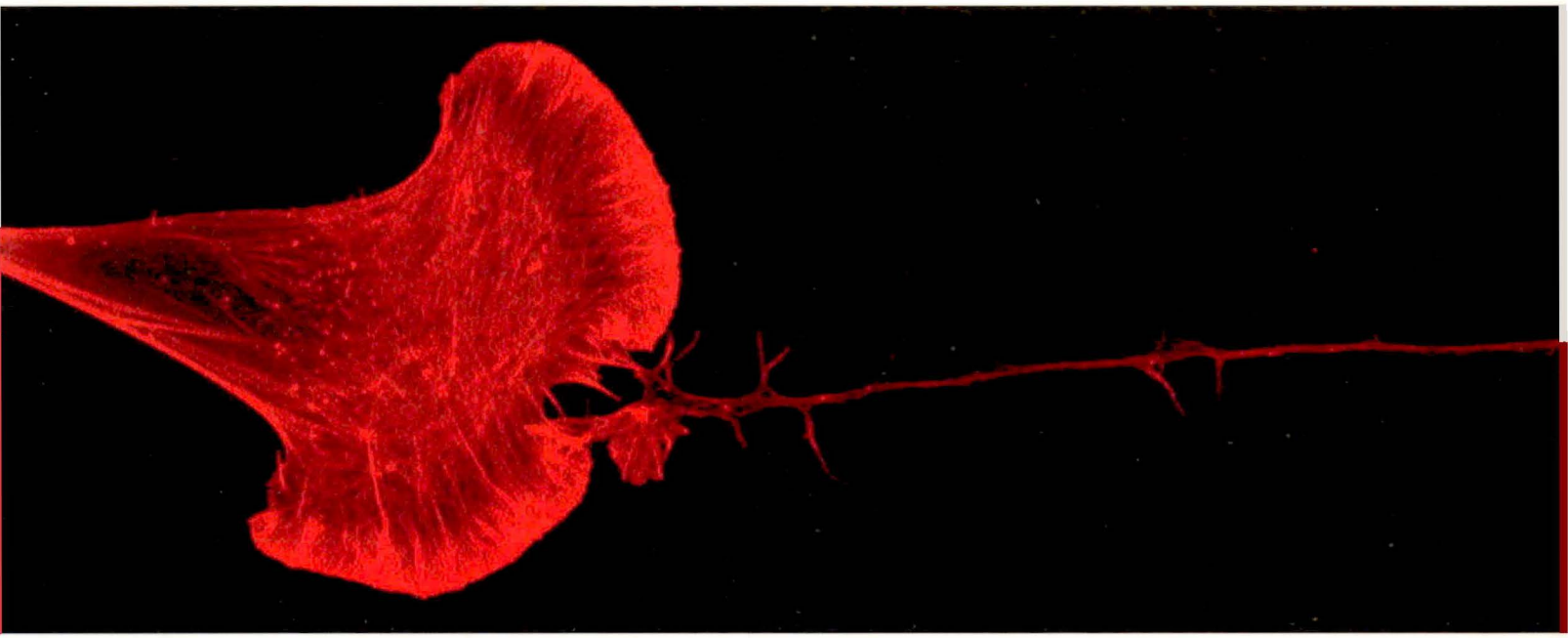

BSCB Newsletter

Winter 2002

British Society for Cell Biology

They've always been hip flasks

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Barloworld Scientific

BSCB Newsletter
Winter 2002

Editorial

Last year's Spring Meeting in York was "one of our most successful meetings ever", according to Charles Streuli, attended by over 670 people. With the topical subject of genomics for the next meeting in Warwick, we are hoping for another full house. Book early and pay up – there will be no admission to the conference without full payment. Lord Sainsbury will be addressing the plenary session, so security will be tighter than is the norm for a BSCB meeting. The full programme is contained in this Newsletter.

To get you in the mood for the genomics theme in York, we have an article from Cath Brookbank on the EBI databases. These are free for all and biologists are encouraged to make use of them.

2002 was a bumper year for BSCB meetings; accounts of both the postponed Martin Raff conference and this autumn's Abercrombie symposium may be found here. Each was reported to be highly successful by those who attended. Congratulations and thanks to the organizers.

This summer's fiasco with 'A Level' results put school curricula and examinations in the spotlight. David Archer reports on the current structure of science teaching in the 6th form. Sarah Cant participated in the Wellcome Trust's Researcher in Residence scheme, returning to her old school to impart some of her enthusiasm for biology to current pupils. She has written an excellent account and strongly recommends the scheme to others.

The Editor

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http://www.bscb.org

Front cover: Eph receptor/ephrin-mediated contact repulsion between a fibroblast cell and a retinal ganglion cell growth cone. Courtesy of Lene Harbott and Kate Nobes.

Contents

News

The BSCB Hooke Medal

The Hooke medal has been awarded to Matthew Freeman, who will present the medal lecture during the Spring Meeting at Warwick.

Matthew did his first degree in Biochemistry at Oxford, graduating in 1983, then went to Imperial College, London, to do a PhD with David Glover. He was one of the first people in the group to work on *Drosophila* cell cycle genes. In 1987 he went to Gerry Rubin's lab in Berkeley, where he participated in a large-scale enhancer trap screen for genes involved in eye development. He cloned a gene called *argos* and showed that it regulated cell recruitment in the developing eye. Matthew returned to the UK in 1992, to the MRC Laboratory of Molecular Biology. He discovered that Argos was an inhibitor of the EGF receptor and his lab has subsequently focused on intercellular signalling.

The BSCB Hooke Medal was coined in 2000 to honour an emerging leader in cell biology. The first three winners were Anne Ridley, Iain Hagan and Andrea Brand. The winner gives a lecture at the Spring Meeting and receives a medal.

Spring Meeting 2003

The programme for the Spring Meeting in Warwick is complete and shown on pages 30–32 of this Newsletter. Our Plenary Speaker is Lord Sainsbury, Parliamentary Under Secretary of State for Science. A sponsored lecture will be given by Henry Sun (Borden Lecture; Garland Publishing).

Attention cell biology lecturers: Undergraduate bursaries to attend the BSCB Spring Meeting 2003

In order to encourage our best undergraduate students to continue a career in cell biological research, the BSCB has decided to fund a number of bursaries for these students to attend the Spring Meeting. It is hoped that exposure to cutting edge research and a chance to interact and listen to many internationally renowned cell biologists will bolster the aspirations of our undergraduates to consider pursuing science to a higher level.

Bursaries will be offered to students who are seriously considering undertaking a PhD based in cell biology. An application form is available on page 37 and through the website (www.bscb.org.uk). The form should be submitted by mid-January together with a short letter from the student explaining why they wish to attend and a paragraph of support from their course co-ordinator or supervisor of studies. It is expected that the University will undertake to pay the student's travel to the meeting. Clearly, most suitable undergraduates will not be reading this information so, if you are a lecturer to young cell biologists, please begin considering which students you may have who might benefit from such a scheme.
Applications should be made to the Honor Fell Awards Secretary, Kathryn Ayscough (address details on p 38).

Honor Fell Travel Awards

Young BSCB members attending scientific conferences relevant to cell biology are eligible to apply for financial support in the form of an Honor Fell travel award. Full details are on the application form on page 36 of the Newsletter.

Nobel reception at House of Commons

In October, Iain Gibson MP hosted a reception at the House of Commons to celebrate Paul Nurse and Tim Hunt's award of the Nobel Prize in 2001.

As it happened, this year's prize was announced on the preceding day, so we could also toast the achievements of Sydney Brenner, John Sulston and Robert Horvitz.

The reception was organized by the BSCB, BSDB, Genetics Society, Society for General Microbiology and the Biochemical Society. Paul claimed to be a member of all five and both Paul and Tim have supported the BSCB in many ways during their careers.

In a brief speech, Tim said that the whole point of science was "finding out about stuff"; applications and end uses are not the important features, it's the fun and intellectual excitement to be had in deciphering how things work. Expect to see Tim's name linked with the Literature prize next year.

Featured articles

We have run two occasional series in the Newsletter that I would like to continue, but I need volunteers to write. One comprises articles on cell biology in a European country: recent examples include Uffe Birk Jensen's account of research in Denmark and a description of life in Portugal by Alvaro Tavares.

These can raise the profile of the labs mentioned and have resulted in increased post-doc applications, so if you have a collaborator who might be interested in writing a short description of the main centres and people in their country, please ask them to contact me.
The other series has focused on cell biology centres within the UK. Last winter, we featured the Wellcome Trust Centre at the University of Edinburgh and for the summer newsletter Christina Pelizon wrote about the MRC Hutchison Centre in Cambridge.

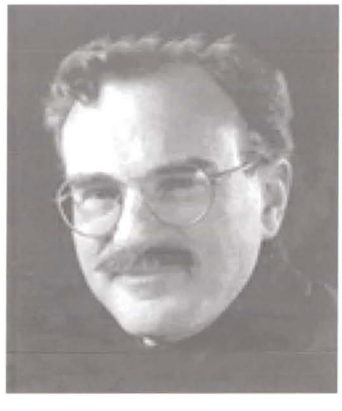
If you would like to give an account of the research being done at your institute, interview some of the key scientists and give a general account of what it is like to work there, please contact me.
The Editor: Joan Marsh (jmarsh@wiley.co.uk)

Lasker Awards go to cell biologists

This year's Lasker Award for basic medical research has been won by James Rothman of the Sloan-Kettering Institute in New York and Randy Schekman from UC Berkeley for their work on membrane vesicles. Rothman has been a guest lecturer at a couple of BSCB meetings, while two of Schekman's disciples, Rainer Duden and Charlie Barlow, were involved in the York meeting last year.

James Darnell received the 2002 Albert Lasker Award for Special Achievement in Medical Research "for an exceptional career in biomedical science during which he opened two fields in biology – RNA processing and cytokine signaling - and fostered the development of many creative scientists."

James Rothman



Randy Schekman

Changes on the BSCB committee

Louise Cramer has resigned as Liaison Officer for the UKLSC/IOB, having had a baby. Her office has been taken by Stephen Nurrish, also from the MRC Laboratory for Molecular Cell Biology.

Rob Insall has also resigned, to help Laura with the twins. Warning: serving on the committee may seriously affect your fertility!

Kairbaan Hodivila-Dilke has been nominated to take over as Meetings Secretary from Charles Streuli, who wishes to step down after the Spring Meeting.

New faces wanted!

We will need new committee members to be elected at the AGM in Warwick. Please note that any BSCB members can nominate themselves or fellow cell biologists for election to the committee. Each person should have a nominator and a seconder. We are looking for committee members who represent a good spread of interests and geographical location and who, above all, will make a positive contribution to the running of the BSCB.

Nominations should be sent to the BSCB Secretary, Michael Whitaker (see page 38), and are welcome throughout the year. Committee meetings are held at the Spring meeting, then once or twice more during the year.

BSCB recruitment

The Society needs more members! We currently have 1173 members, but a surprising number of UK cell biologists, at all levels, do not belong to the Society.

Membership brings many benefits. For younger people, there are the Honor Fell Travel Awards. For others, there is the chance to participate in meetings – organizers for the Autumn Meeting or for sessions at the Spring Meeting are always welcome – or to speak up for cell biology.

The BSCB works through the UKLSC and other umbrella organizations to promote the interests of scientists and to counter the effects of antiscientific lobby groups. The more members we have, the more effective our voice.

Most of the Society's members are based in about 40 institutions. Individuals from those places are being invited to act as BSCB representatives to raise awareness of the Society and encourage more people to join.

If you would like to volunteer to represent your institution, please contact Steve Winder (details on page 38).

Cheaper journal subs

Did you know that BSCB members are entitled to discount subscriptions for several journals? The money saved more than compensates for your membership fee, so encourage your friends to join the Society. Details are on page 40.

Paying double?

All subscriptions are now payable by Direct Debit. A few members still have Standing Orders in place – make sure you're not paying twice!

Funding for local meetings

The Society is prepared to provide limited financial support for meetings organized by any local interest group relevant to cell biology. Requests for funds should be sent to the Treasurer, Mark Marsh (see p 38), accompanied by a report of a previous meeting. If a meeting receives such support, a report of the meeting will be required for publication in the Newsletter.

Quarterly Muscle Development Meeting, King's College London

At these quarterly meetings, speakers present their work on aspects of cell and developmental biology of muscle tissue in health and disease. The meetings have proved extremely 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 the sponsors: ICR, GSK, Improvision and BSDB.

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

Biochem Soc Executive Secretary to retire

At its meeting in Cardiff in July, the Executive Committee of the Biochemical Society announced that the Executive Secretary, Glyn Jones, had decided to retire early, in spring 2003. A subcommittee comprising the President, Professor Jean Thomas (Cambridge), Chairman, Professor Peter Downes (Dundee), and Vice Chairman, Professor Chris Leaver (Oxford), is supervising the recruitment of a successor.

Glyn D Jones joined the Biochemical Society as Executive Secretary in 1984 after a career which started in academic law and then moved on to various committee-based organizations such as the Chamber of Shipping of the United Kingdom. He was also, until recently, Managing Director of the Biochemical Society's publishing subsidiary, Portland Press. Glyn has helped guide the Biochemical Society through recent changes, including its new Meetings Strategy (http://www.biochemist.org/meetings) and the launch of the Biochemical Journal online (http://www.biochemj.org).

He has also held office in other organizations including Chairman of the Association of Learned, Professional and Society Publishers (ALPSP), Chairman of the Serials Committee of the International Association of Scientific Technical and Medical Publishers (STM) and as a member of the Board of the Publisher's Licensing Society (PLS).

In brief

York Prize Winners

One of the prize winners was omitted from the Summer Newsletter.

The two lucky recipients of a free trip to the ASCB are: Alexander Dammerman and Florian Maderspacher.

Wanted – speakers to talk in schools and colleges

The UK Life Sciences Speakers Database is now open. Launched at the BA Festival of Science on 12th September, this database already holds details of over 350 University Academics and Researchers who work in the Life Sciences and are willing to visit local schools and colleges to give talks on their specialist subjects. See www.Biology4All.com for details.

Education, Education, Separation, Evaporation, Distillation?

The AS and A2, A-level examinations in the UK, outside Scotland

In this column of the Summer 2000 edition of the BSCB Newsletter, I wrote about the extensive changes due to take place in the General Certificate of Education (GCE) A-level courses in the UK, outside Scotland, from September of that year. In the following newsletter, under the title 'The New Lacquered Cross', I suggested that we should give the new 'AS' and 'A2' system time to settle before passing comment.

With the first set of results from the A2 examinations now published, we can take a guarded look at how pupils are adapting to the system and how decisions, informed by AS-level results, are influencing A2-level entries and outcomes.

Education, education

For the first year after studying General Certificate of Secondary Education courses (GCSE), often taken at age 16, pupils study perhaps five subjects at AS-level (in the UK outside Scotland). Each subject is composed of three modules and at the end of the year pupils are given a grade based on coursework and examination performance.

This 'AS year' is very important because it represents a considerable jump from the style, and some would say the standard, of work done in the GCSE courses. At the same time it provides a 'taster' for items on the menu in the next A2 year and the importance of this aspect cannot be emphasised enough.

AS-level is proving immensely popular with entries up from 800,000 in 2001 to nearly one million in 2002. With an 'A' grade pass at AS-level giving a Universities and Colleges Admissions Service (UCAS) tariff score of half a grade of the A2-level, AS-levels are considered a useful investment as well as providing a more broadly based education.

Separation

After 'tasting' a portfolio of subjects at AS-level, students are using the new system to distinguish the subjects they like, and in which they have obtained good results, from those to which they are less suited. Their preferred subjects are then studied in the following year at A2-level.

The AS-level 'tasting' year can generate many issues. If the subject studied is perceived as 'too hard', it will be dropped, or studied under sufferance with a negative feeling. This is what happened in 2001 with the AS-level Mathematics. This difficult course and examination resulted in a drop this year at A2-level of 12,307 entries compared with the old style A-level mathematics last year.

A2-level entries in both biology and chemistry were also down this year but, interestingly, entries for physics at A2-level were up, compared with last year.

In addition to pupil-controlled separation, establishments may persuade students who do only moderately well in a subject at AS-level not to take it at A2-level. This might be helpful advice but it might be coloured by the expectation that their grade might not help the school league table figures.

If the subject matter at AS-level is perceived as uninteresting, or if it is not taught with

Notes from the School Bag

Researcher in Residence

On the following pages of this Newsletter there is an article by Sarah Cant of the MRC Laboratory for Molecular Cell Biology and Cell Biology Unit about her work under the Researcher in Residence (RinR) scheme. Under this scheme Sarah, in addition to her PhD work and with the agreement of her supervisor Julie Pitcher, found time to work with groups of pupils in schools.

Through this work, pupils were introduced to research and ideas in modern cell biology. Pupils also visited and worked with Sarah in a leading research laboratory. Encouragement for this came from Louise Cramer of the laboratory and Alan Hall, Director of the MRC LMCB and Cell Biology Unit, as part of a commitment by the laboratory to increased interactions with the community. The benefits of 'opening laboratory doors' in a controlled way such as this are immeasurable in terms of education and public relations.

enthusiasm, then it is unlikely that a student will be inspired to continue with that subject at A2-level or later at tertiary level.

Getting the syllabus balance right at AS-level is both vitally important and difficult. It has to be interesting and inspirational, not too hard but demanding enough in some parts to stimulate and extend the most able. It needs to be meaningful to students, most of whom are teenagers. It also needs to be true to the subject in its contemporary context.

Some teachers, for example, are finding that some of the AS-level pupils are not experienced enough to visualise and appreciate the microstructure and working of a cell without constant recourse to similes, metaphors and models. But to leave topics in cell biology until the 'A2' year would be to deny the student a taste of the fascinating and wondrous things to be discovered; it would also give a very unbalanced view of modern biology. To get all this right in just one year is very demanding for both staff and students.

Evaporation

Clearly, work in the 'AS' year is extremely important. For some, AS-level will be their last formal teaching and learning experience in biology. What they have learned, together with their perception of biology, will influence their views as adult members of the community. It will colour their views on genetic modification, news items about stem cells, vaccines, animal rights, cloning and so on. It will also influence their views as taxpayers and donors to charity and possibly therefore your salary!

From the point of view of further formal education in biology, this large group will have 'evaporated' but as a 'vapour' they will probably be very influential.

Distillation

Students who continue with a subject to A2-level can be considered as the 'distillate'. They represent a concentrated group, probably studying three or four of the subjects in which they obtained good grades at AS-level. This year the total number of entries at A2-level fell by 50,000 and whilst the figure from one year should be treated with caution, it indicates that the 'distillate' volume is diminishing. The good news is that the 'distillate' is improving with the number of students gaining grades 'A' and 'B' increasing this year (2002) by 4.5% to 94.3%. It is claimed that A2-level is designed to be as near to the old 'A' level standard as possible.

Conclusion

What does this mean for those BSCB members involved in selecting students for undergraduate courses? It will probably mean there will be fewer applicants but that those who do apply to study biology will be keener, more focused and perhaps more knowledgeable.

It will probably mean, in time, the acceptance of a two-tier entry system, with selected universities requiring multiple high grade passes at A2-level whilst some establishments may accept a clutch of UCAS tariff points, many gained as AS-level qualifications. It may mean that university admissions officers will take both AS-level results and 'A2' predictions into account when offering places. Some may use additional information and screening procedures. Some medical schools, for example, are investigating the use of psychometric tests in an effort to obtain reliable indicators of potential.

Importantly for everyone, it will mean that very few, if any, pupils will study a subject for two years before being labelled a , as happened with the old system.

As I write this article in September 2002, there is a big debate about the possible down rating by one or more of the examination boards of some marks at A2-level. The media suggest this is being done in order to raise the A2-level standard because it might appear that too many students were doing too well.

Perhaps Anne Robinson's comment is apposite when she said at the end of the American version of her programme: "The Americans celebrate success. In Britain it's failure that appears to lift our spirits". Surely we can do better than this and ensure that our young people are not made to be 'the weakest link' by a mere system.

David Archer

Notes from the School Bag

American Society for Cell Biology

This summer our sister organisation in the States launched Vol. 1 No.1 of *'Cell Biology Education – a Journal of Life Science Education'*. We wish ASCB every success with this new electronic journal. The production of it has been aided by a grant from the Howard Hughes Medical Institute for three years at $95,000 annually. The contents are listed under the headings: Editorial, Features, Essays and Articles and may be accessed through the BSCB website link facility.

United Kingdom Life Sciences Committee (Education Group)

A database of the names and details of biology lecturers who are prepared to talk to school groups was launched at the British Association meeting in Leicester . Peter Robinson of the University of Central Lancashire has established it as part of the website www.biology4all.com with financial help from the Biochemical Society, the British Society for Immunology and the Society for Experimental Biology.

If you are prepared to talk to school groups in your locality, please send your name, e-mail address and postcode to pkrobinson@uclan.ac.uk

After initial registration you can enter and alter details about what you are prepared to offer, e.g. travel limits, talk title and timings.

Researchers in Residence
Getting back to the classroom

To most people, the phrase 'researcher in residence' conjures up an image of a household investigator or a very committed post-doc. However, to the UK science and engineering research councils and the Wellcome Trust, Researchers in Residence (RinR) is a scheme that matches PhD students with secondary schools and provides pupils with modern and enthusiastic scientific role models. Not only does this enable young people to understand how science affects their lives, it also gives them the chance to experience scientific research first hand and broaden their experiences through lab visits and conferences. Sarah Cant discusses her experiences.

Sarah Cant

I first heard of Researchers in Residence via word-of-mouth when I was nearing the end of the first year of my PhD. As I was interested in encouraging more people to enter science after secondary school and wanted to show school children what modern science entailed, I decided to look further into the scheme. After finding out as much information as I could through the RinR website, I was determined to get involved and signed up for a briefing session.

The briefing took place in London in September 2001 and was one of many being held throughout the country. Attendance was necessary before starting a placement and the session lasted a day, but it was interesting, informative and fun. As prospective researchers in residence, we were brought up to date with the science curriculum, given ideas and resources that we could take into the classroom and even had a go at some games and problems ourselves.

Having been briefed in the art of 'classroom management' (if in doubt, ask a teacher!), we next had to find a school. Researchers could go back to their old school or could be placed with a school close to their work or home. Although the RinR scheme assists in identifying and making initial contact with a school, as soon as I had confirmation of my placement the rest of the project was in my hands.

I chose to return to my old school, The Abbey School in Reading, and was given details of the head of science, Mrs. Sue Colebrook. Having taught me A-level chemistry, Mrs. Colebrook hadn't managed to forget me and was even willing to have me back! We met in January 2002 and devised an action plan.

Researchers in residence are expected to spend 25 hours at their host school, although how they spread this time is entirely at their discretion. I chose to spend four consecutive Fridays at the school so that I could supervise a long-term project that would allow the pupils time for research and wouldn't disrupt their or my working week too much.

I was asked to work with Year 8 and to take the entire year. As they all had science lessons on a Friday, this turned out to be relatively simple (although I did get tired of repeating the lesson for the fourth time by the end of the day!). I wanted to introduce the pupils to current scientific applications and how these could affect their daily lives, so I decided to focus on two 'hot topics': GM food and human cloning.

I started my placement at the end of February 2002 and began by conducting the Draw A Scientist Test [1]. I asked the pupils to draw a scientist and then counted the number of stereotypical features that they included (such as male, labcoat, glasses, facial hair, crazy hair on head, lab equipment, pens in pocket). Unfortunately, all of the pictures included at least half of the above features, so I was keen to start dispelling some of the negative images of scientists (See also BSCB newsletter, Winter 2000, p6 "Drawn to a male concept"). I talked about myself and my work, showed photos of my colleagues (did they look like scientists?) and then introduced the concept that science is all around us and topics such as GM food and cloning are often in the news.

Over the course of the four weeks, we investigated the facts and fiction surrounding the chosen subjects. The pupils surveyed friends and family to ascertain the 'public's' view on GM food or cloning and then used the internet to research the technologies that are used and the advantages and disadvantages of each application. This culminated in the presentation of all the data in posters, plays, talks, books and even handmade pamphlets! Finally, each class led an assembly where they discussed their findings, implications and opinions in front of the 800 pupils and staff of the school.

As part of the RinR scheme, I have also become involved in other projects, such as being a Virtual Researcher. Pupils from schools that do not yet have their own researcher in residence can contact PhD students via the RinR website, where information on who the Virtual Researchers are and what they do has been posted. If pupils have any queries regarding science, be it to do with school projects or studying it at university, I can help by telling them about some of my experiences. There's also the opportunity to assist at the RinR Express Yourself conferences – regional science conferences where pupils present their project work and attend talks and demonstrations.

My links with the Abbey School were extended when 24 pupils from Year 7 became the first group of school children to visit the MRC Laboratory for Molecular Cell Biology and Cell Biology Unit in June 2002. As part of a committee of graduate students headed by Dr Louise Cramer, I helped to organize a day during which the pupils toured our labs and took part in activities including microinjection, running DNA in agarose gels and lysing cells. On their return to school, the pupils made posters of their visit and described their experiences to their form classes. Following this, I hosted a Year 11 work experience student from the Abbey for a week in my lab and introduced her to some of our experimental techniques.

Over my first year as a researcher in residence, I have already achieved some of my ambitions: to promote science as an exciting and interesting career, to introduce science as a factor that affects our daily lives and to communicate my work and show 'lab life' to a younger, non-scientific audience. Throughout all of my experiences, the pupils were enthusiastic and willing to get involved and the teachers were welcoming and supportive. I thoroughly enjoyed being a researcher in residence and would recommend the scheme to all PhD students: get back to school and get involved!

Thanks to Sue Colebrook and the staff at the Abbey School, Reading for all their support; Prof. Alan Hall for hosting and Dr. Louise Cramer for organizing the school visit to the MRC Laboratory for Molecular Cell Biology and Cell Biology Unit; and to Marilyn Brodie at RinR for advice. The BBSRC, EPSRC, MRC, NERC, PPARC and Wellcome Trust sponsor RinR. For more information, see http://www.shu.ac.uk/rinr or contact Nicky Fuller at n.a.fuller@shu.ac.uk.

Reference

1. Chambers D W (1983) 'Stereotypical Images of the Scientist: the Draw a Scientist Test' Science Education 67:255-265

Sarah Cant
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s.cant@ucl.ac.uk

RinR
Researchers in Residence
BIOSCIENCES & THE ENVIRONMENT

Background to the scheme

Launched in 1997, the Researchers in Residence Biosciences scheme enables PhD students to spend four days working alongside teachers and pupils in school.

The four days can be organized as flexibly as necessary and the placements are designed to create as little extra work for teachers as possible.

There is no financial cost to the school and all the researcher's expenses are met by the scheme.

Researchers can carry out their school placement at any time during the school year - some researchers opt to return to their former school while others prefer a school close to their laboratory.

The scheme is managed for the Wellcome Trust and the Research Councils by the Centre for Science Education at Sheffield Hallam University.

European Bioinformatics Institute
EBI services in context

The explosion in genomic sequence and functional genomics data far exceeds the capacity of individual scientists to keep abreast of the information. If we are to fulfil the promise of genomics, we need to collect, store and curate the data in ways that allow its rapid retrieval, and we need to build tools that allow us to mine and analyse the data. The European Bioinformatics Institute (EBI) is one of the few places in the world that has the resources and expertise to perform these vital functions. Catherine Brookbank, the EBI's Scientific Outreach Officer looks at the services available.

Building on more than 20 years' experience in bioinformatics, the EBI maintains many of the most important repositories of DNA and protein sequences, macromolecular structures, and gene expression. The results of our endeavours have always been made freely available to scientists as part of our policy to share scientific knowledge and further scientific progress.

EBI services at a glance

If you are unsure which of our many services best suits your needs, take a look at the simplified services site map on the facing page, at www.ebi.ac.uk/services/services_tree2.html, which has a more detailed tree and our help pages at www.ebi.ac.uk/help.

Our user-support group (support@ebi.ac.uk) is always available to assist you with any questions related to the EBI's services.

What types of information does the EBI manage?

The six core molecular databases hosted by the EBI reflect the methods used by biologists to collect information on how cells and organisms work. These store information on DNA and RNA sequences (EMBL-Bank), protein sequences (SWISS-PROT and TrEMBL) protein structure (MSD), whole genomes (Ensembl) and gene expression (ArrayExpress). Details on each of these resources are provided in separate information sheets, and you can link directly to the databases at www.ebi.ac.uk/Databases.

Our databases are enhanced through annotation: features of the genes or proteins stored in them are extracted from other sources, defined and interpreted. Much of our annotation is performed by highly qualified biologists, and the automated annotation that we do is subjected to rigorous quality control.

DNA and RNA sequences

EMBL-Bank is Europe's primary resource for DNA and RNA sequence information. It is produced in an international collaboration with two other nucleotide sequence databases – GenBank (USA) and the DNA Database of Japan (DDBJ).

Each of the three groups collects a proportion of the total sequence data reported worldwide, and all new and updated database entries are exchanged between the groups on a daily basis, so you can access sequences submitted to any of the three collaborating databases through EMBL-Bank.

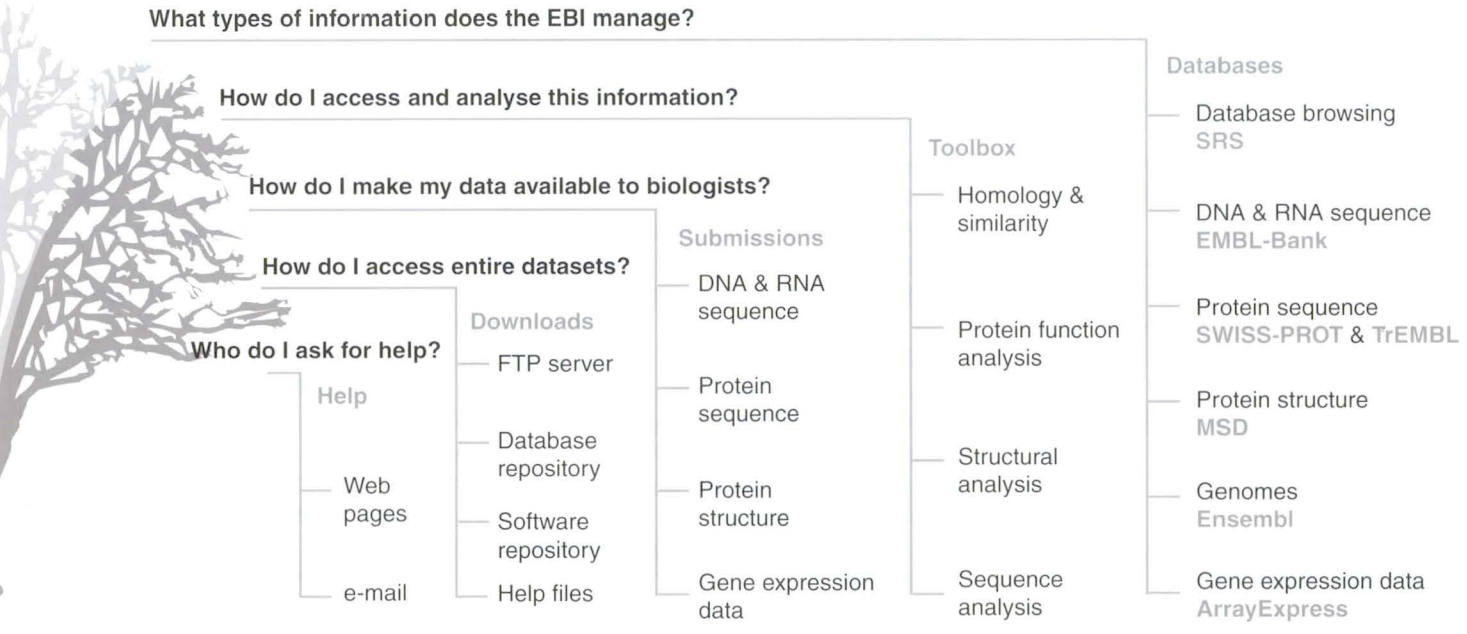
Links

Services
www.ebi.ac.uk/services

Services tree
www.ebi.ac.uk/services/services_tree2.html

help pages
www.ebi.ac.uk/help

Databases
www.ebi.ac.uk/Databases



Above: An overview of the EBI's services.

Use EMBL-Bank if you want to:

- deposit a new sequence before publishing it;
- retrieve any nucleotide sequence that is in the public domain, and compare your sequence with it;
- explore completed or unfinished genomes – from microorganisms to humans;
- find the coding sequence of a gene;
- search for expressed sequence tags (ESTs) and find out what EST libraries they're available in;
- view or submit multiple sequence alignments.

From sequence to function

Ultimately, we would like to know the function of every protein encoded by the human genome and other genomes. SWISS-PROT is the most highly annotated protein sequence database. It is complemented by TrEMBL — a database of protein sequences that are automatically translated from EMBL-Bank, annotated and carefully validated.

Together, SWISS-PROT and TrEMBL form the world's most comprehensive nonredundant protein database. We also provide resources dedicated to proteome analysis and to protein families, domains and functional sites.

Using our suite of protein databases, you can:

- access a wealth of information on a protein, including its function, secondary structure, domain structure and modification sites;
- analyse whole proteomes;
- retrieve any coding sequence that is in the public domain, and compare your sequence with it;
- find out what domains your novel sequence has and predict your protein's function;
- identify remote homologies in proteins;
- identify and align all the proteins containing a domain you're interested in;
- link to other protein resources worldwide.

Proteins in three dimensions

Solving the three-dimensional structures of proteins can reveal a great deal of functional and mechanistic information, as well as facilitating drug design.

The Macromolecular Structure Database (MSD) is the European project for the collection, management and distribution of data about macromolecular structures. MSD collaborates closely with the Research Collaboratory for Structural Bioinformatics (RCSB), which maintains the

Protein Data Bank (PDB) in the USA.
Use MSD if you need to:

- submit and retrieve three-dimensional protein data, including three-dimensional electron microscopy data;
- visualize the three-dimensional structure of a protein;
- compare two known structures;
- predict the secondary structure of a protein from its sequence;
- understand structure–function relationships in proteins;
- search for protein ligands;
- search for the sequences and predicted structural domains of proteins that are targets of structural genomics efforts.

Exploring whole genomes

Each of the databases described above is based on individual genes or their products, but genomics now allows us to take a more holistic approach to biology.

Ensembl was designed to make the assembled human genome, automatically annotated to a consistent standard, readily accessible to biologists. It is rapidly becoming a Noah's Ark for genomes, including those of mouse, zebrafish, pufferfish and mosquito. Use Ensembl if you want to:

- explore and download sequence data in its genomic context, zooming from whole chromosomes to nucleotides;
- find a wealth of information on known genes, including their predicted structure and location in the genome;
- find predicted novel genes, all with supporting evidence;
- find out what genes are associated with particular cytogenetic bands or regions of the genetic map, and what diseases are associated with them;
- find single nucleotide polymorphisms (SNPs), repeats and homologies;
- compare two genomes;
- link to other genome resources worldwide;
- view and compare genomic data from different sources.

Transcriptome analysis

Microarrays are one of the most important recent breakthroughs in the experimental life sciences. They allow snapshots to be made of gene expression levels on a genomic scale, and are revolutionizing all areas of the molecular life sciences, from basic biology to drug discovery.

ArrayExpress is a new database for collecting information about microarray experiments. With ArrayExpress you can:

- make your microarray data publicly available in accordance with standards that have been developed by the microarray community (MIAME);
- download public-domain microarray data for in-house data mining;
- link gene expression patterns with biological processes;
- obtain protocols for microarray experiments;
- find out what cDNAs and oligos are represented on different microarrays.

How do I access and analyse this information?

Biology is not just about accumulating data; to understand how organisms function, we need to analyse and manipulate biological information. The EBI provides a comprehensive collection of tools to help you find relevant information and analyse it efficiently.

You've just discovered a new sequence. How will the EBI's toolbox help you to find out what it does?

Gene or junk? We have a gene-prediction service that assesses the coding potential of a sequence.

How does it compare with its relatives? We provide a suite of tools that allow you to compare your gene's sequence with those in our DNA and protein databases. You can produce biologically meaningful pairwise and multiple sequence alignments of divergent sequences.

What domains and motifs does it contain? You can compare your sequence with a comprehensive reference set of protein families, domains and functional sites, to infer information about your protein's function.

Submitting data to the EBI

Submission tool	Description
Nucleotide sequence submissions	
Webin	Interactive system for submitting DNA sequences to the EMBL-Bank, GenBank or DDBJ sequence databases. You can also report updates or corrections for existing EMBL-Bank nucleotide sequence entries and submit multiple sequence alignments.
Genome Project Accounts	Large volumes of genome sequence data can be deposited and updated by the originating group via FTP or e-mail.
Protein sequence submissions	
SWISS-PROT	Submit protein sequences to SWISS-PROT and submit corrections to an existing (publicly available) SWISS-PROT entry.
Protein structure submissions	
PDB-AutoDep	Three-dimensional structure submissions to the Protein Data Bank.
Gene expression data submissions	
MIAMExpress	MIAME-compliant microarray data submissions to the ArrayExpress database.

Links

Submissions
www.ebi.ac.uk/Submissions

Entire data sets
www.ebi.ac.uk/FTP

Contacting EBI Services
www.ebi.ac.uk/services
support@ebi.ac.uk

Catherine Brooksbank
Scientific Outreach Officer
European Bioinformatics Institute
cath@ebi.ac.uk

How might it look in three dimensions? You can predict your protein's secondary structure from its sequence or a multiple sequence alignment, and find out whether it might have a quaternary structure. If you have a three-dimensional structure for your protein, you can compare it with those in the Protein Data Bank.

What does this gene expression pattern mean? You can cluster, analyse and visualize your gene expression data, and map gene-expression patterns to specific biological processes, molecular functions and cellular components.

How do I make my data available to biologists?

Where does all the information in our databases come from? In short, it comes from you. Help us to disseminate the results of your experiments to biologists worldwide, by using the submission tools summarized below. We'll work with you to enrich your data by adding functional information and crosslinks, and to update the database entries as new information becomes available. For more details on how to submit your data to the EBI's databases, please see the information sheets on each database. Online links to our submission tools are available at www.ebi.ac.uk/Submissions.

How do I access entire data sets?

You can download our data sets, allowing you to incorporate them into your own bioinformatics resources. The EBI FTP server provides a comprehensive archive of databases and software, along with documentation to help you download the files that you need. Links to our FTP servers are provided at www.ebi.ac.uk/FTP.

Support

Projects within the EBI are supported by the European Molecular Biology Laboratory (EMBL), the European Commission, the Wellcome Trust, the UK Medical Research Council, the UK Biotechnology and Biosciences Research Council, the UK Engineering and Physical Sciences Research Council and the EBI Industry Programme.

'Alternative' Career Paths for Scientists
Effective Communicators

Communicating our science to others is a fundamental aspect of what we do, whether it is through publication, teaching students or presenting our data in seminars. Some of us are naturally better communicators than others, but how many of have what it takes to make a career out of communication?

Sharron Vaas

To find out more, I contacted Gail Cardew, who is Head of Communications at the Royal Institution, and Jennifer Moynihan, currently employed as a Business Development Officer (Life Sciences) at the University of Reading. Both had undertaken a Ph.D. and a research-based post-doctoral position, but had decided to make a big change in their career direction. As Jennifer told me, "about one year into my post-doc, I decided that what I really liked doing was writing about, and talking about, science; whereas the lab work was becoming more and more like washing up and cooking!"

I was interested to know what a typical week was like in the world of scientific communication. Gail told me: "I manage the work of five people in the office. Together, we make up the Events Team at the Royal Institution and we organise all the public events and schools lectures - around 150 events for adults and nearly 200 events for schools that attract 34,000 people and 40,000 students annually."

"The job is seasonal in that the busiest time is in term time. A typical week during this period involves getting into the office around 8.30am and trying to read and reply to the emails I didn't get around to looking at the day before. The remaining time is spent liaising with speakers of upcoming events, organising the programme up to a year in advance, developing marketing materials, speaking with the press, writing grants to help finance our activities, liaising with corporate sponsors and external clients, pondering over evaluation statistics, and representing the RI at various committees, launches and receptions. If there is an event in the evening, I usually introduce the speaker, attend the event and catch a taxi home around 10.30pm (later, if I take the speaker out to dinner). Some weeks, we have an event every night - so it can be very tiring."

When I asked Jennifer what was the most appealing aspect of her work she told me, "the fact that I get to talk science all day, but never have to put a lab coat on! Also, you get to help, and be part of, the process that may bring new products onto the market for the treatment of disease".

For Gail, the reward is "knowing that the 400 adults or students piling out of the lecture theatre are brimming over with enthusiasm for science because of an event we've organised. If we've organised a debate about the nature of science, it's equally satisfying to see people engaging in heated science debate afterwards in the bar –

seeing people debating science in this way is definitely preferable to general apathy or uninformed debate."

I also asked whether they had any career advice for other scientists interested in communication or business development. Gail told me: "I'd say first go to some science events (at the Royal Institution, of course!). If you don't feel inspired at that point, try something else. Get involved in some local science communication work. It could be that when you start communicating science yourself to students, for example, you realise that you do actually want to stay in science research (for details on how to get involved with this, try out the Science and Engineering Ambassadors Scheme). Or, find out from your research council if there are courses available in media training or communicating science to the public. If you'd like to be the person organising the events, rather than giving them, then there are a number of science communication courses you can go on, e.g. at Imperial College".

Jennifer was really enthusiastic and her advice was "Go for it! Try and get some training in business or IP management /Tech Transfer – on the job, if possible. You need to be able to understand scientific language and to be able to translate it into layman's terms, as many of the people that you speak to will not have a scientific background."

I would like to thank the contributors and hopes this article may have given a little insight into the fast moving and rewarding world of Scientific Communication.

Sharron Vass
Wellcome Trust Centre for Cell Biology, University of Edinburgh

UK Life Sciences Committee, Animal Science Group

None of us likes it, most of us accept it, but some of us have to use animals in our research. Those who do require animals, to answer scientific questions or to develop new treatments for animal and human disease, know only too well of the problems: the continuous personal and national concern about animal welfare, high cost, and the complexity in designing and analysing whole animal experiments. This must make it one of the most difficult subjects with which we have to deal. But these problems are compounded by concerns about public opinion, the vociferous and sometimes violent actions of a small group of extremists who oppose animal experiments, and a seemingly ever increasing burden of regulations, requirements, paperwork and delays.

Nancy Rothwell

The UK Life Sciences Committee (UKLSC) Animal Science Group (ASG) was established to address all of these issues. It represents academic scientists, but has regular dialogue with, and representation of, all scientists with an interest in this area including funding bodies, the commercial sector, laboratory vets and technicians and scientific and medical academies (see membership below).

The BSCB provides support for ASG and may soon have a representative on the Group. The Group is chaired by Nancy Rothwell from Manchester, secretariat is provided by the British Pharmacological Society, and the Group supports a part-time consultant policy administrator, Dr Vernon Barber. The purpose of this article is to update the membership on the recent and likely future activities of ASG, and to welcome comments, suggestions for action and even criticisms of ASG activities.

The Group, or its representatives, meet regularly with senior Home Office staff in several fora. In June 2002, we organised a discussion meeting with Home Office staff and academics which was efficiently and effectively organised by Universities UK, Home Office staff and Vernon Barber. Invitations were sent to all academic institutions in the UK. About 50 institutions were represented and feedback was very positive. A range of issues was discussed, including turnaround times for licence processing, Ethical Review Process, Animal Procedures Committee, new inspectors, consistency of Home Office Inspectorate decisions, presentation of best practice for animal welfare and ensuring best practice in preparing project licences, including the development of "low maintenance" licences. Many actions are now being followed up. A proposal was welcomed for a "virtual centre" to coordinate and disseminate information and developments about animal welfare, and to optimise protocols for standard techniques.

An important outcome was that those present recognised the enormous diversity of structure,

operation and turnaround times for Ethical Review Processes. ASG is now preparing a document recommending "best practices" for efficient and effective ethical review, which will be distributed widely.

ASG frequently corresponds and meets with senior government and Home Office Officials. These have included meetings with Jack Straw (when he was Home Secretary), Lord Hunt (Minister for Health), Lord Sainsbury (Minister for Science) and three previous ministers with direct responsibility for animals. We arranged for the two previous ministers (Mike O'Brien and Angela Eagle) to visit academic animal units – both were clearly impressed by what they saw. We are now pushing for a meeting with the recently appointed minister (Bob Ainsworth) and have invited him to visit scientific institutions.

Nancy Rothwell meets regularly with Lord Sainsbury and senior Home Office staff as a member of the Pharmaceutical Industry Competitive Task Force, which also represents the concerns of academia. Lord Sainsbury has been enormously supportive of our aims and concerns and these meetings continue to be very valuable. At his suggestion, we will continue to meet regularly to review progress in ensuring that the UK has the most efficient as well as the most effective regulatory system for animal experiments.

One aspect of this efficiency review is that ASG is in regular discussion with the Home Office about the processing of licences. We have been reviewing turnaround times of selected institutions and are pleased to report what we believe is a significant reduction in the time for Home Office processing of new project licences. We will continue to monitor turnaround times for processing all licences by the Home Office and through the Ethical Review Process, and to search ways to make these processes more efficient, but also more effective in improving animal welfare. We are particularly keen to hear from institutions or individuals who have experienced problems.

ASG had a major input into the House of Lords Select Committee on animals in scientific procedures. We have welcomed the report and provided a detailed response (see ASG web site, www.lifesci.org/asg/default/htm), and will be following up several recommendations. We are working with the Association of British Pharmaceutical Industries to simplify the project licence application and are actively considering how we can better promote animal welfare and the three Rs (reduction, refinement and replacement of animals used in experiments) and establish a "Centre" to meet these goals.

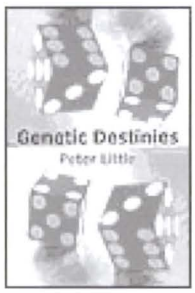
An important recommendation of the House of Lords Select Committee was for more openness by scientists about what they do. ASG is very keen to meet this goal, but also recognises that scientists have very real concerns about security, safety and competitiveness. We are working towards better national, public understanding about the use of animals in research, we are in regular discussion with police and security bodies about protecting scientists (and breeders) and are considering ways that any revision of the project licence can meet the requirements of the Freedom of Information Act without jeopardising the very real concerns of the scientific community.

This is just a snapshot of the activities of the ASG. We welcome your input about our concern or future activities.

Nancy Rothwell
Chairman, UKLSC Animal Sciences Group

Book reviews

Genetic Destinies
Peter Little



Genetic Destinies
Peter Little.
Oxford University
Press 0198504543
264 pp April 2002

In his first popular science book, Prof. Little provides us with his thoughts on our current knowledge of genetic science in an accessible and forthright manner. Sound familiar? That may be because there is now a considerable choice of books covering a similar subject aimed at the educated layman, so how does this effort compare? Well, quite favourably.

The book works within the conceptual framework of a future history. Little opens with the biography of a woman born in a utopic future, who will live her life free of suffering due to advances in genetic medicine. Then he contrasts this with an altogether different future history, where genetic advances foster discrimination and oppression. The main body of the book is spent outlining the current state of our genetic knowledge, before returning to discuss the likelihood of each future scenario coming true.

The core of the book is a delightful read. After a sound introduction to the basics of DNA and genetics, we are taken on a diverse journey through the subject field, stopping here and there to learn from specific examples of genes and their effects. Little adopts a strict no-jargon policy (describing transcription factors as 'gene regulators' for example) and provides a 'Yrassolg' for those interested in translating back to the technical terms. While this is probably makes it more accessible to the non-specialist, it can be frustrating for those au fait with the language of genetics!

The future histories are a little more frivolous, addressing some of the more fanciful applications of current genetic technology as suggested by science fiction writers and the popular press. However, as a concept it allows Little to highlight the important (and often misunderstood) difference between the possible, impossible and the improbable. He also uses it to maintain focus, concentrating on human genetics and relating examples back to five central themes: the genetics of development, diversity, health, intelligence and behaviour. Furthermore, the dystopic future history provides the opportunity to tackle controversial issues.

The roles of genes in defining race, sexuality and IQ are all discussed in depth. While this should be applauded, it also leads to my one major criticism. In his eagerness to explain why some experiments are flawed or indeed morally wrong, Little indulges in over-lengthy sermons, firstly on the merits of twin-studies versus case/control and then on the dangers of human experimentation (specifically with regards to gene therapy). These diversions are distracting, and temper the flow of an otherwise fascinating read.

The short but thorough section on development deserves special praise. In non-technical language, Little illustrates the importance of cascades, signalling, positioning, division and fate. Each process is described simply, while still conveying the immense complexity of the developing body. Scientists considering writing developmental biology texts for non-experts would do well to take notes.

In conclusion, Genetic Destinies would provide an entertaining introduction to human genetics for undergraduates and I will certainly recommend it to non-scientists with an interest in the field.

Darren Logan, MRC Human Genetics Unit, Western General Hospital, Edinburgh

Books for review

Fancy reviewing a book? If so, choose one from the selection below. Alternatively, if there is a book you would like to review that is not included here, contact me (jmarsh@wiley.co.uk) and I will request a review copy from the publisher.

Molecular Biology of the Cell, 4th Edition, *Alberts et al, Garland*

Molecular Biology of the Cell, 4th Edition, A Problems Approach *Wilson & Hunt, Garland*

From DNA to Diversity *Sean Carroll, Jennifer Grenier, Scott Weatherbee, Blackwell Science*

Bioinformatics for Geneticists *Barnes & Gray, Wiley*

Principles of Gene Manipulation *Primrose et al, Blackwell Science*

Chromatin and Gene Regulation *Turner, Blackwell Science*

A Biologist's Guide to the Analysis of DNA Microarray Data *Knudsen, Wiley*

Molecular Infection Biology: Interactions between microorganisms and cells *Hacker & Heesemann, Wiley*

Culture of Epithelial Cells, 2nd edition *Freshney, Wiley*

In Silico Simulation of Biological Processes *Novartis Foundation symposium, Wiley*

Glasgow Cell Biology Symposium
April 2002

The Glasgow Cell Biology Symposium was held to mark the official opening of the new Henry Wellcome Laboratory for Cell Biology. The recently refurbished laboratory space, occupying nearly a whole floor of the Davidson Building, forms part of the Institute of Biomedical and Life Sciences at the University of Glasgow. The work was funded by a £2.4M Wellcome Trust Joint Infrastructure Fund grant awarded to Kathryn Ayscough, Francis Barr, Gwyn Gould, Miles Houslay and Steve Winder. The event attracted over 160 cell biologists from throughout the UK.

Heather Spence and Mike Broderick

Following a brief introduction from John Coggins, Dean of the Faculty of Biomedical and Life Sciences, **Bill Earnshaw** (University of Edinburgh) opened the scientific part of the meeting by presenting work on the chromosomal passenger proteins, INCENP, Survivin and Aurora B. These proteins are thought to coordinate chromosomal and cytoskeletal functions in mitosis. They associate with chromosomes during prophase and become concentrated at the inner centromere by metaphase, but during anaphase they transfer to the mitotic spindle.

The importance of these proteins in mitosis was illustrated by expressing a mutant INCENP that lacks the C-terminal half of the protein, which resulted in delocalisation of endogenous INCENP and Aurora B and induced defects in mitosis. Ablation of Survivin also resulted in similar defects. This work suggested that the three passenger proteins form a complex, and that INCENP and Survivin recruit Aurora B to chromosomes, where it can function as a kinase during mitosis.

Gwyn Gould (University of Glasgow) continued the theme of mitosis by presenting work on a novel protein, Arfophilin 2, which binds the ADP ribosylation factors (ARFs). ARFs are a family of proteins known to be involved in membrane trafficking, so it was intriguing to find that Arfophilin 2 localised to the perinuclear compartment, the centrosome and focal adhesions during interphase, whilst during cytokinesis it relocalised to the midbody. The function of Arfophilin 2 during mitosis is unknown, but Prof Gould proposed that ARF family members and Arfophilin 2 may be involved in intracellular membrane delivery, which is required for cytokinesis.

Control of membrane fusion dynamics during regulated exocytosis was the focus of **Robert Burgoyne's** (University of Liverpool) talk. Two forms of exocytosis were discussed: classical fusion followed by slow clathrin-dependent recycling, and a 'fast, kiss-and-run' form. The form of exocytosis that cells use appears to be determined by vesicle composition, since overexpression of cysteine-string protein resulted in a loss of kiss-and-run secretory events.

In contrast, a switch to 'kiss-and-run' exocytosis was seen when cells expressed a mutant version of the fusion complex protein, munc-18, which has a weakened interaction with the SNARE component syntaxin. In addition, it was reported

Above: At the official opening of the Wellcome Trust-funded Glasgow Cell Biology Group laboratories – Gwyn Gould (GCBG director), Angela Kingman and Pam Reid (Wellcome Trust), and John Coggins (Dean of Biomedical and Life Sciences).

that PKA phosphorylation plays a role in determining the form of exocytosis that occurs in cells.

Kathryn Ayscough (University of Glasgow) presented work on the yeast protein Sla1p, which has been shown to interact with the yeast homologues of the Arp2/3 complex Lasp 17p/Bee1p, Abp1p and Pan1p, highlighting its role in actin organisation. In addition, Sla1p appears to interact with End3p, Pan1p and Lsb5p, which are involved in endocytosis. She proposed that Sla1p plays a central role in coupling the endocytic machinery to the actin cytoskeleton.

Miles Houslay (University of Glasgow) switched the direction of the symposium to cell signalling by presenting data on how the c-AMP and MAPK pathways interact. This interaction was highlighted by the demonstration that ERK2 phosphorylates the long isoform of PDE4 cAMP phosphodiesterase, resulting in its inhibition. In contrast, ERK2-dependent phosphorylation of the short isoform of PDE4 resulted in activation of the enzyme. These results indicate distinct functions for the isoenzymes and also raise the possibility of using isoenzyme inhibitors for therapeutic interventions in treating a wide range of inflammatory diseases and depression.

The theme of cell signalling was continued by **Steve Winder** (University of Glasgow), who proposed that dystroglycan, which is a heterodimeric transmembrane protein, enables cells to transmit signals from the extracellular matrix to the cytoskeleton. Overexpression of dystroglycan in fibroblast cells resulted in the formation of filopodia and loss of actin stress fibres. These results indicated for the first time that dystroglycan is able to cause actin cytoskeleton rearrangements within cells. Dystroglycan could induce this rearrangement via either direct interaction with actin or by activation of the small Rho family of GTPase Cdc42.

Margaret Frame (Cancer Research UK, Beatson Laboratories) and **Victor Small** (Institute of Molecular Biology, Austria) focused on proteins that are involved in assembly and disassembly of focal adhesion structures and how this process contributes to cell motility. Prof. Frame described the role of focal adhesion kinase (FAK) turnover in this process. Using v-*src* transformed cells, they were able to show that FAK is cleaved by the proteolytic enzyme calpain, which results in loss of focal adhesion structures and increased motility. In addition, in such cells, there is an increase in the synthesis of calpain, while the endogenous calpain inhibitor, calpastatin, appears to be degraded. These data suggest that degradation of FAK by calpain contributes significantly to the motility of transformed cells, and that the manipulation of the calpain-calpastatin proteolytic system may represent a novel therapeutic approach for the inhibition of tumour growth and invasion.

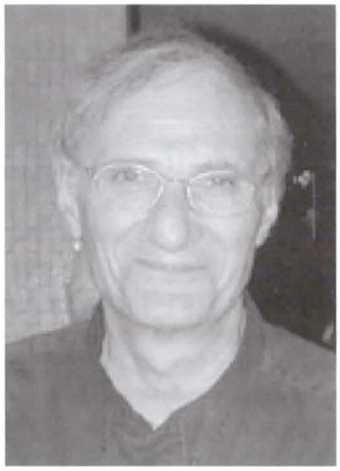
Prof Small proposed a role for microtubules in the assembly and disassembly of focal adhesions. With a series of elegant real-time microscopy studies using a number of different fluorescence-tagged proteins, he showed that microtubule polymerisation is guided to sites of cell adhesion at the leading edge of the cell; this then results in adhesion turnover, a vital part of cell motility. He proposed that at the cell front, microtubules deliver signals that limit the growth of focal adhesions, whereas at the cell rear they promote adhesion sliding and detachment.

The day was rounded off with 20 posters from Glasgow cell biology laboratories washed down with wine and a few nibbles.

Heather Spence and Mike Broderick, Division of Biochemistry and Molecular Biology, Davidson Building, University of Glasgow

A Raff Fest
3–5 July 2002, London

The postponed Autumn 2001 BSCB/DB meeting was in honour of Martin Raff, who is sadly (for the rest of us) retiring at the end of this coming academic year. While the list of speakers at the UCL meeting was really something special, it was only fitting that such a breadth and quality of exciting science was covered, when these characteristics sum up the man himself so perfectly. The atmosphere at the meeting, along with the content, made it easily the most enjoyable conference I've attended. Almost without exception, the speakers had anecdotes they wanted to share and it was obvious from the start that everyone was thoroughly enjoying themselves.



Martin found all the compliments a little embarrassing (not to mention some of the archival photographs); in fact, he likened it to attending one's own funeral. I have been lucky enough to have Martin inspire me since my undergraduate days, when he was a favourite lecturer (even cynical freshers find immunology a pleasure when delivered in such style). So, I have to take the opportunity to add my own gratitude to Martin for being so generous with ideas, challenging with discussions, and (that most important of characteristics to a new graduate student) approachable.

I'm informed by Anne Mudge that it wasn't difficult to assemble such a fantastic programme (even doing it twice), which says a lot about how keen everyone was to attend a meeting in Martin's honour.

The meeting began with **Ruth Lehmann** (New York University) talking about mechanisms of transcriptional silencing during *Drosophila* germ cell migration, followed by **David Anderson** (Caltech) giving a seminar on the genes that control neuron vs. glia and neuronal subtype decisions in the developing central and peripheral nervous system.

An overriding theme of the meeting was, of course, members of the Raff lab past and present. One former post-doc of Martin's, **Ben Barres** (Stanford), gave a fascinating talk on the effects of neuron-glia interactions, concentrating on synaptic transmission. The presence of glia, or glial cell-conditioned media, with retinal ganglion neurons increases synaptic activity around 100-fold, raising the number and stability of synapses without changing their ultrastructural morphology. Interestingly, it seems that electrical activity in the neurons is necessary for the soluble protein factor to be released from the glial cells; an elegant positive feedback loop which may be involved, for example, in synaptic potentiation.

Another especially enjoyable aspect of the meeting was the presence of Martin's co-authors on 'the book' and their reminiscences about the

Herculean effort it turned out to be. **Keith Roberts** (John Innes Centre, Norwich) gave an excellent seminar on transdifferentiation and plasticity in plants. After wounding of the vascular bundle in *Zinnia*, ground cells undergo a very elegant series of redifferentiation steps, memorably paralleled with photographs depicting the development of Martin's appearance over the time he's been in the UK.

Although the *Zinnia* system is not suitable for genetic approaches, careful investigation has shown the impressive potential of fully differentiated photosynthetic cells from leaves to undergo transdifferentiation in cell culture, thereby enabling us to uncover the genes involved in this process. Addition of two growth factors to these cells over a 10 minute period, after 48 hours in the dark, is sufficient to commit the majority of the cells to transdifferentiation. The addition of the growth factors initiates the bundling of microtubules within the cell; these direct the deposition of cellulose wall reinforcements that then lignify prior to apoptosis and the formation of a hole in the end of the cell to form the vascular tube.

Joshua Sanes (Washington University) wrapped up the session with a seminar on the formation and remodelling of laminar specificity in the retinorecipient layer, particularly the role of two proteins in chick, the sidekicks, which are expressed in the synaptic layers of retinal ganglion cell subsets.

The session on *Wiring the Brain* covered a broad range of very interesting subjects, starting with **Marc Tessier-Levigne** (UCSF) describing the guidance of long range projection axons during development. The response of commissural axons in mammals to netrin (attractive) is switched once the axons cross the midline; Robo is upregulated to mediate a negative response to Slit at the midline, and signalling through this receptor silences DCC to prevent further positive responses to netrin. Thus, the axons do not re-cross the midline. This plasticity during axon outgrowth can be manipulated in regenerating axons. If cAMP levels are raised in DRG neurons, severed axons will grow over a lesion and onto a normally prohibitive myelin substrate.

Tom Jessell (Columbia University, NY) spoke about how motor neurons are specified in the developing spinal cord, and about the initiation of motor projections, which seem to require chemokine (e.g. CXCR4 and SDF1) signalling to exit the spinal cord.

Paul Patterson (Caltech) introduced a mouse model that is based on the epidemiological finding that maternal respiratory infection during the second trimester of pregnancy increases the risk of schizophrenia in the offspring. Infecting a pregnant mouse with a human influenza virus causes a flu-like illness that resolves in the mother but has long-term consequences for the offspring. Adult offspring of infected mothers display behaviours and drug responses consistent with those seen in schizophrenia and/or autism.

At least one of these behaivours can be mimicked by introducing a synthetic double-stranded RNA into the mother, suggesting that it is the maternal immune response rather than foetal infection that produces the phenotype. Interestingly, the offspring of infected mothers also display a specific abnormality in the anatomy of the cerebellum that is found in autistic human subjects.

Charles Weissmann (Imperial College, London) described the propagation of prions, including experiments following up the observation that CJD was accidentally transmitted from a CJD sufferer to other patients via an intracerebral EEG electrode that had been chemically sterilised after each operation. Metallic surfaces that have been exposed to scrapie-infected brain are incredibly infectious, but can infect cells only via direct contact. Because an antibody against PrPC not only prevents but also cures prion infection in cultured cells, it was concluded that PrPSc has a relatively short half life. The antibody will deplete the supply of PrPC available to be converted to PrPSc, and if existing PrPSc is degraded but not replenished, the infection is abrogated.

Julian Lewis (Cancer UK, Oxford) was the first to speak on Wednesday morning's *Cell biology* session, giving a seminar on the inherent delay in the Notch-Delta positive feedback loop which results in oscillation of protein expression in the developing zebrafish. **Jordan Raff** (Wellcome/CRUK Institute, Cambridge) then presented some beautiful movies of GPF-cyclin B degradation during spindle assembly in *Drosophila* and the regulation

"I suppose I am biased, but it was the best and most interesting meeting I have ever attended. It was especially wonderful to have so many present and past postdocs and students all together for the first time."
Martin Raff

of this degradation. He also shared some of his memories of the way Martin developed his wonderful people management skills whilst looking after his children over the summer at the same time as writing the book. The session continued with **Alexander Johnson** (UCSF) talking about phenotype switching and mating in *Candida albicans*; historically thought to be asexual. **Alan Hall** (University College, London) then covered the role played by Rho GTPases in the changes in cell shape, polarity and motility in migrating primary astrocytes.

Since Martin trained as a medic, it is always important to him to relate the findings of basic science to medicine, and Wednesday's afternoon session focussed on the application of biological science. During an interesting seminar on autoimmunity, **Eli Sercarz** (Salk Institute, CA) spoke about various mouse models for human conditions, including a model for diabetes in which preinsulin and GAD65 are recognised as antigens.

Gerard Evan (UCSF) gave a fascinating talk introducing the idea that a tumour can be formed *in vivo* with only two lesions. Deregulation of c-Myc activation is sufficient to put cells back into cycle but, in the absence of additional mutations, c-Myc-induced apoptosis far outweighs the increase in proliferation. Mutations which prevent apoptosis in Myc-deregulated cells (for example, loss of p53) lead to the synchronised appearance of tumours in the animal, and these tumours are genetically stable, i.e. do not need to accumulate further mutations to continue through malignancy.

In a related talk **David Lane** (Dundee) introduced the potential therapeutic benefits of artificially activating p53 in tumours wild-type for p53. Traditionally, radiotherapy and most chemotherapy activate p53 by inducing DNA damage, but peptides that mimic p53 interactions with HDM2 without inducing damage are under investigation.

Continuing the cancer theme, **Ron Laskey** (Cambridge) presented data on the importance of the DNA replication mechanism as a point of convergence in tumour formation. In normal cells, as cyclin A activates DNA synthesis, it also prevents the assembly of further replication machinery. In this way, the cell ensures that in any one cycle all the DNA is replicated only once. However, there seems to be no way for a cell to proliferate, for example into a tumour, without stimulating MCM proteins and indeed there seems to be great potential for using antibodies against MCM proteins to detect abnormalities in cervical smear tests, after mouth swabs for oral cancer or a urine test for bladder cancer. Ron finished with an elegant model for MCM proteins acting as DNA 'pumps'.

Friday morning's session was the second on *Cell biology*, commencing with **Tim Mitchison** (Harvard) showing some fantastic movies of *Xenopus* extract spindles imaged with fluorescent tubulin. Interestingly, the images show unexpected buckling of the microtubules upon uncaging of a tubulin depolymeriser. This led to discussion about the possible existence of a spindle matrix that limits the length of the mitotic spindle in the absence of any extrinsic factors. This 50-year-old theory lost popularity after the finding that spindle microtubules are under both tension and compression, but is interesting to place alongside the current theories as to what governs spindle length in the absence of extrinsic factors.

Paul Nurse (CRUK, London) gave a fascinating talk addressing some of the issues involved in localised polarisation during growth and cytokinesis in *Schizosaccharomyces* using a genetic approach. tea1 (tip elongation abnormal 1) is a protein which marks the ends of the cell at which growth occurs. It seems to be positioned under the influence of a kinesin, tea2, and a

clip170 family protein, tip1. He also discussed work of Mercedes Pardo showing that the late mitotic midzone microtubule structures are necessary to position the actin-myosin ring in the centre of the cell ready for mitosis.

The following session on *Behaviour and Psychiatry* started with a stimulating talk by **Simon LeVay** (Los Angeles) on gender dimorphism in the brain, and how these studies have been extended to include differences in sexual orientation. There is evidence for differences in nucleus size and oto-acoustic emissions (sounds produced by the cochlea), and it seems that prenatal exposure to levels of androgens may influence these dimorphisms.

He also discussed the idea introduced earlier by Paul Patterson concerning the possibility that differences might arise between genetically identical siblings because of different positions within the uterus.

Richard Axel (Columbia University, NY) then presented data showing that social and sexual behaviour in mice is innate (wired into various pathways in the olfactory system) but also plastic. There is significant sexual dimorphism in areas of the mouse brain, and hormone levels can influence this, not only during development but also in an adult. In addition to these internal cues, behaviour is influenced by external stimuli, for example males exude a pheromone which is recognised by the vomeronsal projection of other males, to prevent inter-male mating behaviour.

Lewis Wolpert (University College London) then gave a thought-provoking seminar on malignant sadness, including the neuroanatomical changes that tend to accompany depression. Interestingly, reduction in the area of the prefrontal cortex in depressives is due to a reduction in the number of glia, rather than neurons as seems to be the case in the hippocampus. There was also some discussion addressing the theory that depression may have a biological significance - to allow people to accept the unobtainable and so adjust their expectations. On the other hand, the condition is so detrimental to recovery from physical conditions, one can argue that it is not adaptive.

The final session of the meeting was quite unusual, but fascinating. It was broadly entitled *Science Policy and Ethics*. To start us off, **Vitek Tracz** (London) chaired a lively discussion asking if scientists and publishers can ever be friends and ultimately focussing on the topic of free access journals. **Gerald Fischbach** (NINDS, Bethesda) then spoke about the incredible results that can be obtained in Parkinson's patients using deep brain stimulus through an implanted electrode. In providing this therapy, however, account must be taken of the fact that many patients experience emotional effects, such as deep depression, during the placing of the electrode or when the stimulation point is varied by even millimetres. In addition, he gave examples of mutations found in neurological disorders by genetic epidemiology, and the implications of privacy laws and stem cell legislation on neurodegenerative research and therapy.

Bruce Alberts (National Academy of Sciences, USA) explained what the National Academies are and gave examples of the reports they publish, before paying his own tribute to Martin and recounting anecdotes from the times they spent writing the book together.

The final seminar in the session, given by **Paul van der Maas** (Vrigie Universitat, Amsterdam), focused on a national study commissioned on the practise of euthanasia in Holland. The results show that this is a major area neglected not only by research, but also during medical training, since the vast majority of people die whilst under the care of a medical professional. Euthanasia is a subject Martin is particularly interested in, and in fact he finally broke his previous silence during the questions to ask about the possible implications for assisted suicide legislation in Holland as the government moves back to the right.

The meeting was a hugely enjoyable event for everyone present. I would like to thank Anne Mudge, all the staff and students at the LMCB who were involved, and all the speakers and session chairs for making it so great.

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BSCB Autumn Meeting

5th Abercrombie Meeting on Cell Behaviour

15–18 September 2002, Oxford

This time around, the Abercrombie meeting on Cell Behaviour took place at St. Catherine's College, Oxford. It was sponsored by the British Society of Cell Biology and was organised by Anne Ridley (Ludwig Institute and University College London), Michelle Peckham (University of Leeds) and Peter Clark (Imperial College London). These gatherings take place every five years. The first, in 1982, was to be a celebration of Michael Abercrombie's 70th birthday that year, but sadly turned into a tribute to his life and work as he died before the meeting took place.

Kate Nobes and Sarah Dickinson

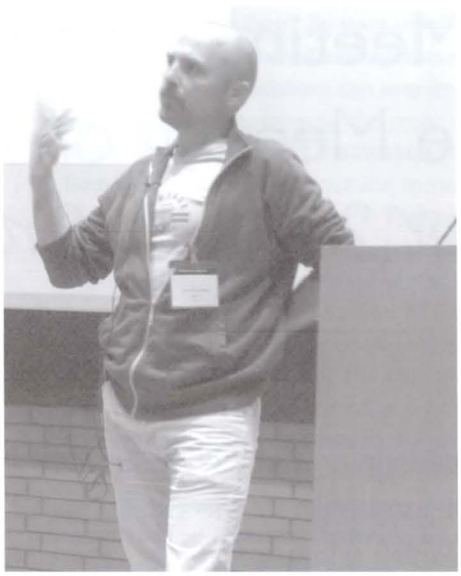
Michael Abercrombie was an inspiring pioneer in the study of cell behaviour, both in in vivo situations like wound healing and in the culture dish. It was Abercrombie who used cine-film to make some of the first time-lapse movies of cell motility. These films and morphological information gathered from electron microscopy of fibroblasts crawling on solid surfaces suggested that cells move by extending protrusions and forming new contacts with the substratum ahead of them. He observed that the cell body is then drawn up to the new adhesions by a "system of contractile filaments".

These steps in the motility cycle of a crawling cell still form the basis of our current understanding of how cells move. What would excite Abercrombie now is that we are beginning to assemble many of the details of the molecular events that underlie this fundamental cell behaviour and some of the best of this work was highlighted at this meeting.

Abercrombie was particularly fascinated by the response of migrating cells when they contact other cells, since lamellar protrusions, which lead any polarised migration, become paralysed at the point of contact and the cell retracts its attached margins. He felt that such behaviour between unlike cells could contribute to the stability of boundaries between tissues during embryonic development. How right he was. This was perhaps the first description of what we now call 'contact repulsion' and it probably underlies inhibitory cell behaviours at many different tissue boundaries, for example between rhombomere segments in the developing brain.

In a very fruitful collaboration with Joan Heaysman in the 1960s and 1970s, these studies became his most celebrated work and provided us with the term "contact inhibition" of locomotion. Importantly, he also showed that cells derived from tumours did not obey this basic principle and he believed this likely contributed to their invasive migratory behaviour.

The Abercrombie meetings of recent times have tended to focus on the control and mechanism of cell motility. It is ironic then, as Joan Heaysman



Above, left to right: T Takenawa (Tokyo); Philippe Chavrier (Institut Curie, Paris); and John Condeelis (New York).

explained to us at the end of the meeting, that although Michael Abercrombie was interested in many aspects of cell behaviour, he started working on cell motility only as a way to understanding the mechanisms underlying contact inhibition of locomotion.

One interesting aspect of these meetings, since they take place every five years, is that they chart very clearly advances in our understanding of cell motility, perhaps like an extended time-lapse film of cell migration research. The 2002 meeting followed in this fine tradition.

One major advance, of course, is our molecular understanding of the first step in the cell motility cycle – actin-driven lamellar protrusion. **Tom Pollard** (Yale University, USA) gave a provocative opening keynote lecture (edge of the seat stuff despite the late hour of a Sunday). He gave an overview of his own and other labs' studies that have revealed the steady-state dynamics of actin filament assembly and the role of the Arp2/3 complex in initiating new actin filaments. It was a lecture full of interesting anecdotes and, importantly, he put many of the key experiments in context, including the reconstitution studies of Marie France Carlier that have defined the minimal set of proteins required for actin-based motility. He also discussed a key controversy in the field - where does the Arp2/3 reaction take place?

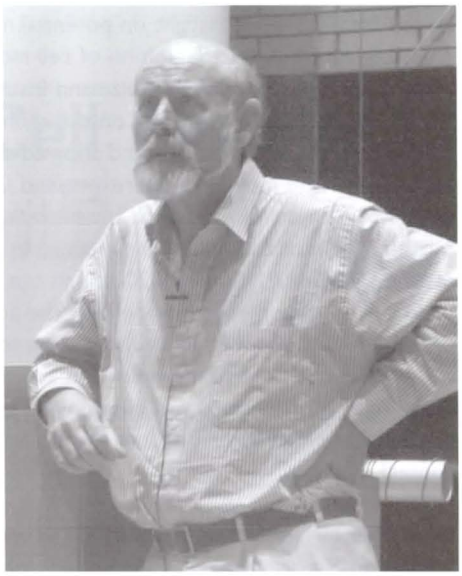
Also still unclear, and needing more attention, is the issue of precisely how growing filaments lead to the membrane being pushed forward. Pollard controversially proposed that since the Arp2/3 branches are stiff and the filaments are flexible, the actin filaments might act like springs that elongate and recoil against the membrane.

Abercrombie was clearly a pioneer of movie making and at this meeting there were several he would have been proud of. Many of the powerpoint presentations climaxed with spectacular, often multicoloured, time-lapse movies. Seeing these films highlights that cell behaviour is a very dynamic business and extremely difficult to figure out simply from fixed cell studies alone.

John Condeelis (Albert Einstein College of Medicine, NY, USA) discussed his fascinating studies of chemotaxis of rat mammary adenocarcinoma cells. His lab has developed a live animal cell migration assay where GFP-labelled carcinoma cells are transplanted into host animals and multiphoton microscopy is used to track the movement of these cells as they leave the tumour mass. The movies reveal that carcinoma cells move in an amoeboid fashion and that their movement proceeds along linear tracks. Interestingly, they polarise at blood vessels in a 'relay' chemotaxis response associated with macrophages – seemingly, the two cell types are mutually attractive.

James Nelson (Stanford University, USA) used time-lapse movies to describe cell behaviour in the moments as a cell transits from the active

Below and right: Abercrombie poster prize winners. Sylvia Benesch (German Research Centre for Biotechnology, Braunschweig) won a year's subscription to *Nature Reviews Molecular Cell Biology*; Rafika Athman (Institut Curie, Paris, Daniel Louvard's lab) won a year' subscription to *Nature Cell Biology*



Above, left to right: Robert Insall (Birmingham); Clare Waterman-Storer (Scripps, La Jolla); and Daniel Shotton (Oxford). Pictures courtesy of Natalie Andrew.

migratory phase to the assembly of cell-cell adhesions as MDCK epithelial cells make contact with one another. His lab's studies show that just after contact is made, both cells continue to extend lamellae at their interface – this cell ruffling was beautifully demonstrated with GFP-labelled cell margins.

Nelson believes that this continued lamellar protrusion initially spreads and expands the cell-cell contact zone; subsequent actomyosin contraction develops at this contact interface and is what drives the assembly of a compacted cell-cell adhesion.

Rick Horwitz (University of Virginia, USA) described some exquisite time-lapse confocal microscopy experiments in which they observe the formation, turnover and trafficking of adhesions in migrating cells. By co-expressing pairs of adhesion molecules fused to GFP analogues, the Horwitz lab has developed a sequential model for the formation of adhesions with the first component to localise being FAK, followed rapidly by paxillin, GIT1 and alpha-actinin. Disassembly of the adhesion, by contrast, is not sequential; rather, it appears to be a concerted collapse and loss of the constituent proteins.

Some of the attendees at this meeting had worked with Michael Abercrombie; Joan Heaysman who has been to all five of the meetings since the 1982 tribute meeting, Adam Middleton and Graham Dunn all gave insights into the history of cell motility studies. **Graham Dunn** (Kings College London, UK) described his new method of photoactivation called FLAP (Fluorescence Recovery After Photobleaching), and showed how using this technique he can track actin transport, both the fast relocation of monomeric (globular) actin and the much slower dynamics of filamentous F-actin simultaneously in living cells.

The punchline from these dynamic studies is that diffusion is almost certainly not the means by which material from inside the leading lamellae travels to the leading edge of the cell.

Several speakers touched on the issue of contact inhibition of movement that had so fascinated Abercrombie in the early years. I spoke about our lab's work on Eph receptor/ephrin signalling and how this may regulate membrane ruffling and subsequent retraction between two contacting cells.

Anna Huttenlocher (University of Wisconsin, USA) also mentioned contact inhibition during her talk, focussing on the role of the calcium-dependent protease, calpain, in regulating detachment of the back end of a migrating cell. She reported the observation that calpain null cells in culture fail to form a monolayer efficiently; instead they pile up on one another suggesting that they might not be contact inhibited. She speculated that calpain may play a role in cells sensing their neighbours and this could be mediated through calpain-triggered cleavage of the adhesion complex component, talin.

Another talk also threw light on potential molecules regulating contact inhibition of cell movement. **Sasha Bershadsky** (Weizmann Institute, Israel) presented his lab's work on the cadherin-binding protein, p120 catenin, and showed dramatic time-lapse movies of overexpressed GFP-tagged p120catenin localised to lamellipodia in migrating cells and at adherens junctions in contacting cells. Since he finds p120catenin can stimulate cell motility through modulating the activity of Rac and Cdc42, while its redistribution to cell-cell contacts abolishes these effects, it seems likely that redistribution of p120catenin is key for the lamellar paralysis that occurs as cells become contact inhibited.

One other highlight of the meeting for us was the session on 'Signalling and Cell Migration' with talks from **Mark McNiven** (Mayo Clinic, Rochester, USA) and **Clare Waterman-Storer** (Scripps Institute, USA) among others. Signalling to the actin cytoskeleton was a strong focus of the last Abercrombie meeting with Rho GTPases featuring high on the agenda. At the current meeting the small GTPases had a somewhat less high profile but another GTPase, this time the large GTPase dynamin, made an appearance with respect to its function in regulation of the actin cytoskeleton.

Mark McNiven presented a novel function for dynamin and its interacting protein cortactin that bundles filaments, in triggering actin filament disassembly; he suggested that these events might be critical for the transition of a static cell into one ready for motility. It is intriguing that dynamin might coordinate and link the processes of endocytosis and actin filament dynamics in the protrusive lamellipodia.

Clare Waterman-Storer presented evidence that Rac1-PAK1 signalling promotes microtubule growth by inhibiting catastrophe through phosphorylation and inhibition of the microtubule-destabilising protein, Op18/stathmin. In turn, these growing microtubules are thought to localise Rac1 activity to the leading edge. These data strongly suggest growing microtubules and Rac1 constitute a self-perpetuating system regulating directed cell locomotion.

This meeting was outstanding and truly inspiring. Because of space limitations we have only mentioned a few of the highlights. A more in-depth report of the meeting by Maryse Bailly and John Condeelis will appear in the December issue of *Nature Cell Biology*. The full proceedings will be published as a book by John Wiley & Sons in 2003 (see box).

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BSCB/BSDB Spring Meeting
Genomics and Proteomics in Cell Biology
University of Warwick, 8-11 April 2003

General information

Dates
8–11th April 2003 (Arrival, dinner and accommodation on 8 April, Conference 9–11 April, depart after lunch on 11 April).

Venue
University of Warwick Conference Park
Central Campus
Coventry
CV4 7AL
Tel: +44 (0) 24 7652 3222
www.warwickconferences.com

Packages available
Full Residential, including:
- Dinner B&B in Single Standard Accommodation, Tuesday, Wednesday and Thursday
- Conference, Tea/Coffee & Lunch Wednesday, Thursday, Friday
- Programme and Abstract Book
- Access to Trade Exhibition and Posters
- Cost: £280 (£305 after 31st January 2003)
- En-Suite upgrade: £30 per night
- Upgrade to Conference Dinner & Ceilidh on Thursday £20

Non-Residential, including:
- Conference, Tea/Coffee & Lunch Wednesday, Thursday, Friday
- Programme and Abstract Book
- Access to Trade Exhibition and Posters
- Cost: £280 (£305 after 31st January 2003)
- Conference Dinner & Ceilidh on Thursday £30

Abstracts
An abstract form and full instructions are available at www.bssb.org. The deadline for abstracts is **31st January**.

Registration
Registration will be open in Rootes Social Building:

Tuesday 8 April	3–10pm
Wednesday 9 April	8am – 8pm
Thursday 10th April	8am – 8pm
Friday 11th April	8am – 1pm

Arrival/Departure
Rooms will be available after 3pm for check in. Please vacate your room by 9.30am on the morning of your departure. You should return you key to reception in Rootes Social Building as soon as possible after vacating the room.

Badges
Conference delegates are required to wear name badges at all times, for security reasons and for catering identification.

Car Parking
Delegates may use car parks 2, 6, 7, 8 or 15 free of charge. No pass is required during vacation time.

Internet Access
Delegates will be able to access their emails at the Management Training Centres, internet access is available in the Business Centres and lecture rooms

Programme

Tuesday 8 April

3:00 Registration and key pick up in Rootes Reception
7:30 Self-service dinner in Rootes restaurant

Wednesday 9 April

7:30 – 8:30 Breakfast in Rootes restaurant
8:00 – 9:00 Poster set up in Arts Centre Gallery (all abstracts)

Arts Centre Cinema

BSCB Session 1 - Signalling and growth control
Chair: Julian Downward

08:30 - 09:00 Giulio Superti-Furga, Heidelberg, Germany - *Towards a proteomic charting of biological processes*
09:00 - 09:20 *Short talk chosen from abstracts*
09:20 - 09:50 Garret Hampton, San Diego, USA - *Genomic analysis of molecular pathway defects in ovarian carcinomas*
09:50 - 10:20 *Trade exhibition & coffee in Gallery*
10:20 - 10:50 Hartmut Beug, Vienna, Austria *Integration of receptor serine and tyrosine kinase signals in epithelial plasticity and metastasis*
10:50 - 11:10 *Short talk chosen from abstracts*
11:10 - 11:40 Julian Downward, London, UK *The use of transcriptional profiling to uncover novel signalling mechanisms acting downstream of the Ras oncogene*

Posters and lunch (in Gallery)
12:00 - 13:50 *Posters on view*
12:30 - 13:50 *Buffet lunch with trade exhibition*

BSCB Session 2 - Cytoskeleton & cell division
Chair: Julie Ahringer

13:50 - 14:20 Buzz Baum, University College London, UK - *From genotype to phenotype - using information to generate form*
14:20 - 14:40 *Short talk chosen from abstracts*

Arts Centre Theatre

BSDB Session 1 - Induction
Chair: Judith Kimble

08:30 - 09:05 Judith Kimble, University of Wisconsin, USA - *Induction of germline stem cells in C. elegans*
09:05 - 09:35 Liz Robertson, Harvard University, Cambridge, USA - *Title to be advised*
09:35 - 09:50 *Short talk chosen from abstracts*
09:50 - 10:20 *Trade exhibition & coffee in Gallery*
10:20 - 10:50 Konrad Basler, University of Zurich, Switzerland - *Title to be advised*
10:50 - 11:20 Caroline Dean, John Innes Centre, Norwich, UK - *Molecular basis for the cold-induced acceleration of flowering*
11:20 - 11:35 *Short talk chosen from abstracts*
11.35 - 12:05 Alex Shier, New York University School of Medicine, USA - *Nodal signalling: From morphogens to morphogenesis*

Posters and lunch (in Gallery)
12:10 - 13:20 *Posters on view*
12:30 - 13:20 *Buffet lunch with trade exhibition*

BSDB Session 2 - Cell fate and differentiation
Chair: Ryoichiro Kageyama

13:20 - 13:55 Ryoichiro Kageyama, Kyoto University, Japan - *Regulation of cell differentiation by the bHLH oscillator Hes1*
13:55 - 14:25 Cynthia Kenyon, University of California, San Francisco, USA - *Genes and cells that regulate the aging of C. elegans*

Social Science Theatre

BSCB Workshop – Organelle proteomics
Chair: Mark Marsh, LMCB, London, UK and Paul Luzio, CIMR, Cambridge, UK

08:30 - 09:00 Paul Dupree, Cambridge, UK - *Arabidopsis proteomics: Investigating plant organelle proteomes*
09:00 - 09:20 *Short talk chosen from abstracts*
09:20 - 09:50 Margaret Robinson, University of Cambridge, UK - *Clathrin-coated vesicle proteins*
09:50 - 10:20 *Trade exhibition & coffee in Gallery*
10:20 - 10:50 John Kilmartin, Cambridge, UK - *Yeast spindle pole body duplication*
10:50 - 11:10 *Short talk chosen from abstracts*
11:10 - 11:40 Ian Fearnley, Cambridge, UK - *Title to be advised*

Posters and lunch (in Gallery)
12:00 - 13:50 *Posters on view*
12:30 - 13:50 *Buffet lunch with trade exhibition*

13:50 - 14:20 Clothilde Théry, Institut Curie, Paris, France - *Exosomes and endosomes in dendritic cell functions*
14:20 - 14:50 Angus Lamond, Dundee, UK - *Title to be advised*
14:50 - 15:20 Michel Desjardins, Montreal, Canada - *Phagocytosis in the post-genomic era*
15:20 - 15:50 *Trade exhibition & tea in Gallery*
15:50 - 16:20 Kathryn Howell, Denver, USA - *Title to be advised*
16:20 - 17:00 *Round table discussion*

Wednesday 9 April (continued)

Arts Centre Cinema

BSCB Session 2 - Cytoskeleton & cell division (continued)

14:40 - 15:10 Ahna Skop, Berkeley, California, USA - *How do cells divide? Using proteomics and genomics to study cytokinesis*
15:10 - 15:40 *Trade exhibition & tea in Gallery*
15:40 - 16:10 Aaron Straight, Boston, USA - *Small molecule approaches to the study of mitosis*
16:10 - 16:30 *Short talk chosen from abstracts*
16:30 - 17:00 Julie Ahringer, Wellcome/CRUK, Cambridge, UK - *Using genome wide RNAi screening to study cell polarity in C.elegans*

Posters (in Gallery)

17:00 - 18:00 *Poster session 1 - core time for presenters*

BSCB Hooke Medal lecture and AGM (Arts Centre)

18:00 - 18:50 BSCB Hooke Medal Lecture
19:00 - 19:30 BSCB AGM
19:30 Self-service dinner in Rootes restaurant

Arts Centre Theatre

BSDB Session 2 - Cell fate and differentiation (continued)

14:25 - 14:40 *Short talk chosen from abstracts*
14:40 - 15:10 Jeff Williams, University of Dundee, UK - *The origins of SH2 domain phosphotyrosine signalling: Multiple STAT signalling pathways that regulate the growth and development of Dictyostelium*
15:10 - 15:45 *Trade exhibition & tea in Gallery*
15:45 - 16:15 Roger Patient, University of Nottingham, UK - *Origins and programming of blood and the cardiovascular system in Xenopus and zebrafish*
16:15 - 16:30 *Short talk chosen from abstracts*
16:30 - 17:00 Andrew Jarman, University of Edinburgh, UK - *Control of cell fate determination in the developing Drosophila peripheral nervous system*

Thursday 10 April

7:30 – 8:30 Breakfast in Rootes restaurant

Arts Centre

Plenary Session

Chair: Fiona Watt, BSCB President
08:30 - 09:20 Lord Sainsbury of Turville, UK Government Minister for Science and Innovation - *Government support for world class bioscience in the UK*

Arts Centre Cinema

BSCB Special Plenary Session - Borden Lecture

Chair: Fiona Watt, BSCB President
09:25 - 10:10 Henry Sun, New York, USA - *Why you shouldn't trust your PhD supervisor*

BSCB Session 3 - Transcription and Replication

Chair: Julian Blow
10:10 - 10:40 Paul Harkin, Queen's University of Belfast, Northern Ireland - *Uncovering BRCA1 regulated signalling pathways by microarray-based expression profiling*
10:40 - 11:00 *Short talk chosen from abstracts*
11:00 - 11:20 *Trade exhibition & coffee in Gallery*
11:20 - 11:50 Peggy Farnham, Madison, USA - *Genomic approaches toward the identification of target genes of human transcription factors*
11:50 - 12:20 Oscar Aparicio, Los Angeles, USA - *Mapping and characterization of replication origins throughout the Saccharomyces cerevisiae genome*
12:20 - 12:40 *Short talk chosen from abstracts*

Arts Centre Theatre

BSDB Session 3 - Organogenesis

Chair: Jonathan Slack
09.30 - 10.05 Jonathan Slack, University of Bath, UK - *Organogenesis and the stability of organ identity*
10.05 - 10.35 Drusilla Roberts, Massachusetts General Hospital, USA - *Roles of the Bmp signalling pathway in gut endoderm, mesoderm and neural development*
10.35 - 10.50 *Short talk chosen from abstracts*
10.50 - 11.20 *Trade exhibition & coffee in Gallery*
11:20 - 11:50 Benny Shilo, Weizman Institute of Science, Israel - *Regulation of epithelial polarity by the Drosophila VEGF/PDGF receptor*
11:50 - 12:20 Ken Zaret, Fox Chase Cancer Centre, Philadelphia, USA - *Patterning the liver and pancreas in the endoderm*
12:20 - 12:50 Gerald Cunha, University of California, San Francisco, USA - *Title to be advised*
Posters and lunch (in Gallery)
12:50 - 13:40 *Posters on view*
12:45 - 13:40 *Buffet lunch with trade exhibition*

Thursday 10 April (continued)

Arts Centre Cinema

BSCB Session 3 - Transcription and Replication (continued)

12:40 - 13:10 Julian Blow, University of Dundee, Dundee, UK - *Proteomic identification of cell cycle-regulated chromosome proteins*
Posters and lunch (in Gallery)
13:10 - 13:50 *Posters on view*
13:10 - 13:50 *Buffet lunch with trade exhibition*

BSCB Session 4 - Cell adhesion & extracellular matrix

Chair: Paul Crocker

13:50 - 14:20 Chris Buckley, Birmingham, UK - *Not all fibroblasts are the same: Selective gene expression using microarrays*
14:20 - 14:40 *Short talk chosen from abstracts*
14:40 - 15:10 Hans Clevers, Utrecht, The Netherlands - *Wnt signaling and colon cancer*
15:10 - 15:40 *Trade exhibition & tea in Gallery*
15:40 - 16:10 Victor Koteliansky, Biogen Inc, Cambridge, MA, USA - *Regulation of gene expression by extracellular matrix*
16:10 - 16:30 *Short talk chosen from abstracts*
16:30 - 17:00 Paul Crocker, School of Life Sciences, Dundee, UK - *Sialic acid binding lectins (siglecs) in the innate immune system*

Arts Centre Theatre

BSDB Session 4 - Genomic reprogramming

Chair: Azim Surani

13:40 - 14:15 Azim Surani, University of Cambridge, UK - *Epigenetic reprogramming and control of genome functions*
14:15 - 14:45 John Gurdon, University of Cambridge, UK - *Nuclear reprogramming in Xenopus*
14:45 - 15:15 Rod Scott, University of Bath, UK - *The epigenetic basis of gametic gender in mammals and flowering plants*
15:15 - 15:45 *Trade exhibition & tea in Gallery*
15:45 - 16:15 Helen Blau, Stanford University School of Medicine, California, USA - *Adult bone marrow derived stem cells: Repair of brain and brawn*
16:15 - 16:30 *Short talk chosen from abstracts*
16:30 - 17:00 Austin Smith, University of Edinburgh, UK - *Pluripotency and lineage restriction of ES cells*

Posters (in Gallery)
17:00 - 18:00 Poster session 2 - core time for presenters

BSDB Medal Lecture and AGM

18:00 - 18:50 BSDB Waddington Medal Lecture
19:00 - 19:30 BSDB AGM0
20:00 Conference dinner and Ceilidh in Panorama Suite

Friday 11 April

7:30 – 8:30 Breakfast in Rootes restaurant

BSCB Session 5 - Development and tissue assembly

Chair: Rick Livesey

08:30 - 09:00 Marc Vidal, Boston, USA - *Mapping the C.elegans proteome*
09:00 - 09:20 *Short talk chosen from abstracts*
09:20 - 09:50 Steve Kay, The Scripps Research Institute, San Diego, USA - *Genetics and genomics approaches to understanding circadian clocks*
Posters and coffee (in Gallery)
09:50 - 11:20 *Poster session 3 - core time for presenters*
10:30 - 11:20 *Coffee with trade exhibition*
11:20 - 11:50 Andrea Brand, Cambridge, UK - *Genomics approaches to Drosophila neurogenesis*
11:50 - 12:10 *Short talk chosen from abstracts*
12:10 - 12:40 Rick Livesey, Cambridge, UK - *Studying forebrain development with single cell expression profiling*

12:00 Self-service lunch in Rootes restaurant

BSDB Session 5 - Disease

Chair: Nick Hastie

08:30 - 09:05 Nick Hastie, Western General Hospital, Edinburgh, UK - *The Wilms' tumour suppressor, WT1 - a multifunctional regulator of genitourinary development*
09:05 - 09:35 Peter Currie, Western General Hospital, Edinburgh, UK - *Genetic control of muscle cell specification and maintenance within the zebrafish embryo*
09:35 - 09:50 *Short talk chosen from abstracts*
Posters and coffee (in Gallery)
09:50 - 10.20 *Poster session 3 - core time for presenters*
09:45 - 10:15 *Coffee with trade exhibition*
10:15 - 10:50 Andrew Wilkie, John Radcliffe Hospital, Oxford, UK - *Apert syndrome: A tale of two nucleotides*
10:50 - 11:20 Ricardo Fodde, Leiden University Medical Center, The Netherlands - *Colorectal cancer - it takes two to tango*
11:20 - 11:35 *Short talk chosen from abstracts*
11:35 - 11:55 Helena Edlund, Umea University, Sweden - *Factors controlling pancreatic beta cell differentiation and function*

Other forthcoming meetings

Chromosome replication to cell division: *40 years anniversary of replicon theory*
18–22 January 2003
Villefranche sur Mer, France
SD Ehrlich: Fax +33 1 34 65 25 21
ehrlich@biotech.jouy.infr.fr

Junior Academics Meeting:
Molecular Mechanisms of Exoctyosis and Endocytosis
23–25 March 2002
Edinburgh
Mike Cousin, Division of Biomedical and Clinical Laboratory Sciences, University of Edinburgh
www.bms.ed.ac.uk/research/meetings/exo2003/exo2003
M.Cousin@ed.ac.uk

BSCB Annual Spring meeting on Genomics and Proteomics in Cell Biology
8–11 April 2003, University of Warwick
(see pages 29–32)

Functional Genomics and Disease
14–17 May 2003, Prague (see page 15)
www.esffg2003.org

European Association of Science Editors:
Eighth General Assembly and Conference
8–11 June 2003, Bath
www.easd.org

FEBS 2003 Meeting on Signal Transduction: *From membrane to gene expression, from structure to disease*
4–8 July 2003
Brussels, Belgium
V Wouters, International Congress and Event Organiser:
Tel +32 2 7795959; Fax +32 2 7795960
febs@iceo.be www.febs-signal.be

International Gap Junction Intercellular Communication conference
23–28 August 2003
St Johns College, Cambridge
Howard Evans, Dept of Medical Biochemistry, University of Wales College of Medicine, Cardiff
Tel/Fax 02920 743133
GAPJUNCTION@cf.ac.uk
www.med.ic.ac.uk/divisions/32/gj/index.htm

CANCER RESEARCH UK
Beatson International Cancer Conference
Co-sponsor
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CELL SIGNALLING AND CANCER

Sunday July 6th – Wednesday July 9th 2003. Glasgow, Scotland

Speakers and Sessions

Keynote Address: F McCormick (US)
Tyrosine Kinases: S Courtneidge (US), M Frame (UK), T Pawson (CA), P Vogt (US)
Kinases and G Proteins I: N. Ahn (US), W Kolch (UK), P Parker (UK), G Vande Woude (US)
Kinases and G Proteins II: J Condeelis (US), C Der (US), C Marshall (UK), D.Schlaepfer (US), S Sebti (US)
Signalling Complexes: R Derynck (US), C Heldin (SE), M Schwartz (US), J Scott (US), L Stephens (UK)
Apoptosis: J Downward (UK), E Hafen (CH), G Kroemer (FR), S Lowe (US)

A number of abstracts will be selected for oral presentation and time is available for late breaking news.

The conference will be followed by a workshop on Real Time Signalling and Imaging, Thursday July 10th

Speakers: P Bastiaens (DE), A Brand (UK), J Condeelis (US), P Martin (UK), T Ng (UK), V Small (AT)

Aims of the conference
To increase the understanding of the mechanisms, and control, of cell growth and metastasis in cancer and how cell signalling molecules are targets for novel therapeutics.

For additional information please contact:
Tricia Wheeler, Conference Co-ordinator, Beatson Institute for Cancer Research, Garscube Estate, Switchback Road, Bearsden, Glasgow G61 1BD, UK
Tel: (24hrs) +44 (0)141 942 0855. Fax: +44 (0) 141 330 6426.
e-mail: t.wheeler@beatson.gla.ac.uk.
Website, on-line registration and abstract submission: http://www.beatson.gla.ac.uk/conf

Deadline for registration; April 11th 2003

The Beatson Institute for Cancer Research · AICR · CANCER RESEARCH UK

Cells V
7–10 September 2003
Ceske Budejovice, Czech Republic
www.entu.cas.cz/cells

BSCB Autumn Meeting: Cell Biology of Cancer
(Jointly organised with BACR)
14–17 September 2003
St Catherine's College, Oxford
www.bscb.org

The American Society for Cell Biology
43rd Annual Meeting
13–17 December
2003, San Francisco, CA
ascbinfo@ascb.org
www.ascb.org

Application to join the BSCB

Please complete and return along with a signed Direct Debit mandate to:
Margaret Clements, Department of Zoology, Downing Street, Cambridge, CB2 3EJ.

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Position: ..... Male/Female

Academic qualifications: .....

Email: .....

Telephone: .....

Fax: .....

Address: .....

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..... Postcode: .....

Research interests: .....

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Membership of other societies:

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BSCB Member	Proposer	Seconder
Name:	.....	.....
Membership Number:	.....	.....
Signature:	.....	.....

Applicants without proposers should enclose a brief CV

The society has an searchable database of its members on the BSCB web page; if you wish your details to be included tick here ☐

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Jointly funded by the BSCB and the Company of Biologists

Honor Fell Travel awards are made to provide financial support for younger BSCB members at the beginning of their research careers to attend meetings. Applications are considered for any meeting relevant to cell biology. The amount of the award depends on the location of the meeting. Awards will be up to £250 for UK meetings (except for BSCB Spring Meeting for which the registration and accommodation costs will be made, even in excess of £250), up to £350 for European meetings and up to £450 for meetings in the rest of the world.

Awards are made throughout the year.

The following rules apply:
- Awards are not normally made to applicants over 35 years of age
- Applicants must have been a member for at least a year
- No applicant will receive more than one award per year and three in toto
- The applicant must be contributing a poster or a talk.

Applications should be sent to

Kathryn Ayscough, IBLS, Davidson Building, University of Glasgow, G12 8QQ.

All applications must contain the following:
- **the completed and signed application form (below)**
- **a copy of the abstract being presented**
- **a copy of the completed meeting registration form**

Application for an Honor Fell travel award

Full name and Work address
(write clearly – this will be used as a return label)

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BSCB Membership number: .....
The years of previous Honor Fell awards:
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Degrees (with dates): .....
.....
Present position: .....
.....

Key publications (2) or research interests:
.....
.....
.....

Number of meetings attended last year:
.....

Meeting for which application is made (title, place, and date):
.....
.....
.....

Estimated expenses: Travel: .....
Subsistence: .....
Registration: .....

Have you submitted any other applications for financial support?
YES NO (delete as applicable). If YES, give details including source and whether these monies are known to be forthcoming:
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Supporting statement by Head of Department:
This applicant requires these funds and is worthy of support. I recognise that in the event of non-attendance at the meeting, the applicant must return the monies to the BSCB and I accept the responsibility to reimburse BSCB if the applicant does not return the funds.
Signature: .....
Name: .....

Applicant's signature: .....
Name: .....

Undergraduate bursaries to attend the BSCB Spring Meeting

Administered through the Honor Fell Travel Award Scheme
Jointly funded by the BSCB and the Company of Biologists

Undergraduate Bursaries are made to provide financial support for undergraduates currently studying cell biology or a related degree subject to attend the BSCB Spring Meeting. The award will cover the registration and accommodation costs of attendance. Travel costs are expected to be met by the University that the undergraduate attends.

The following rules apply:

- Awards are made to undergraduates in their final year of study.
- Applicants must be studying for a Cell Biology or related degree.
- Applications must be accompanied by a half page justification from the student **and** by a supporting statement from the supervisor of studies or course organiser.

Applications should be sent to: Kathryn Ayscough, IBLS, Davidson Building, University of Glasgow, G12 8QQ.

All applications must contain:

- **the completed and signed application form (below)**
- **statements from both the student and course organiser.**

- The statement from the student should include details on why they wish to attend, what they hope to gain and also aspects of cell biology that to date they have found interesting.
- The statement from the course co-ordinator should indicate the course being undertaken by the student and reflect the calibre of the student, their enthusiasm for the subject and why they believe the student will benefit from the experience of attending the meeting.

Application for an undergraduate Honor Fell travel award

Full name and Work address
(write clearly – this will be used as a return label)

.....
.....
.....
.....
.....

E-mail address: .....
Age: .....
Institution attended: .....
Degree course: .....
.....

Main cell biological interests: .....
.....

Supporting statement by Head of Department or Course Co-ordinator: This applicant requires these funds and is worthy of support. The University/Department also agrees to pay the travel costs for the named undergraduate to attend the meeting.

Signature: .....
Name: .....

Applicant's
signature: .....
Name: .....

DEADLINE FOR APPLICATIONS: 17 JANUARY 2003

British Society for Cell Biology
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e-mail: d.archer@cwcom.net

The BSCB newsletter is published twice a year in June and December.

Submission:
If you have an idea for an article please e-mail the editor a brief outline first. Appropriate colour images are welcomed for consideration for the front cover.

It is preferable to send all articles, reports and images by e-mail (though alternatives can be arranged after contacting the editor). Attachments for text are best received in Microsoft Word and images as 200-300 dpi JPEG/TIFF or Photoshop files. Hard copy images can also be sent.

Submission of articles and images should be made to
Dr Joan Marsh, John Wiley & Sons, International House, Ealing Broadway Centre, London W5 5DB. Tel: 020 8326 3846. Fax: 020 8326 3802. e-mail: jmarsh@wiley.co.uk

Meetings:
Please note there is no charge to advertise a scientific or educational meeting. Please contact the editor with details of any meeting you wish to advertise.

Deadlines:
For the final version of articles and other materials and adverts is 1 April for publication in June and 1 October for publication in December.

Please note the first version of any material must be received by the editor at least 2 weeks prior to this deadline so that any changes can be made.

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If you are still paying by standing order, please cancel it and set-up direct debit (form on p29). Those members who do not have a UK bank account should pay by bankers draft in pounds sterling payable to 'the British Society for Cell Biology'.

New members should complete an application form to join the BSCB (form on p28) and include it with their subscription dues. Send direct debit forms, bankers drafts and any membership application forms to Margaret Clements, Department of Zoology, Downing Street, Cambridge, CB2 3EJ.

Journals
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- *Journal of Cell Biology* **special 2002 discounted subscriptions** $365 print, $55 online or $420 for both print and online;

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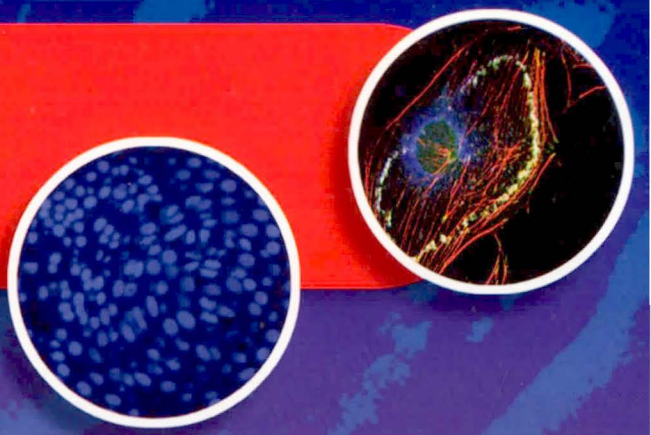

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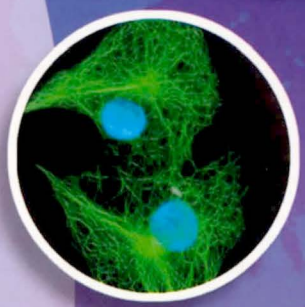

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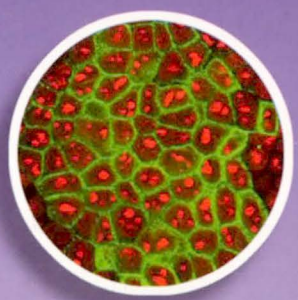

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