future topics for meetings or for a half-day themed session at the Spring Symposium. Contact Nancy Papalopulu

Other meetings of interest

Development of the enteric nervous system: cells, signals and genes

26-29 March 2006

New York Academy of Medicine, New York

Topics include stem cells, migration, genetic screens, Ret signaling, endothelin signaling, Sox10.

Plenary speakers: Nicole Le Douarin, Aravinda Chakravarti and Michael Gershon.

Meeting website:
http://www.anatomy.unimelb.edu.au/devens

8th International Congress of Plant Molecular Biology (ISPMB 2006)

20 - 25 August 2006

Adelaide Convention Centre, South Australia

Website:
http://www.sallyjayconferences.com.au/ispmb2006/

Invited Speakers: David Baulcombe, Gloria Coruzzi, George Coupland, Jeff Dangl, Joseph R. Ecker, Geoff Fincher, Crisanto Gutierrez, Ottoline Leyser, Maurice Moloney, Natasha Raikhel, Jens Stougaard, Steven Tanksley.

US Society for Developmental Biology 65th Annual Meeting

17-21 June 2006

University of Michigan, Ann Arbor, Michigan, USA

For details visit: http://www.sdbonline.org


ABSTRACT DEADLINE:
THURSDAY 13 APRIL 2006
EARLY REGISTRATION DEADLINE:
MONDAY 22 MAY 2006
THE BIOCHEMICAL SOCIETY
Founded 1911
BioScience 2006
bioscience for the 21st century
23–27 July 2006, Glasgow, UK
Over 25 mini-symposia including:
• Regulation of chemokine-mediated leukocyte migration
• Negative control and regulation of the immune system
• Structure and function of ligand-gated ion channels
• Voltage-gated calcium channels: structure, trafficking and role in disease
• Intracellular calcium channels
• Glutamate receptor trafficking and synaptic transmission
• Traffic into and out of the nucleus
• Biogenesis and delivery of secretory vesicles
• Mitochondrial dysfunction and diabetes
Central image supplied by Dr Elaine Huston, Glasgow, UK
BioScience2006 also includes the Biochemical Journal Centenary Symposium
BJ 1906–2006 Centenary
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The Ultrastructure of Life
Friday 6th January 2006
A one-day symposium at King's College London to open its Centre for Ultrastructural Imaging.
http://www.kcl.ac.uk/depsta/emu/symp.html
Wolfgang Baumeister - Mapping Molecular Landscapes inside Cells-Martinsried
Stefan Hell - Sub 100 resolution flourescent imaging-Goettingen & KCL
Judith Klumperman - Intracellular vesicle trafficking-Urecht
Aki Kusumi - Single molecule tracking on living cells-Kyoto
Debbie Stokes - EM of Cells in a Native State-Cambridge
Helen Saibil - Chaperones-Birkbeck
Bart Van Meerbeck - Ultrastructure of biomaterials-Leuven
Alice Warley - Ion gradients in apotosis-KCL
Shimon Weiss - Ultra resolution flourescent imaging-UCLA
KING'S College LONDON
CUI

15th International Society of Developmental Biologists Congress

Sydney, Australia, September 2005

Playing the didgeridoo in the auditorium is usually frowned upon; not so at this meeting.

Around 1000 delegates attended this ISDB meeting in Sydney, apparently the largest number of attendees they've ever had. The opening plenary session was given by Sydney Brenner (Berkeley, CA) who encouraged us to submit our work to journals with very low impact. Cliff Tabin (Harvard, MA) then talked about the role of miRNAs in the control of hind vs forelimb identity. He outlined how an miRNA (mir196) may act in the hindlimb as a safeguard against leaky transcription of low levels of *Hox8b*, expression of which is normally linked with forelimb development.

The congress then got properly underway with concurrent sessions on Organogenesis, Germ Cell Formation and Migration, and Signal Transduction. In the Organogenesis session, Richard Behringer (University of Texas, TX) spoke on the genetic mechanisms of organ diversity between species, illustrated by comparisons of mouse and bat limb formation. Some of the differences can be accounted for purely by divergence in the *cis*-regulatory elements of the *Prx-1* gene, which shows about 70% sequence similarity between mouse and bat.

In the Signal Transduction session, Liz Robertson (University of Oxford) discussed Nodal signalling pathways during early mouse development. Smad2/3 are the effectors of Nodal signalling, but Smad3 mutant mice show no defects in anteroposterior patterning, despite the role of Nodal in this process. The tissues of Smad2 mutant mice are highly disorganised from an early stage. Liz described various combinations of Smad2/3 homo- and heterozygous mutants, concluding that there is a dose-dependent requirement for these Smads during early development. She finished by demonstrating how conditional loss of Smad4 function affects formation of those tissues that require the highest levels of Nodal signal during development.

Later, in a session entitled "Polarity and development", Scott Fraser (CIT, Caltech, CA) outlined various approaches to imaging whole embryos and showed impressive images obtained by MRI of live specimens. He went on to describe cross-disciplinary work on the role of blood flow in cardiovascular development. He concluded that during endothelial development, blood velocity (and high shear stress levels) drives remodelling of the endothelium.

That evening, we were treated to a welcome reception and poster viewing. Around 600 posters were presented during the first two days of the congress, covering a wide variety of subjects, from the use of unusual model organisms (shark, lungfish) to the more familiar signalling pathways (Wnt, Hh, TGFβ). The reception provided an excellent opportunity to renew old acquaintances, as well as to view posters with relevant unpublished data.

The second day started with plenary seminars given by Janet Rossant (Mount Sinai Hospital, Toronto, Canada), who spoke about stem cells and lineage development in the mouse, and Olivier Pourquié (Stowers Institute, Kansas City, MO). He described the segmental patterning of the vertebrate axis, in particular the somites, and the clock and wavefront model through which they are widely, although not universally, thought to form.

Despite my personal interest in the Neural Patterning session, which included a seminar by Thomas Edlund (Umea University, Sweden) on factors involved in early rostrocaudal patterning, the highlight of the second morning was the talk by Marianne Bronner-Fraser (CIT, Caltech, CA) on regulatory events in neural crest formation. Although I know very little about neural crest cells, I left the seminar with a clear, albeit basic, appreciation for the logical and solid work that she presented.

Later, the session "Patterning the embryo" proved interesting. Claudio Stern (UCL, London) introduced us to coiled-coil proteins and chromatin remodelling complexes and how these are involved in regulating neural fate. He described a coiled-coil protein called ERNI (Early Response to Neural Induction) that is regulated by FGFs and which may delay induction of *Sox2* during gastrulation. Patrick Tam (Children's Medical Research Institute, NSW, Australia) discussed embryonic patterning and head morphogenesis in the mouse. He focused on the importance of tight control of endo- and mesodermal migration, and how the antagonistic activity of the anterior visceral endoderm, prechordal plate and foregut endoderm can modulate Wnt and TGFβ signalling during craniofacial patterning.

My poster was presented on the second evening. The misfortune of being placed next to a very popular poster and associated access difficulty was outweighed by some of the interest shown in mine towards the end of the session, which was ended only by the expulsion of all the conference delegates from the conference centre shortly after 8pm. The standard of most of the posters was very high, and I learnt many things (not all particularly useful, but at least interesting). The enthusiasm of many of the poster presenters should certainly be respected.

"…female Drosophila *… had been altered to exhibit elaborate courtship rituals usually found only in males"*

The third day began with plenary talks by Hiroshi Hamada (Osaka University, Japan) and Barry Dickson (Institute of Molecular Biotechnology, Austria). Hiroshi Hamada talked about left-right asymmetry in the mouse and how, through the use of extremely demanding technical manipulations, direction of flow can be affected by the degree of posterior tilt exhibited by cilia in the node. The unidirectionality of flow is necessary to break asymmetry in the embryo. He showed how a small break in symmetry in a restricted area may be converted to a robust asymmetry using a reaction-diffusion system of Nodal and Lefty. Barry Dickson spoke about sexual behaviour in female *Drosophila* that had been altered to exhibit elaborate courtship rituals usually found only in males. Surprisingly, alteration of a single gene was sufficient to achieve this behaviour in these flies – the aptly named *fruitless*.

Steve Wilson (UCL, London) gave an intriguing talk on using zebrafish to study the development of lateralised circuitry in the central nervous system. Usually, the habenular nuclei are different sizes as a result of Nodal signalling. Steve showed how in the zebrafish ace mutant, the habenulae lack obvious asymmetry, thereby implicating fgf8 in the development of laterality. Normally, left-sided habenular axons project to the dorsal region of the interpeduncular nucleus (IPN), and right-sided axons project to the ventral IPN. In the absence of fgf8, habenular axons show unusual spiralling around the midline in a dorsoventrally restricted plane of the IPN, suggesting involvement of FGF8 in migration and/or delamination of axon projections.

The final day featured several excellent talks. Brigid Hogan (Duke, NC) discussed branching morphogenesis in the lung while Malcolm Logan (NIMR, London) described patterning in the hind- and forelimbs. He is interested in two aspects of limb development – initiation (what triggers outgrowth of limb buds) and limb-type specification (fore- vs. hindlimb). Tbx5 is expressed by forelimbs, and Tbx4 and Pitx1 are expressed by hindlimbs. Such an expression pattern would indicate a differential requirement for each gene for fore- or hindlimb development, but limb-restricted conditional knockout of Tbx4 and 5,combined with 'limb rescue assays', showed that Tbx4 expressed in the appropriate place could rescue Tbx5 knockout and allow a forelimb to develop. This demonstrated that Tbx4, despite being expressed exclusively in hindlimb, is able to drive forelimb development. Closer inspection of the Tbx4/5 genes revealed that only the *cis*-regulatory elements differ, suggesting that although the genes arose through a gene duplication event, the two copies have since become uncoupled. Malcolm Logan used further limb rescue assays to find that Pitx1 could convert rescued forelimbs into hindlimbs in the Tbx4-expressing Tbx5 knockout limbs. He proposed a model in which limb type specification is initiated (through rostrocaudal hox codes) before initiation of limb outgrowth.

"As befits a closing lecture, visions of the future were presented; in this future, nuclear implantation using nuclei from fully differentiated adult cells would enable treatment of disease or degeneration…"

In the final plenary session, Sir John Gurdon (Gurdon Institute, Cambridge) gave a talk entitled "From adult to egg: nuclear reprogramming and stem cell creation". When transplanted into an egg, the nucleus of a determined or differentiated cell can revert from its committed state. Nuclei become progressively less able to do this as they approach terminal differentiation. As befits a closing lecture, visions of the future were presented; in this future, nuclear implantation using nuclei from fully differentiated adult cells would enable treatment of disease or degeneration with younger cells containing the genetic constitution of the target individual.

The opportunity to attend a meeting of such high calibre, with the advantage of such a good location, does not often arise. I would like to express my gratitude to the BSCB for the Honor Fell Travel Award, particularly as the meeting was focused on developmental rather than cell biology. I would also like to thank the Royal Society for their Travel Award. Together, these generous awards enabled me to attend this superb meeting.

Katherine Jeays-Ward, Centre for Developmental Genetics, University of Sheffield

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BSDB/BSCB Annual Spring Symposium

Warwick, 2005

The following are reports of selected sessions at the recent Spring Symposium.

Neural stem cells

The neural stem cell session was opened by Charles ffrench-Constant (University of Cambridge, UK) who gave an overview of how integrins and their ligands in the extracellular matrix regulate growth factor signalling to provide precise temporal and spatial control within the stem cell niche. He also described how in tenascin-C deficient mice, neural stem cells show reduced sensitivity to FGF-2 and enhanced activity to BMP-4. He illustrated the expression of laminins within the neural niche and demonstrated their roles in maintenance.

Jun-An Chen (Wellcome/CRUK Gurdon Institute, Cambridge, UK) described a novel cell type-specific cyclin (cyclin Dx) that is required for maintaining ventral neuronal progenitors in the spinal cord. He suggested that motor neuron progenitors differentiate prematurely when the concentration of cyclin Dx falls. These results support the hypothesis that the coordination of cell proliferation and cell fate determination is regulated by cell cycle components.

It was a pity that Magdelena Gotz (Max Planck Inst Neurobiology, Germany) was ill and could not come to this meeting. However, a post-doc from her lab presented evidence of how Pax6 plays a master role in the control of neurogenesis. He showed that neurogenesis becomes fully Pax6-dependent in the neurosphere culture system, independent of the region of origin, and that Pax6 overexpression is sufficient to direct almost all neurosphere-derived cells towards neurogenesis.

Kate Lewis (University of Cambridge, UK) described the advantages of using zebrafish to study ventral interneuron specification and patterning. Many of the transcription factors (Evx1, Eng1b, Chx10) implicated in interneuron specification in amniotes are also expressed in the embryonic zebrafish spinal cord, suggesting that the mechanisms of interneuron specification are conserved across vertebrate species. She also showed a transgenic line of zebrafish in which GFP is expressed in cells that express Pax2, a ventral interneuron transcription factor. This tool will be very useful for future functional studies.

Derek van der Kooy (University of Toronto, Canada) showed how primitive neural stem cells are formed directly from single ES cells in a manner dependent on exogenous LIF and endogenous FGF. Embryonic stem cells quickly acquire neural identity and give rise to neurons and glia in minimal culture conditions. Moreover, experiments in vivo with mouse chimeras reveal that these primitive ES-derived neural stem cells have a broad range of neural and non-neural lineage potential. These results support a model whereby definitive neural stem cell formation is proceeded by a primitive neural stem cell stage during neural lineage commitment.

Finally, Wieland Huttner (Max Planck Institute, Dresden, Germany) demonstrated how is it possible to distinguish between proliferating and neuron-generating neuroepithelial cells using the anti-proliferative gene TIS21. Using time-lapse microscopy of neuron-generating divisions of neuroepithelial cells in a transgenic TIS21-GFP mouse embryo reveals the existence of a novel neuronal progenitor dividing at the basal side of the neuroepithelium. In addition, he described using prominin-1 to define the symmetric and asymmetric distribution of apical plasma membrane during proliferating and neuron-generating divisions of neuroepithelial cells.

Jun-An Chen, Gurdon Institute and Department of Zoology, University of Cambridge

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Polarized secretion of endocytic organelles

One of the fantastic things about the BSDB/BSCB Spring meeting is the broad range of topics covered and the opportunities this presents to discover (or rediscover) exciting areas of research that unfortunately one never seems to have the time to keep up with. Thursday presented me with such an opportunity and also a dilemma: which session should I choose? Finally plumping for “Polarized secretion of endocytic organelles”, I headed over to social sciences to see what I could learn.

The session was chaired by Gillian Griffiths (University of Oxford, UK) who kicked off with a fantastic account of how T lymphocytes achieve polarized secretion, allowing them to kill target cells. Brilliantly, Griffiths has been able to exploit clinical samples to get a handle on the process. She outlined both what this had taught us about players in the biological processes and the understanding this conferred of clinical aspects of the syndromes, highlighting how much can be gained by the availability of clinical samples to the research community. In a short talk, Alistair Hume (London, UK) then gave us a summary of the melanocyte assay he has been using for his research and the insights it has provided into the role of melanophilin in melanosome transport. Next, Phillipe Chavrier (Paris, France) gave an excellent account of his work on membrane delivery to the cell surface during phagocytosis and of the interplay of formins and arp2/3 in actin dynamics. G. Michaux followed with a brief outline of his functional analysis of P-selectin trafficking in endothelial cells.

After a coffee and biscuit pit-stop, I heard Susan Eaton (Dresden, Germany) address a packed audience. She spoke of how gradients of lipid-linked morphogens are achieved during *Drosophila* development. I was intrigued by her research on argosomes – membranous particles that may play a role in the process. These particles sounded fantastic – a novel solution to an old question. Eaton went on to present progress she is making in dissecting the argosome, which highlighted just how difficult some questions are to address and yet how, with some ingenuity and determination, we can move forwards. Last, but definitely not least, was Ira Mellman (New Haven, USA) who wowed us with some fantastic images of endocytosis in action. She demonstrated that with careful analysis of such data we can get a crucial understanding of the processes in question.

"As the session ended, I reflected on the fantastic opportunity I had been afforded."

As the session ended, I reflected on the fantastic opportunity I had been afforded. I had hoped to get an insight into this topic unfamiliar to me and had been lucky enough to spend the afternoon listening to cutting edge research by world class scientists. Not something I have the luxury of doing everyday!

Nina Peel, Gurdon Institute, Cambridge

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Asymmetric cell division

The session on asymmetric cell division was chaired by Jürgen Knoblich (IMP, Vienna), who started by talking about polarization of recycling endosomes during asymmetric cell division in the *Drosophila* nervous system. The hallmark of asymmetric cell division is segregation of cell fate determinants, the first of which to be identified was Numb. In the endocytic pathway, recycling endosomes are generated and accumulate around the centrosome of only one of the daughter cells. Rab11 is the marker for these recycling endosomes and is suppressed in cells that do not inherit Numb. Rab11 binds Nuf, a centrosomal protein that binds and accumulates on only one of the centrosomes. Nuf and Numb act redundantly in asymmetric cell division.

"[The] spatial arrangement of individual 4-cell stage [mouse] blastomeres and the order in which they are generated correlate with blastocyst pattern in the mouse embryo."

Rita Sousa-Nunes (King's College, London) described a mutant obtained in a screen to identify new genes involved in the asymmetric division of the *Drosophila* neuroblast. This mutant has the intriguing phenotype of enhanced detection of centrosomal Miranda. Continuing the studies on *Drosophila*, François Schweisguth (Ecole Normale Superieure, Paris) spoke about Neuralized, which, along with Numb, regulates Notch-mediated binary fate decisions. Bearded is a partner of Neuralized; overexpression and deletion experiments suggest that negative regulation of Neuralized by Bearded is at least partly responsible for the spatially restricted distribution of Delta (a Notch ligand).

Arwen Wilcock (School of Life Sciences, Dundee) outlined a strategy to build extensive maps of cell lineage using electroporation of the spinal cord of chick embryos with GFP tubulin, followed by time-lapse 3D imaging. After the coffee break, Pierre Gönczy (ISREC, Switzerland) described the importance of G protein signalling pathways for asymmetric cell division in *C. elegans* embryos.

Finally, Magda Zernicka-Goetz (Gurdon Institute, Cambridge) presented a non-invasive lineage tracing study of the early mouse embryo. The aim is to determine whether development of blastocyst pattern shows any correlation with the orientation and order of the second cleavage divisions that result in specific positioning of blastomeres at the 4-cell stage. The results suggest that the spatial arrangement of individual 4-cell stage blastomeres and the order in which they are generated correlate with blastocyst pattern in the mouse embryo.

Teresa Barros, Gurdon Institute, University of Cambridge

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Micro RNAs

The micro-RNAs session was devoted to small, non-coding RNAs that regulate gene expression at the post-transcriptional level. It was opened by Steve Cohen (EMBL, Heidelberg), who described a combined experimental and computational approach to study genome-wide micro-RNA functions. Given the large number of micro-RNA-encoding genes (over 100 in *Drosophila*), the time that would be required for functional analysis by genetics alone has prompted the use of computational methods to infer potential roles for these genes. Although the variability in base pairing makes it hard to predict the identity of candidate targets for micro-RNAs, Steve described how comparisons between known micro-RNA targets reveal that base pairing is more consistent at the 5' end and this "seed" region appears to contain most of the important information, whilst the targeting of micro-RNAs to a suite of genes with related functions facilitates functional annotation. Jan Rehwinkel (EMBL, Heidelberg) then described a genome-wide analysis of RNAs regulated by Drosha and Argonaut proteins in *Drosophila*, using microarray expression profiles. Of the various transcripts upregulated when these proteins were depleted, most were known to be involved in axon guidance, cell adhesion, organogenesis or apoptosis (including the validated micro-RNA targets hid and reaper).

The role of RNAi in transposon silencing was explored by Ron Plasterk (Hubrecht Laboratory, Utrecht), who pointed out that even though there are multiple copies of transposons in the Caenorhabditis elegans genome, none of these are mobile in the germline. However, in "mutator" mutants (which lose the activity of genes owing to the aberrant activation of a subset of transposons in the germline), it was found that RNAi was also defective, suggesting that RNAi might protect the genome against transposon activity. Describing RNAi as the "immune system of the genome", Ron pointed out how the amplification of RNAi signals might be compared to clonal selection, given that a brief episode of RNAi activity may lead to stable germline gene silencing that is heritable over 30 generations! Changing track, Ron then highlighted how the sequencing of micro-RNAs from a host of primates might facilitate the discovery of new micro-RNA genes through "phylogenetic shadowing" and described ongoing functional studies of micro-RNAs in zebrafish development.

The role of micro-RNAs in C. elegans development was picked up by Eric Miska (Gurdon Institute, Cambridge), who described a combined functional genomics approach involving GFP expression studies and the generation of knockout mutants. In this way, the lin-4 micro-RNA and four members of the evolutionarily conserved let-7 family were shown to yield heterochronic phenotypes in mutants. Eric then described the downregulation of micro-RNAs in primary human tumours. The session was concluded by David Baulcombe (Sainsbury Laboratory, Norwich), whose presentation focused on the role of siRNAs in chromatin silencing in Arabidopsis. He related how enhanced and reduced silencing phenotypes were observed in a host of mutants for homologues of RNA processing enzymes, presumably by affecting the turnover of RNA sequences entering the RNA silencing pathway and their subsequent direction of sequence-specific epigenetic modifications.

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BSDB Autumn Meeting

Aberdeen, 2005

Wnts and all

It sometimes seems that you can't do anything in developmental biology without running into Wnts. For the uninitiated help appears to be at hand with the constant stream of review articles describing a linear pathway of protein interactions that lead from Wnt ligand-receptor binding to increased β-catenin concentrations and subsequently altered gene expression. However anyone who stops to consider Wnt signalling soon realizes that the questions far outweigh our current understanding. Our attempts to find answers brought together an exciting mix of over 200 developmental biologists, cell biologists and biomedical researchers. for the BSDB Autumn meeting on "Wnt signalling in development, disease and cell biology" at the University of Aberdeen.

There are multiple Wnt proteins, which fall into families that are conserved throughout the animals; for example, sea anemones have 11 of the 12 Wnt sub-families, including WntA, which is not present in mammals. This level of complexity occurs throughout the Wnt signalling. There are at least two other signal pathways in addition to regulation of β-catenin: one controlling cell and tissue polarity, the other mediating calcium signalling. This generates a two-tier problem of identification of which pathway is active in a particular circumstance and then to explain how specificity is maintained and different pathways insulated from each other. This second problem is exacerbated by the presence of paralogues and parallel signalling for many of the pathway components and potential cross over into other signalling pathways.

Part of the answer lies in the cell biology of Wnt signalling cells. Cell surface interactions control the delivery of Wnt proteins to cells, then internalization and subcellular compartmentalization control protein interactions within the cell. Kinetics is also clearly important and rapid Wnt mediated changes in cytoskeletion and cell adhesion are distinct from those mediating gene expression. Signalling pathways may assemble over time to first establish and then maintain cellular states such as cell polarity. Wnt signalling must also be considered in the overall signal network. A case in point is the interaction of Wnt and Notch in formation of colon crypts – this offers alternative approaches to suppressing aberrant Wnt signalling in colon cancer.

Discussion of the imperfections in our understanding of this apparently well-known signalling pathway provided more than enough material for a fascinating and intellectually lively Autumn meeting. It raised as many questions as it answered, a sign of an exciting field, and invigorated our research. It has long been our ambition to hold a meeting in the UK and we are extremely grateful to the BSDB for their support. We hope that this is the beginning of a series of Europe based meetings.

Adrian Harwood, Cardiff University

Note added by Editor: We should add that the meeting proved to be very popular – with twice as many delegates as originally intended. The organisers are due our thanks for adapting the meeting to this and still managing to produce a highly successful meeting.

Genesis: the evolution of biology

Jan Sapp
Oxford University Press
0195156196
2003

"Political, religious and personal angles are all explored, creating a unique approach to biology which is accessible at any level…"

Genesis is an ambitious book covering the progress of biological thought since the 1800's. The usual scientific jargon that often dominates such books is absent here, as Jan Sapp presents a clear and fascinating history of biology ranging from Darwin and Mendel to modern day Molecular biology. This is considerably more than just a factual chronicle, revealing the philosophical debates and contentious relationships of the past, often building on common knowledge with more in depth accounts. This is exemplified by the book's description of the discovery of the structure of DNA, an achievement that won Crick and Watson a Nobel prize. Their work was greatly aided by similar studies by other scientists such as Rosalind Franklin, whose name is largely unknown today, but it has been argued that her name would have been included on that Nobel prize, had she not tragically died of cancer.

The book also details reaction to genetics in the Soviet Union during the cold war, a scenario that could be compared to some attitudes to aspects of biology in countries today. The 'Anti-geneticists' acquired a significant following, rejecting Mendelian genetics and replacing it with their own beliefs. Sapp explores the impact of Lysenko's influence and his dubious theories, explaining his appeal to the Russian people through positive exposure in the press despite his actual contribution to work on agricultural techniques being irrelevant.

Political, religious and personal angles are all explored, creating a unique approach to biology which is accessible at any level, from academics to people who are new the study of Biology. Both a scientific and historical work, the book offers a variety perspectives while giving a fresh look at the subject.

Joanna Young, University of Edinburgh

Centrosomes in development and disease

Edited by Erich A. Nigg
Wiley VCH 3527-309802
August 2004

"The editor compares [the centrosome] to Mona Lisa's smile in its beauty and mystery!"

The centrosome is a small non-membrane-bound organelle, which has captivated and intrigued cell biologists ever since it was first described over 100 years ago by the early cytologists - indeed the editor compares it to Mona Lisa's smile in its beauty and mystery!

The centrosome consists of two centrioles – analogues of the basal body of cilia and flagella - surrounded by a complex mix of proteinaceous pericentriolar material that acts to nucleate and anchor microtubules in the cytoplasm of a wide range of organisms. Over the last decade or so, the centrosome field has made huge strides. It has employed techniques as diverse as light and electron microscopy, genetics, biochemistry, mass spectrometry and laser microsurgery, in model organism such as *Saccharomyces cerevisiae*, *Caenorhabditis elegans*, *Drosophila melanogaster* and *Chlamydomonas reinhardtii,* as well as animal cells in culture. This book therefore comes along with perfect timing. It covers essentially all these areas and furthermore deals with the role of centrosomes in cell cycle control and cancer, their involvement in infectious diseases caused by intracellular pathogens and their significance in the life cycle of human parasites.

The book begins with an elegant historical perspective with reproductions of the original hand-drawn illustrations, reflecting the painstaking observations of centrosomes made by the pioneer cytologist Edouard Van Beneden. It describes the early input into theories of centrosome function from a rival young researcher - a certain Theodor Boveri. Moreover, the author, Jo Gall, even shows some of his own microscopy images taken using Boveri's original slides of *Ascaris* eggs.

A key function of centrosomes is to nucleate the polymers of α- and β- tubulin that we know as microtubules. The third chapter in the book gives a thorough discussion of the role of gamma-tubulin and the large gamma-tubulin ring complex, termed γ-TuRC, in the nucleation process and presents a model based on kinetic and structural data.

Studies of the spindle pole body - the centrosome analogue in the genetically tractable yeast - have played a major role in increasing our understanding of centrosome function and the book gives an excellent overview of the state of play in this field. It details the morphology, molecular composition and duplication mechanisms of the spindle pole body and its important role as a signalling platform in the mitotic exit network. The book also covers the contributions to our understanding made by a different unicellular eukaryote, the green alga *Chlamydomonas reinhardtii*, regarding the role of the basal body/centriole. An outstanding chapter deals with the evolutionary aspects of centrosome function and provides thought-provoking insights. The mass spectrometer has contributed to many areas of cell biology over the last decade. The book gives an excellent overview of the contribution proteomics has made to realising the goal of a complete inventory of the human centrosome.

Many of the studies on the centrosome have focused on the mechanisms controlling centriole duplication and separation during the cell cycle, a topic also well covered in various chapters in the book. The chapters that stand out in this context are those from Kip Sluder (9) and Alexey Khodjakov and Conly Reider (10). The latter authors elegantly describe the pioneering work using laser microsurgery to selectively ablate not only the entire centrosome but even a single paired centriole, allowing them to show that centrosomes are not required for spindle assembly in somatic cells. Both chapters describe efforts to determine the role the centrosome plays in regulating entry into mitosis and its apparent function in blocking initiation of replication.

The third part of the book covers the role of the centrosome in development and tissue architecture, with a particularly well-written chapter describing the structure and function of the centrosome in the early embryonic development of *C. elegans*, followed by a great chapter on the important contributions *Drosophila* studies have made to our understanding of the developmental aspects of centrosome function in this system. The role of centrosomal and non-centrosomal-nucleated microtubule arrays in the functions of polarised epithelial cells is described in a well written chapter by Mette Mogensen.

In the last section, entitled “Centrosomes in Disease”, several chapters deal with centrosomes and cancer. A very early observation made by Boveri was that certain characteristics of malignant tissues, such as loss of cell polarity and chromosome segregation defects, were the results of aberrant centrosome function. Viral effects on centrosome and microtubule networks, as well as the way certain intracellular pathogens use the microtubule cytoskeleton to their advantage, are covered in an interesting penultimate chapter. Lastly, but far from least, is an excellent chapter on the basal body and microtubule cytoskeleton in pathogenic protozoa such as *Trypanosoma brucei*.

Overall, *Centrosomes in development and disease* is a comprehensive book which is well written, concise and has many excellent reviews of the key topics in the field. The book balances the historical with the cutting edge, the background with the detail and is therefore a recommended read for the newcomer and the experienced centrosome researcher alike.

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Nuclear organization in development and disease

Novartis Foundation Symposium
John Wiley & Sons 0470093730
January 2005

"There is a distinct lack of textbooks that cover this area of cell biology and this book fills the gap nicely."

This book is the product of a Novartis Foundation symposium held in London in January 2004, which brought together 31 leading scientists within this field to present and discuss their research. The book is a collection of the presentations, generally in review form, plus the discussion that followed every talk, giving valuable insight into the minds of the participants and their thoughts on the subject.

The book starts with an introductory review on the nuclear lamins, which are important nuclear proteins for both nuclear structure and function, and indeed the most talked about group of proteins in this book. The roles of lamin and other nuclear envelope proteins in cell division are discussed in the second paper, lamin being thought to have an important role in nuclear envelope assembly and disassembly during this process.

Mutations in the gene encoding Lamin A/C are a primary cause of a group of related diseases termed 'laminopathies', which are discussed in general in the third paper and more specifically later in the book. These diseases include Emery-Dreifuss muscular dystrophy, a partial lipodystrophy, a peripheral neuropathy disorder and premature ageing syndromes. On the surface, these diseases all appear to be very different and it is difficult to understand how the same protein could cause them all, which is a major issue addressed by these scientists in their articles.

Lamin has a wide variety of binding partners, which are thought to determine the disease phenotype according to which particular lamin mutation is present, and some of these are discussed in detail. One of these binding partners is Emerin, a nuclear envelope protein. Emerin mutations result in an X-linked form of Emery-Dreifuss muscular dystrophy that is clinically indistinguishable from the same disease caused by lamin mutations in Emerin-binding regions.

There is a distinct lack of textbooks that cover this area of cell biology and this book fills the gap nicely. It is a comprehensive introduction to the laminopathies and will be useful for scientists and students in this field. Alongside the background information presented here, there is also recent research, making the book an attractive alternative to trawling the scientific literature in search of up-to-date background reading.

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Reviewing a book for the BSDB

Suggestions for future book reviews are always welcome. If you know a book you think should be reviewed, please contact the Editor. Reviewers receive a free copy of the book for their trouble.

Here are some possibilities:

From CUP

Biological Physics of the Developing Embryo
Gabor Forgacs and Stuart A. Newman (eds)
This advanced textbook uses physics to analyse stages and components of the biological development process.

Principles and Techniques of Biochemistry and Molecular Biology, 6th edition (Hardback)
Edited by Keith Wilson, John Walker
New, fully updated edition of bestselling textbook, expanded to include techniques from across the biosciences.
http://www.cambridge.org/0521828899

Key Experiments in Practical Developmental Biology (Hardback)
Edited by Manuel Marì-Beffa, Jennifer Knight
This manual presents 27 laboratory exercises for student practical classes in developmental biology.
http://www.cambridge.org/0521833159

RNA Interference Technology: From Basic Science to Drug Development (Hardback)
Edited by Krishnarao Appasani
Cutting-edge overview of RNA interference (RNAi) technology, covering both fundamental science and applications.
http://www.cambridge.org/0521836778

From Humana Press

DNA Repair Protocols. Mammalian Systems. 2nd ed.
Daryl S. Henderson (ed)
1-58829-513-3/973-7

Differential Display Methods and Protocols 2nd ed.
Peng Liang, Jonathan Meade and Arthur Pardee (eds)
1-58829-338-6

The main function of the BSDB Committee is to organise our meetings, from deciding on appropriate topics to arranging organisers and venues. If you have any ideas on topics for a good meeting, or on a good venue, don't hesitate to convey them to Nancy Papalopulu (or another committee member). The officers of the Society will be happy to answer any questions relating to their specific subjects.

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The Back Page

Don't forget to visit the website for latest news:

www.bsdb.org

Added recently: A short history of the BSDB by Jonathan Slack

This page is 'under construction', as they say. In the future, the intention is produce a light-hearted, indeed frivolous, look at science and developmental biology. Whether this is desired or not, I leave it up to you to tell me!

As a start, here are some crossword-type riddles with a developmental biological connection. For reasons that might become apparent, the contributor wishes to remain anonymous. So (s)he has come up with a suitably mysteriously sounding (if you could pronounce it) pseudonym! Answers will appear on the BSDB website in due course. Please feel free to send a contribution of your own!

From Hypogaeus

1. I am a one in ten (8)

2. From German, but sounds like he has a sore head (3,4)

3. In two minds about this mouse mutant (8)

4. Many more Ayes than Noes? (10,4,8)

5. A peaceful half-dozen masterfully in sight (4)

6. Echoed potato product is all the rage (4-4)

7. "The most important event of your life." (12)

8. Apical ectodermal ridge is likely to come a cropper (3,2,1,4)

9. Come sing a medley for this science (8)

10. Let's all act locally (9,6)

11. A mobile mobile in the USA? (9,4)

12. Growing point has had a tipple? (8)

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http://www.biologists.com/web/index.html