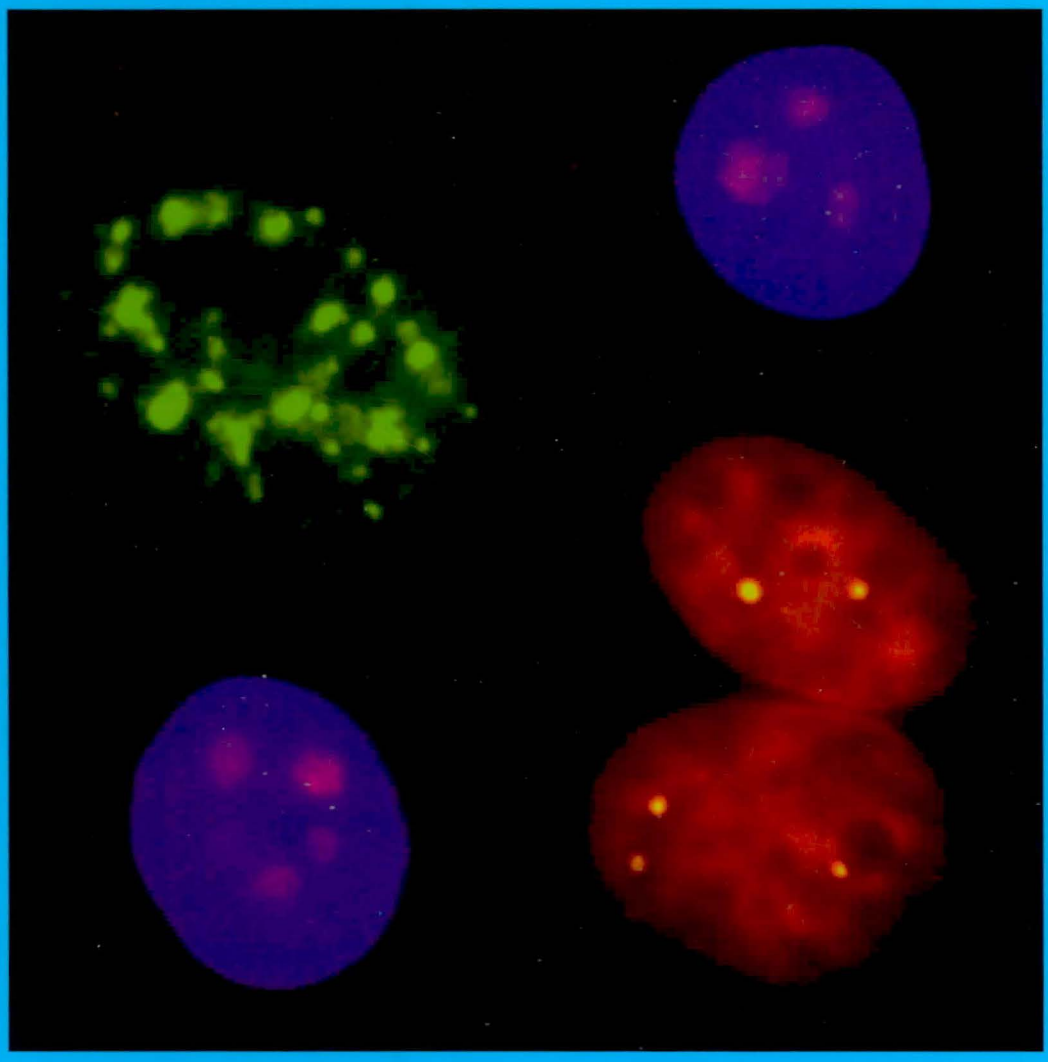
BSCB NEWSLETTER



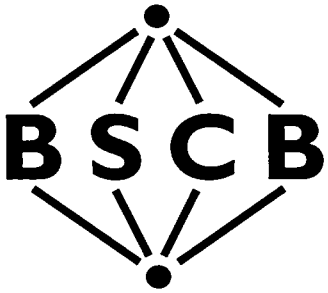
BRITISH SOCIETY FOR CELL BIOLOGY

BSCB

June 1998

INSIDE

BSCB Newsletter
June 1998



Contents

Newsletter editor: Kathryn Ayscough (from July 1998)
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The front cover shows microdomains in the mammalian cell nucleus: nucleolus (magenta), coiled body (yellow), and splicing factor domains (green).

The BSCB newsletter is published twice a year, June and December

Guidelines to Contributors
These guidelines apply to commissioned articles and images, to articles and images that members of the BSCB or interested parties would like to submit to the newsletter (see invitation below), and to material from members of the BSCB committee. The BSCB newsletter also accepts commercial advertisements – see advertising information.

Submission of text: Send the first version in the body of a normal e-mail (not as an attachment). If you do not have access to e-mail, please contact Kathryn Ayscough (address below). Once this has been accepted, submit the final version including all editorial changes, on a floppy disk (preferably in Microsoft Word) and a printed hard copy. Write your name, title of the article, and contact address on the floppy disk. If possible please include one or more images to accompany the submitted text (for example, a picture of the author(s), a picture to illustrate part of the text). Note for members of the BSCB committee, any standard requirements for the newsletter need only be submitted by e-mail and the first/final version requirement is not applicable. For non-standard articles from the Committee, the full procedure applies as above.

Submission of images: submit on a floppy disc, or as a high quality print. For images submitted on disk a printed hard copy must also be supplied (this is for layout purposes only and need not be high quality). Write your name, title of the image, and contact address on the floppy disk and on the reverse of the printed hard copy. Indicate the top of the image. A figure legend should be supplied on a disk and as a hard copy. Electronic files may be JPEG, TIFF or photoshop (300dpi preferred). Line drawings may also be PICT or Adobe illustrator. Preference is given to colour images for the front cover. Images for inside pages may be supplied as grey scale or colour, but will be printed as greyscale.

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If you have an idea for an article please e-mail a brief outline first. Images for consideration for the front cover and inside pages are very welcome. Please submit as above. Please also state whether the image is for consideration for: front cover only, inside pages only or front cover first choice, with automatic consideration for inside pages second choice. Suggestions for images are those that highlight the research in your laboratory, a recent publication from your group, or a review of recent progress in a field.

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Supply either on a floppy or zip disk for Macintosh (Quark version 4, Quark version 3.32, JPEG, tiff or photoshop) with margins: top 26mm, left/right/bottom 20mm. Page size 218x280mm. Alternatively, supply film: single/four colour positive, right reading, emulsion down, screen 133x150. **Please note, there is only one colour advert slot per newsletter.**

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There is no charge to advertise a scientific or educational meeting. Submit as for guidelines for contributors, above.

Submit all articles, images, committee items, and adverts, as per instructions to:
Kathryn Ayscough, Dept of Biochemistry, University of Dundee, Dundee DD1 4HN. Tel 01382 345689 (office); Tel 01382 345864 (lab); Fax 01382 322558; E-mail: KAYSCOUGH@bad.dundee.ac.uk

Deadlines for receipt of the *final* accepted version of articles and all other materials, and adverts:
[Note, the first version of articles from any contributor and any unformatted meetings information from the Committe should arrive two weeks before these dates].
April 7 for publication in June issue, or 6 weeks after the commission of an article, which ever is the earliest.
October 1 for publication in December issue, or 6 weeks after the commission of an article, which ever is the earliest.

Subscription information
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Pay by direct debit (form on p30). If you are still paying by standing order, please cancel it and set-up direct debit. 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 also complete an application form to join the BSCB (form on p29) and include it with their subscription dues.
Send direct debit forms, bankers drafts and any membership application forms to Steve Winder, membership secretary, Institute of Cell and Molecular Biology, University of Edinburgh, Michael Swann Building, Kings Buildings, Mayfield Rd., Edinburgh EH9 3RJ.

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Invoices: send to Stuart Kellie, BSCB treasurer, Yamanouchi Research Institute, Littlemore Hospital, Oxford OX4 4XN

The BSCB supported lecture at the 1998 Annual Meeting of the Association for Science Education

University of Liverpool

The meeting was held from 8–10 January 1998 at the university and with mild weather prevailing attracted over 3000 teachers, advisers, consultants and inspectors.

The BSCB lecture entitled 'Cell Cycle Control' was given by Paul Nurse FRS, Director-General, Imperial Cancer Research Fund on Friday 9th January at 1400hrs. The lecture attracted eighty-nine delegates and registered one of the highest levels of attendance at the annual meeting. It appears that the lecture with its aim, approved by BSCB President Ron Laskey, of presenting "a topic from research in cell biology which will probably have a major impact on biology or challenge current thinking", is becoming an established event and one looked forward to by delegates.

As delegates arrived at the lecture they were welcomed and given a lecture leaflet, written by Paul and produced by Theo Bloom, together with a Cell Cycle Poster kindly donated by Calbiochem.

A formal welcome to the session was given by David Archer who explained the aim of the annual lecture and thanked Calbiochem for the posters. David Edgar, BSCB committee member from the University of Liverpool chaired the lecture and introduced Paul Nurse. An ohp film produced by David summarized Paul's outstanding research career.

In his lecture Paul took his audience through a quick history of biology with particular reference to cells from the observations of Darwin on Life, through Leeuwenhoek and his microscope to Schwann and then to Watson and Crick. On the way, he mentioned how important it was that in any hereditary system a little variability should exist each time cells divide. Paul then described the G1, S, G2 and M stages of the cell cycle emphasising the function of checkpoint controls in arresting the cycle if preceding operations are not complete, are not on time or have gone wrong. To put it positively the checkpoints bring about an orderly progression through S phase and mitosis. The point was also made, and well illustrated with a slide, that Cyclin-dependent kinase (CDK) activity rises through stages G1, S, G2 and M and then falls. A graph showing this appears in the lecture leaflet.

Paul next talked about some of his own work on fission yeast *Schizosaccharomyces pombe*. He explained how important it was to keep looking for mutants and to develop the idea of using 'thought experiments'.

The final part of the lecture was directed to explaining how genetic studies had been used to elucidate the mechanisms underlying cell cycle control especially those focusing on the cell division cycle 2 (CDC2) gene.

At the end of the lecture, David Edgar thanked Paul for his presentation and invited questions. The applause from the audience and comments from three people as they left indicated the warmth with which the lecture and Paul's humour had been received.

The lecture leaflet together with details of virtual mitosis on the WWW is printed on the following pages. If you do not have time to read the leaflet do read Paul's choice of a quote from Schwann for the leaflet front cover. It really is amazing that this was written 159 years ago.

School News

BSCB lecture leaflets like the one reprinted in this edition of the NEWSLETTER are now distributed to

members of ClubBio. This is a subscription mailing service for teachers run by the Biochemical Society. There are over six hundred on its list and membership is growing. This is partly as a result of ClubBio being recognised as a provider of good quality information.

Initial Teacher Training National Curriculum

The Teacher Training Agency, a Government body, has produced consultation documents containing proposals for items to be included in a curriculum for Initial Teacher Training. The following is a list of most of the points connected to cell biology but due to shortage of print space they cannot be set in context.

"In order to teach 'A' level biology effectively" the document proposes "trainees must know and be secure in their understanding of the following principles at degree level" – functioning of cell membranes; transport mechanisms within and between cells; enzyme kinetics; microstructure of mitochondria and chloroplasts; neurotransmission and hormonal action at a cellular level; structure and synthesis of building blocks (proteins, fats, carbohydrates, and nucleic acids); the role of ATP synthesis; genetic mapping and modification; genome concept; mechanisms for gene expression and the significance of cellular differentiation.

For 'A' level chemistry the list includes: the role of nucleic acids in protein synthesis, the structure of DNA and RNA and their relationship to the genetic code.

Trainees for primary school science "must demonstrate that they know and understand life processes" in the appropriate Programmes of Study. To support this they will need for example to know that: all organisms are made up of cells; almost all cells have a nucleus which controls the activities of the cell; the different cells in an organism have the same genes; reproduction results in the genetic material of organisms, DNA, being passed on to future generations; before reproduction, the genetic material of an organism is replicated; mutations inevitably occur during the process of DNA replication and that most biologists believe that the accumulation of occasional beneficial mutations over very long periods gradually leads to evolutionary change.

David Archer
BSCB Schools Liaison Officer
194 Silverdale Road
Earley
Reading
RG6 7NB.

A copy of the leaflet on cell cycle control composed by Paul Nurse and distributed at this year's ASE conference follows overleaf. It can be photocopied two-sided and folded down the middle; the BSCB is happy for copies to be distributed copyright-free within educational institutions.

Further reading:

Murray, A. and Hunt, T. (1993) **The Cell Cycle: an Introduction**. W.H. Freeman & Co, New York.

Nurse, P. (1993) **Cell cycle control.** *Phil. Trans. Roy. Soc. Lond. B* **341**:449-454.

Weinberg, R. A. (1996) **How cancer arises** *Scientific American, September issue.*

Nurse, P. (1993) **Regulation of the eukaryotic cycle.** *Eur. J. Cancer* **33**:1002–1004.

Virtual mitosis:
http://www.biology.uc.edu/vgenetic/mitosis/mitosis.htm

http://www-leland.stanford.edu/group/Urchin/mitosis.htm

BRITISH SOCIETY FOR CELL BIOLOGY

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UK

BRITISH SOCIETY FOR CELL BIOLOGY

Dispatches from the Frontiers of Cell Biology:

Cell Cycle Control

by Paul Nurse
Cell Cycle Laboratory, Imperial Cancer Research Fund, 44 Lincoln's Inn Fields, London WC2A 3PX

Contents:

Keywords: Cancer, Cell cycle, Cell biology, Division, Mitosis

"We have seen that . . . cells are formed and grow in accordance with essentially the same laws; hence, that these processes must everywhere result from the operation of the same forces."

Schwann, 1839

Introduction

The cell cycle is the process by which cells duplicate themselves, grow, and prepare to divide again. It is the basis for the reproduction and sustained growth of all living organisms, and its control is also important for the proper understanding of cancer, because cancer can occur when cell cycle regulation fails. In recent years the basic mechanisms underlying cell cycle control have been unravelled, and shown to be common to living organisms from yeast to humans.

Definitions

Cell cycle: The series of events necessary for the reproduction of a cell from the time of its birth to its division into two daughter cells.

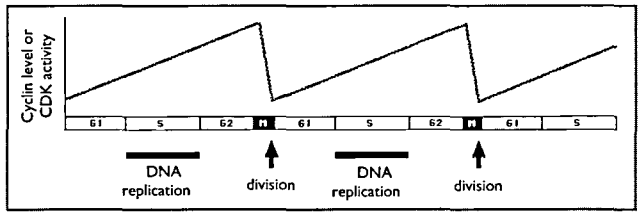
S-phase: The 'DNA synthesis' portion of the cell cycle, when the DNA making up the chromosomes replicates so that there is one complete copy available for each daughter cell.

Mitosis: The process by which the replicated chromosomes become equally segregated into the two daughter cells.

Cyclin-dependent kinases (CDKs): Protein kinases are enzymes that transfer phosphates onto other proteins, thereby changing their function. CDKs are a special class of kinases, each of which has two components, an enzymatic kinase which transfers the phosphate and a cyclin component necessary to activate the enzyme. CDKs are central to control of the cell division cycle.

Control of the cell cycle

Two major events, S-phase and mitosis are required for all cell cycles; they ensure that both of the newly divided cells receive a full complement of chromosomes. If these events are not properly completed in the correct sequence, then the newly divided cells will not receive the full, set of genes required for all cellular activities; daughter cells then either die or sustain genetic damage and so can no longer function correctly. Controls acting during the cell cycle are necessary to bring about an orderly progression through S-phase and mitosis and to couple these two processes with cell growth.



A schematic representation of key events of the yeast cell division cycle

Genes and mechanisms

Genetic studies have revealed the mechanisms underlying cell cycle control. Mutants were isolated in yeast which either failed to divide properly or which divided more rapidly than normal. The mutants had defects in genes which control the rate of progression into S-phase and mitosis. The most important gene was called *CDC2* (for cell division cycle 2). Yeast cells lacking the *CDC2* gene could not undergo either S-phase or mitosis, and so never divided but continued to grow in size. Cells containing a more active *CDC2* gene than normal divided more rapidly than they could grow, producing very small cells. The human *CDC2* gene was discovered because when it was introduced into yeast cells defective for yeast *CDC2*, the cells could now divide properly — human cells contain a *CDC2* gene which could carry out exactly the same function as the yeast *CDC2* gene. The basic mechanism of cell cycle control is probably the same in all living organisms.

The yeast *CDC2* gene encodes a protein kinase which interacts with another protein, called cyclin, whose abundance varies during the cell cycle. At a low threshold of kinase activity, S-phase takes place, and at a higher threshold mitosis takes place. For cells to leave mitosis, activity must drop to a low level which triggers division. An increase in activity leads once more to the S-phase of the next cell cycle. In more complex cells there are several more specialised CDKs in addition to CDC2.

The cell cycle and cancer

Cell cycle controls must be activated in cancer cells for them to undergo division and form a tumour, and defective controls can lead to genetic damage which promotes the development of cancer. So, cell cycle control is central to understanding cancer, and the proteins that control the cycle provide new targets for treating the disease.

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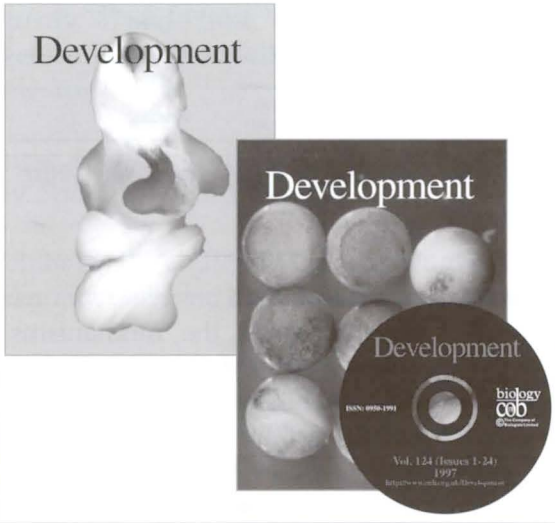

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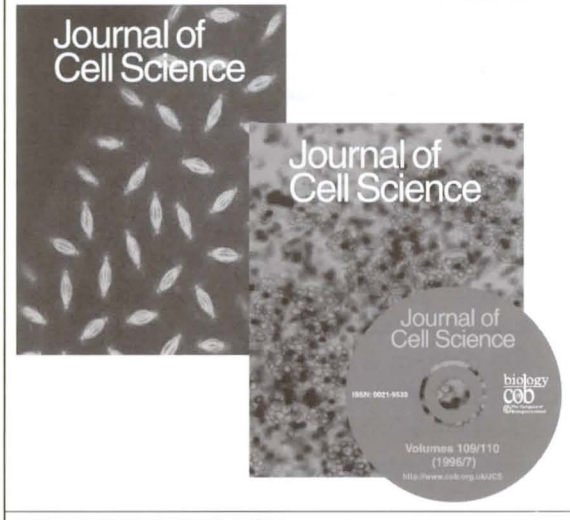

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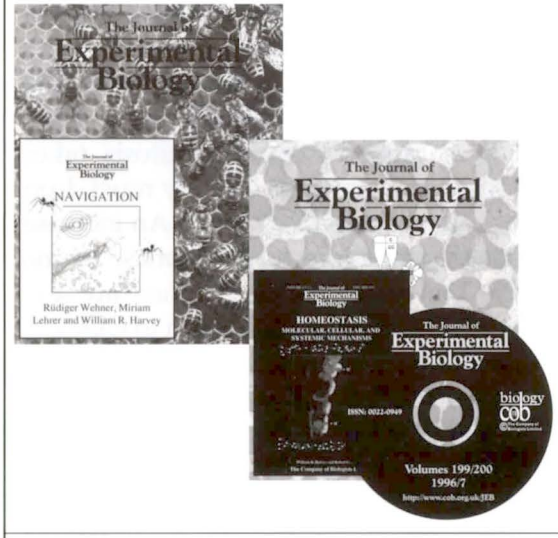

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An overview of The Wellcome Trust

The Wellcome Trust usually comes to mind when thinking about organisations which fund biomedical research. It is a charity with a history of supporting first class science and it is committed to building and maintaining the UK's prominence in scientific research. It is a well-respected organisation but, like many large concerns, not everyone understands everything about it.

There is sometimes confusion about its relationship to the pharmaceutical company GlaxoWellcome and misunderstanding of its reasons for not funding in certain areas. Also, many people may not be aware that it does a huge amount of work to promote the public understanding of science as well funding research.

The Trust was founded in 1936 on the death of the philanthropist and entrepreneur, Sir Henry Wellcome. In his will he left his entire estate, including the share capital of his pharmaceutical company, the Wellcome Foundation, in trust, stating that the money should be used to "*support scientific research which may... conduce to the improvement of the physical conditions of mankind*".

Income from Sir Henry's company enabled the Wellcome Trust to distribute nearly £182 million between 1937 and 1986. In the mid 1980s the company was floated on the stock exchange. There were two share sales in 1986 and 1992. Then, in 1995 almost all of its remaining shares were sold to Glaxo, leading to the creation of the pharmaceutical giant GlaxoWellcome.

The Trust is now independent of the pharmaceutical company which partly bears its name, though it does own 4.7% of GlaxoWellcome shares and, of course, both the Trust and the company have historical links to Sir Henry Wellcome. The income generated by the share sales are invested widely in stocks and shares, property and other investments. It is the income from these investments which provides the Trust with its funds for ploughing into research.

The founder of the Wellcome Trust, Sir Henry Wellcome (1853–1936).

Now with an asset base of about £10 billion, the Trust is able to make available around £250 million each year for biomedical research. Nine governors – seven eminent scientists and two senior company board directors – are responsible for the Trust's policy making. A director is in charge of an executive management board of nine members.

It funds in three broad areas, primarily through the UK university system. It awards grants for basic and clinical science related to human and veterinary medicine; the public understanding of science; and research into the history of medicine. Each application is thoroughly peer-reviewed by independent referees from within the research community and the final decision on making an award is taken by experts who sit on one of eight panels. These panels meet five times a year and their specialist areas include molecular and cell biology, neuroscience, population studies and the history of medicine.

The Trust is also committed to assisting the career development of scientists in the UK and overseas and has a number of programmes for individuals, from PhD studentships through to Principal Research

The Sanger Centre at Hinxton, Cambridgeshire.

Fellowships, for scientists at readership or professorial level who have at least ten years, post doctoral research experience. Special programmes cater for areas of science which are under-resourced or which the Trust believes to be highly relevant to future health-care, such as mental health, cardiovascular disease, veterinary research, and tropical diseases, a subject of particular interest to Sir Henry Wellcome.

At present, roughly one in four grant applications is successful. Due to the diverse nature of the Trust's interest in medical science, these cover a huge range of topics. Among recent awards made by the molecular and cell biology panel is research into asthma which will help develop new approaches to treatment of this increasingly prevalent disease. The research is based on an innovative cell biological investigation which will look at the mechanism by which the airway epithelium is damaged, thus exacerbating the disease. Another project will examine the role of coated vesicles in mouse cells. Information about their function in mice could help research into certain human genetic disorders.

The Wellcome Trust funds a number of large units attached to universities in the UK. One which has benefited from its long term commitment is the Wellcome Trust Centre for Cell–Matrix Research at the University of Manchester. The Centre's location encourages good working relationships between basic scientists and academic clinicians and has created a focus for research in cell–matrix biology in this country. It is home to over 120 research staff and sixteen independent research groups.

The one area of research which the Trust does not directly fund is cancer. This is because the Trust believes that this disease receives substantial funds via the government and from charities dedicated to finding a cure. That said, a lot of the work which the Trust does fund, in cell biology and in genetics, for example, does contribute to understanding the way in which the disease works and how it might be treated.

Its charitable status, independence from government, the funds it has available and its ability to react quickly to scientific priorities means that the Wellcome Trust is often in an ideal position to take major projects forward. The Wellcome Trust Genome Campus is just such a venture. It demonstrates the Trust's commitment to genetics and it represents the UK's major contribution to the Human Genome Project. Scientists at the Trust's Sanger Centre at the Campus are on course to sequence one sixth of the human genome by 2002. At the same time they are sequencing the genomes of other organisms such as the nematode worm, and of pathogens such as the bacteria causing whooping cough and leprosy. Last December they completed the sequence of teh bacterium responsible for tuberculosis.

However, it is not only biomedical science that the Trust is interested in. Equally important to it is the public's understanding of biomedical science. This is especially relevant now as medical advances are moving so breathtakingly fast and can have a huge impact on the lives of ordinary people who, for instance, could be the carrier of a genetic disease or may know that there is history of breast cancer in their family. What do they do with this knowledge? What choices do they make? How society tackles these ethical issues are addressed under the Trust's Medicine in Society programme which seeks to find ways of informing the public about scientific progress and engaging them in debate about the consequences. Activities in this area include exhibitions, public debates, conferences

The Library of the Wellcome Institute for the History of Medicine contains a vast collection of manuscripts, illustrations (such as this cartoon, 'The Greatest Men in England'), paintings and books.

and social research. Under a new funding programme, grants are available for research into biomedical ethics.

The third area of the Wellcome Trust's work is the History of Medicine. Sir Henry Wellcome was an avid collector of all things linked to medicine and was fascinated by its development since ancient times. His collection of manuscripts, illustrations, paintings, books, and a wealth of items related to health and medicine from all over the world were the basis for the Wellcome Institute for the History of Medicine. Researchers can use his collection at the Trust's Library, which contains some 500,000 printed books dating from the fifteenth to the twentieth centuries, and also at the Science Museum in London, where two galleries are devoted to items once owned by Sir Henry. The collection is constantly updated so that it includes materials belonging to the present day. The Wellcome Institute provides resources and teaching facilities for anyone with a serious interest in the history of medicine and associated subjects. It runs both post and undergraduate courses in association with the University College London and offers grants to researchers for studying aspects of the history of medicine.

Sir Henry Wellcome had a huge vision which encompassed the history of medicine, art, the public understanding of science and the biomedical research. This vision has allowed the Wellcome Trust to take a very broad and open approach to its work. It means that it can support artistic creativity as well as academic excellence. It can look to the past for answers and yet think ahead to influence health and medicine of the future. The Wellcome Trust will continue to fund the best examples of work that it can, ensuring that the wishes laid out in the will of its founder are fulfilled.

Further information about the Wellcome Trust is available on its website at www.wellcome.ac.uk and in its quarterly magazine, *Wellcome News*. A handbook, *Grants and Support for Biomedical Research*, can be obtained from:

The Wellcome Trust
183 Euston Road
London NW1 2BE
Tel: 0171 611 8888.

Catherine Nestor
Chief Press Officer
The Wellcome Trust

Photographs courtesy of the Wellcome Trust Medical Photographic Library.

AWiSE

The Association for Women in Science and Engineering was founded following the publication of the 1994 report from the OST "The Rising Tide", on how women's potential might best be realised. AWiSE was launched in a number of places, and branches were formed in London, Oxford, Cambridge, Wessex, the Heart of England, Sussex, the Northeast and elsewhere.

Activities were various: open lectures, scientific and social meetings, visits, contributions to Science Week, 'girls into science' workshops, mentoring, networking in general – sharing information on education, training, retraining, and the job market, promoting women and family friendly practices, country walks in the Heart of England.

The Wellcome Trust gave us an office in London, but founding a national association with a constituency of several thousand women, in the sciences from biomedicine to mathematics and the social sciences, in engineering and the technologies, in education, administration and the media at all levels and across the country takes time. Much fundraising has been needed to cover administrative costs. The crowning contribution was an award from the DTI, under their Professional Institutions Network Challenge to promote use of the Internet. This has enabled the development of the Website www.awise.org and wider networking with sister organisations, working towards linked or collaborative Websites for women in SET.

AWiSE members receive a quarterly journal "Forum" and hear about activity in their neighbourhood. Subscription rates for national AWiSE are £5 a year for undergraduate and graduate students, £10 for people on low incomes or unemployed; the standard rate is £20, and you can be a Founder (10 year) member for £200. Men are welcome as associate members at these rates. Corporate membership is available for organisations, and reciprocal membership, exchanging publications, for sister organisations.

Association for Women In Science and Engineering

To join AWiSE or for further information visit the Website at www.awise.org or write to the Administrator:

Dr Christine Linfield,
Beech Cottage,
Barnecourt,
Moretonhampstead,
Newton Abbot,
TQ13 8QU.

Surveying the State of the Art

Cell biologists currently face a number of practical concerns in addition to the pleasures, excitements and pitfalls of conducting experiments. These concerns range from the balancing of work and homelife in dual career families, career progression in academic life, and the development of alternative career paths in the face of growing pressure on existing resources. A number of organisations have recently carried out surveys which address various aspects of these issues in life science research. This article describes the surveys and their major conclusions.

The upcoming millenium provides an extra impetus to the traditional end-of-century activities of reviewing the past and surveying the future. A current, widely-shared perception amongst biologists is that the flow of new information from the genome projects is galvanising changes in research practices. In addition, funding resources remain tight and there are now more active scientists than ever before; this raises questions both as to the prioritisation of research activities and to practical questions of career direction for non-tenured scientists. These perceptions and the questions they raise extend beyond national boundaries.

It is important that millenial prognostications should be backed up by accurate information. First and most obviously, to help individuals in their decision-making. Secondly, and perhaps less obviously, to provide information for individuals who can be proactive in communicating to politicians that the pursuit of biomedical research is an activity of national interest and importance. Although not fashionable in the UK, grass-roots lobbying by individual scientists through their societies has proved effective in exerting leverage on Members of Congress in the USA.

A number of surveys have recently been conducted which provide information on the state-of-the-art within the life sciences. Each has focused upon a different aspect of the profession and each has yielded some unexpected insights. Here, I review some of the major conclusions.

A continuing preoccupation in several surveys has been the nature of the academic climate for women and minorities, and how this may be improved. Whilst this may yet appear a "minority issue", it is important to realise that the existence of increasing numbers of dual-career households has converted matters traditionally regarded as women's concerns into broader social issues. It is also recognised that attention to improving the climate for minorities invariably has a positive impact on the overall climate (1).

In demographic terms, female students make up around 50% of the undergraduate population in the biological sciences, yet around 25% of positions at lecturer/assistant professor level are filled by women and this percentage falls into the single figures at professorial level : the so-called "leaking pipeline" phenomenon (2). A study of peer-review scores for post-doctoral fellowships in Sweden provided evidence that female applicants need to be two and a half times more productive in publication than male colleagues to obtain the equivalent peer-review rating (3). The results of this survey thus appeared to offer reasons why, in Sweden at least, it would prove relatively harder to pursue a scientific career.

Similar surveys were subsequently carried out by the Wellcome Trust and Medical Research Council within the UK, by audit of the applications made for project grants or research fellowships. These surveys found no evidence for gender-bias in grant awarding practices (4). The surveys did, however, reveal something surprising in that the percentage of appplications by women for project grants was

unexpectedly low: 20% of the applications made in 1996. The reasons behind this are not known at present. It may be conjectured that the low percentage reflects a symptom, rather than a cause, of any unfavorable features within the academic climate.

Further along this line of enquiry, the results of a survey which specifically sought to address existing conditions and catalyse change within the USA have recently been published by the Association for Women in Science (AWIS) (5). Rather than simply seeking raw demographic information, this survey took the approach of analysing the existing "climate" at three institutions of academic excellence with proven success in supporting diversity of students and staff. The analysis was conducted by collecting background statistical information, by surveys and questionaires to students and staff and by conducting site visits at the institutions. Overall, the report offers a series of guidelines for policy, informal advice and mentoring based on the common principles identified through the three levels of the survey (5).

Obviously, these surveys have focused upon the current reality for those undertaking a traditional, university-based academic career path. As indicated at the begining of this article, a number of considerations now provide an impetus towards developing alternative types of career. The satisfactions and concerns of individuals now pursuing alternative options to traditional research and teaching (for example, scientific publishing or patent law) have not been addressed by survey, yet such information could be very useful to undergraduates, graduate students or postdocs. In addition to tangible factors such as funding resources or numbers of participants, intangible factors such as attitude also have a role to play in determining the state-of-the-art. Such issues have not been addressed by survey within the UK, but have recently been undertaken by the ASCB. During the last year, the ASCB Education Committee has undertaken a large scale survey of the membership with the aims of obtaining factual data on the state of the profession and to probe the attitudes of ASCB members towards their chosen careers. The survey also solicited ideas for possible solutions to concerns or issues which the respondants perceived as highly pressing.

The survey was successful in achieving a high rate of response to the questionaires. The data gathered has yet to be published in the form of an Executive Summary and we hope to feature the main findings in a subsequent article. Whilst aspects of this survey relate specifically to the practice of Cell Biology within the USA, the size and scope of the survey will surely yield food for thought to many UK cell biologists. In conclusion, although we are living in changing times for biological research, the flow of information from various surveys provides a unique documentation of these times.

References

1. Dresselhaus *et al.* (1995) Report on NSF sponsored site visit program on improving the climate for women in physics.
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3. Wennera and Wold (1997) *Nature* 387: 341–343.
4. Grant *et al.* (1997) *Nature* 390: 438.
5. Didion *et al.* (1998) *AWIS Magazine* 27: 23–27.

Websites:
http:// www.wellcome.ac.uk
http:// www.mrc.ac.uk
http:// www.awis.org
http:// www.ascb.org

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BSCB Spring Meeting: Cellular localization, Functional microdomains within the cell

Lancaster University 31 March -3 April, 1998

This year's meeting addressed one of the most fundamental questions facing us as cell biologists, of how regional differences are set up inside plant and animal cells. While there has been considerable research into signals that target proteins to specific organelles in eukaryotes it is becoming increasingly apparent that there exists within the cytosol and various organelles, microdomains to which proteins become localized.

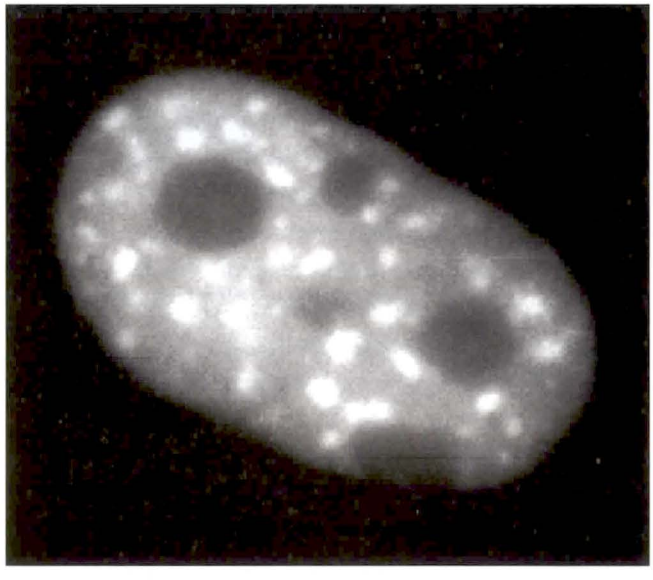
Two of the meeting sessions addressed how proteins might become associated to form such complexes and domains and the possible functions of these structures. A third session took a broad view of mechanisms of cell polarity and how cells organize their constituents to facilitate morphogenesis. In addition to the main sessions there was a two part workshop 'Optical Tools in living cells' which considered many of the recent technical advances that are greatly facilitating studies in the field.

Session 1: Nucleus

The recent interest in microdomains within the cell nucleus was reflected in the first session dedicated to nuclear organization and function. **Ron Laskey** gave an overview of the import of proteins into the nucleus, pointing out that not all import signals follow the classical consensus sequences and that novel signals are still being found. He also described how by using antibodies against components of the replication machinery the cellular organization of replication can be analysed morphologically. Interestingly, some of these antibodies have proven extremely useful in the development of a novel assay for the detection of proliferating cells in a vastly improved cervical cancer smear test.

Angus Lamond reported on one particular nuclear body, the coiled body, which was discovered almost a hundred years ago, but still little is known about its function. Mutational analysis of one of the coiled proteins and phosphatase inhibitor studies indicate that the structure and localization of this nuclear body is dependent on protein phosphorylation. In support of this idea, a novel nuclear form of protein phosphatase 1, p99, has been identified which can be found in coiled bodies. The mutational studies also suggest that the coiled body is a dynamic nuclear structure.

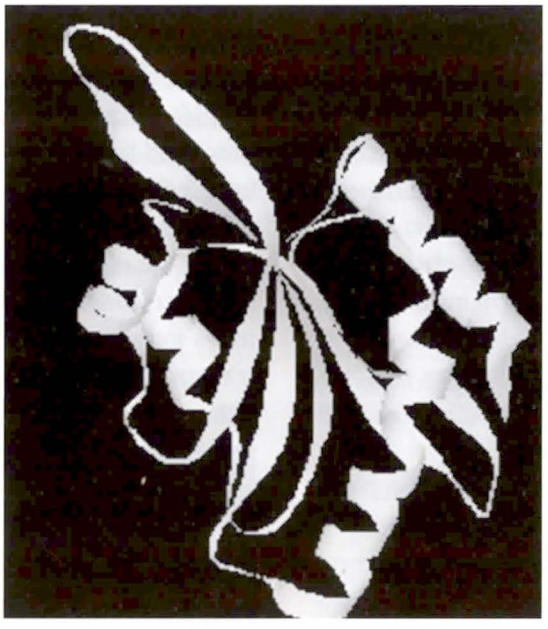
Using the green fluorescent protein (GFP) the dynamic properties of the nuclear microdomains in which pre-mRNA splicing factors are concentrated were described by **Tom Misteli**. Time-lapse microscopy in living cells demonstrates that transcription and pre-mRNA splicing are tightly coordinated with each other within the nuclear space. This coordination is achieved by a recruitment mechanism by which splicing factors move from the microdomains to active sites of transcription (figure below). Evidence was presented



Pre-mRNA splicing factors form distinct microdomains in the nucleus of living mammalian cells. Upon activation of genes splicing factors leave the domains and are recruited to active genes.

to suggest that this recruitment mechanism is controlled by the reversible phosphorylation of splicing factors.

Two talks focused on the movement of proteins in and out of the nucleus. **Urs Greber** has taken advantage of GFP to mark viral particles and to impressively document the entry into the cell and the transport of viral particles to the nucleus in time-lapse experiments. It was demonstrated in such a way that viral movement within the cell is dependent on intact microtubules. **Xing Wang Deng** discussed the remarkable regulation of light-induced development of *Arabidopsis* seedlings. This differentiation program was initially shown to be repressed by mutation of the cop1 gene. The gene product resides in the nucleus exclusively in the dark and is translocated into the cytoplasm upon stimulation with light, allowing progression of the differentiation program. Biochemical data strongly suggest that COP-1 is a component of a large nuclear complex which likely controls the seedling activation program. Using genetic screens, suppressors and enhancers of this repression effect have been identified and the biochemical pathways for light-induced activation of seeds can now be analysed.



Yeast cofilin (Fedorov *et al*, 1997; Brookhaven PDB ID code 1COF). Interestingly, while the 3D structures of cofilin and gelsolin segment 1, are highly similar, the genetic and biochemical studies presented at the meeting indicate that the proteins are likely to interact with different domains of actin.

Session II: Polarity

Paul Nurse gave the keynote Yamanouchi Lecture 'Polarity Mutants in *S. pombe*' which was an inspiring start to a rather grey day in Lancaster. He described how his lab is using genetic strategies to begin elucidation of pathways involved in establishing cell polarity in the fission yeast. These cells are normally cylindrical and grow in a straight line by keeping the growing regions located at their poles exactly opposed to each other. Mutants have been identified which can no longer confine growth to these poles but instead are able to initiate growth at inappropriate sites and form bent or T-shaped cells. One of the proteins identified through screens for such mis-shaped cells, was called tea1p which appears to act as a marker for the cell ends. A second protein, tea2p, was postulated to be a microtubule associated protein involved in localizing tea1p to these sites of cell growth.

Also in this session **David Drubin** gave an excellent talk on cell polarity in the budding yeast *Saccharomyces cerevisiae*. He described studies on the actin binding protein cofilin in which they had used both in vivo genetic approaches as well as biochemical and structural techniques to demonstrate the importance of this protein is in the regulation of actin filament dynamics (figure left). He also described preliminary work on a cofilin related protein in *S. cerevisiae*, twinfilin, identified through searches of the yeast genome database.

Possible roles for calcium involvement in cell polarity were discussed in two talks. **Ole Petersen** described signalling in pancreatic acinar cells and the Ca^{2+}-induced exocytosis of secretory granules. He presented work that suggested movement of calcium through the luminally continuous ER in order to explain the apparent problem of how calcium influx occurs at the basal side of cells while the Ca^{2+}-induced stimulation of secretory granule exocytosis takes

place in the apical region. Peter Hepler then introduced us to pollen tube growth, the process by which sperm cells are delivered to the egg in higher plants. He showed growth and recovery studies which revealed a strong correlation between the presence of an apical Ca^{2+} gradient and the process of elongation.

Session III: Functional Co-localization

Dennis Bray, giving the Borden Lecture, discussed the importance to cells of organizing signalling molecules into complexes. Rather than being dispersed in the cytoplasm appropriate proteins associate to form functional units with distinct localizations in the cell. He drew an analogy between the intermediate level of organization afforded by such signalling complexes and integrated circuits, themselves small functional elements within larger electronic circuits.

The idea of cytosolic microdomains was addressed further by **Tobias Meyer** who gave an interesting talk on the localization of microdomains using GFP constructs. In response to certain stimuli mast cells elicit a number of responses including receptor tyrosine phosphorylation and activation of PLCγ and PKC. Using specific domains of these proteins and their activators fused to GFP he was able to demonstrate that receptors became phosphorylated only in microdomains of the plasma membrane, that there is localized membrane activation of PLCγ and that different domains of PKC are responsible for localization of the protein to the membrane in response to distinct stimuli.

Katalin Torok discussed use of calmodulin activation probes. When calmodulin binds calcium and when it binds target proteins it undergoes conformational changes to expose hydrophobic pockets. She described a functional fluorescent derivative TA-calmodulin which can be introduced into cells and has a marked increase in fluorescence intensity when calcium binds the molecule.

Bruce Schnapp introduced us to mRNA localization in vertebrate cells. He described isolation of a protein, vera, from *Xenopus* that is involved in localization of *Vg1* mRNA, a process required for cell fate determination during oogenesis. Cloning of the protein revealed it to be the *Xenopus* homolog of chick zipcode binding protein (ZBP) which is involved in localizing β-actin mRNA in chick fibroblasts. Thus, despite great differences in the systems, one being embryological, the other somatic, the same protein is required for localization of mRNAs.

Movement and localization of proteins between plant cells was described by **Dave Jackson**. The knotted 1 protein (KN1) is proposed to be a transcriptional regulator during development of the plant shoot. Data indicate that it can traffic between cells via plasmodesmata and that it can associate with its own mRNA during this trafficking. KN1 can be mutated to disrupt this cell to cell movement and thereby affect development of the plant.

Workshop – 'Optical tools in living cells'

The workshop on technical aspects of cell biology documented once again how dependent progress in cell biology is on technical developments. **Steve Bolsover** gave a step-by-step guide on how to avoid artifactual problems in quantitative microscopy using the example of calcium imaging. Several talks emphasized the ongoing efforts to visualize and analyse biological processes in living cells. **Tom Jovin** and **Philippe Bastiaens** explained in two talks the principles of fluorescence resonance energy transfer (FRET) and fluorescence lifetime imaging microscopy (FLIM). These techniques have the potential to ultimately look at biochemical reactions inside of living cells. The latter technique, for example, can distinguish various forms of GFP which can not be distinguished based on their primary spectral properties and has been used to resolve the spatial and temporal organization of signaling events inside of living cells.

An alternative technique termed evanescent-wave microscopy was explained by **Jurgen Steyer**. Its use

in the visualization of single secretory vesicles approaching, docking and fusing with the plasma membrane in chromaffin cells convincingly demonstrated the potential of this method. **Jim Haseloff** described his efforts of modifying GFP for use in plants and the development of numerous forms with distinguishable spectral properties. Using these marker molecules in conjunction with gene trapping methods, the complex cellular rearrangements during root meristem development in *Arabidopsis* have for the first time been described in detail and can now be investigated using genetic tools. Once again, Jim won the award for most creative slides.

Graham Ellis-Davies gave an overview on the use of caged compounds in living cells and how photorelease of individual molecules can be used to study and dissect many cellular interactions in real time. He discussed technical aspects of characterizing synthesized compounds, problems of purity with some commercial preparations and illustrated use of some caged second messengers in eosinophils.

Several talks discussed techniques used for more specific biological problems. **Doina Tumbar** showed how GFP can be used to visualize higher order chromosome structures *in vivo*. Multiple copies of the lac-operator were introduced onto chromosomes and these specific regions visualized in living cells using a GFP-lac-repressor fusion protein. These studies show that the movement of chromosomal regions is precisely choreographed *in vivo* and provide strong evidence for a hierarchical model of chromatin folding. GFP was also put to use to observe plant organelles in living cells. **Maureen Hanson** described previous problems in studying mitochondria and plastids using vital stains due to lack of penetration.

Use of specific GFP constructs is however allowing for the first time, the dynamics of these organelles to be studied. **Rick Firtel** used a stabilized apoaequorin to study cytosolic calcium in *Dictyostelium* cells and demonstrated regional oscillations in calcium levels and the importance of these regions in differentiation.

The talks made it clear that these techniques, and many yet to be invented, will determine greatly the direction modern cell biology will take. Clearly, some of the most complex problems in cell biology, such as the molecular analysis of processes in living cells in real-time, are now within reach for today's cell biologists.

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Epithelial Cell Biology '98

St.Catherine's College, Oxford, 13 September – 16 September

General Information

Dates

Arrive Sunday 13 September in time for dinner; depart Wednesday 16 September after lunch (dinner at 19.30; lunch at 13.00).

Travel

Buses will be available on Sunday afternoon and Wednesday after lunch for transport to and from the Oxford bus and rail stations. Regular, straightforward transport exists between Heathrow terminals and Oxford bus station. Parking spaces are available in college.

Abstracts

Poster sessions will be on Monday and Tuesday evenings. Abstracts may be selected for oral presentation. Please indicate which session you wish to be considered for, or whether you do not want to give a talk.

The deadline for abstracts is **3 July 1998**

Registration

The maximum number of registrations will be 170. In the event that the meeting is over-subscribed, priority will be given to those who present posters.

Registration forms and abstracts should be sent simultaneously, and the deadline is 3 July 1998.

Fees

This conference is operated on a fixed-fee basis, to encourage everybody to stay for its duration. The fees, which must be paid at the time of registration, are as follows:

resident BSCB member	£300
resident non-member	£340
non-resident BSCB member	£240
non-resident non-member	£280

The fee for non-residents includes all meals for the duration of the conference, but accommodation must be arranged independently.

A very limited number of en-suite rooms are available for a £13 supplement, on a first-come, first-served basis. Please indicate if you wish to have one of these rooms but do not send payment now: you will be billed on arrival at the conference.

Honor Fell travel awards

PhD students and postdocs should remember that Honor Fell awards are available to cover conference costs in part. An Honor Fell application form should be submitted independently of registration (see page 28). Alternatively you can find an application form on: http://www.kcl.ac.uk/kis/schools/life_sciences/biomed/bscb/honorfell.html

All conference information can also be found on: http://www.path.cam.ac.uk/BSCB98.html

Epithelial Cell Biology '98

Sessions

14 September *am*

Growth factors and epithelial cell fate

Mark Ferguson (Manchester) *Chair*

Matthew Freeman (Cambridge) *EGF receptor signalling strategies in Drosophila development*

Irma Thesleff (Helsinki) *Signals regulating epithelial morphogenesis in teeth*

Sabine Werner (Martinsried) *The roles of keratinocyte growth factor and activin in epithelial morphogenesis and tissue repair*

Gerry Cunha (San Francisco) *Role of mesenchymal-epithelial interactions in the morphogenesis, growth and differentiation of prostatic epithelium*

14 September *pm*

Epithelial morphogenesis

Fiona Watt (London) *Chair*

Kai Simons (Heidelberg) *Mechanism of delivery of apical lipids and proteins*

Helen Skaer (Sheffield) *Maintenance and elaboration of epithelial polarity in Drosophila*

Mark Krasnow (Stanford) *Branching morphogenesis of the Drosophila airways*

Peter Comoglio (Turin) *Scatter Factors control epithelial morphogenesis and invasive growth*

15 September *am*

Signalling through ECM and Rho proteins

Birgit Lane (Dundee) *Chair*

Fillippo Giancotti (Boston) *Control of cell proliferation by integrin signalling*

Charles Streuli (Manchester) *ECM signalling in differentiation and apoptosis*

Patricia Simon-Assmann (Strasbourg) *Cell–matrix interactions in intestinal development and differentiation*

Neil Hotchin (Birmingham) *Regulation of Rho-mediated cellular responses by extracellular matrix*

Paul Martin (London) *Mechanisms of repair in embryos*

15 September *pm*

Catenins, APC, and wnts

David Garrod (Manchester) *Chair*

Mark Peifer (Chapel Hill) *Cell adhesion, signal transduction and cancer: the Armadillo connection*

Paul Polakis (Palo Alto) *Regulation of β-catenin by the adenomatous polyopsis coli (APC) tumor suppressor*

Lukas Huber (Vienna) *TIS7, an immediate early gene product regulating polarity in mammary epithelial cells*

Inke Nathke (Dundee) *The APC protein and catenins in epithelial cell migration and microtubule regulation*

16 September *am*

Epithelial proliferation and apoptosis

Paul Edwards (Cambridge) *Chair*

Martin Raff (London) *The role of programmed cell death in epithelial development*

John Hickman (Manchester) *p53 dependent changes in apoptosis and proliferation following treatment with enterotoxins*

Jon Tilly (Boston) *Molecular and genetic control of epithelial cell apoptosis in the female reproductive tract*

Steve Frisch (San Diego) *Cell adhesion, apoptosis and the epithelial phenotype*

Bill Muller (Ontario) *Oncogene-mediated signal transduction in transgenic mouse models of human breast cancer*

Peter Bryant (Irvine) *Tumour suppressors and growth factors functioning in imaginal discs*

Epithelial Cell Biology '98

Registration

The maximum number of registrations will be 170. In the event that the meeting is over-subscribed, priority will be given to those who present posters.

Registration forms and abstracts should be sent simultaneously; the deadline is **3 July 1998**.

Registration, which is being handled by The Biochemical Society will not be processed without receipt of a cheque or money order in Pounds Sterling, made payable to "**The Biochemical Society**", or appropriate credit card details.

Registration checklist

- registration must be made in writing; fax copies will not be accepted.
- enclose abstract, indicating which session your poster is associated with.
- enclose registration form, indicating your name, phone number, fax number, e-mail address, and dietary, parking space and en-suite room requirements.
- either enclose a Sterling cheque for the relevant amount, payable to "The Biochemical Society", or enclose credit card details.

Name .....Prof / Dr / Mr / Ms

Address .....

.....

.....

Telephone .....

Fax .....

E-mail .....

Please indicate details

Resident BSCB member	£300	❑
Resident non-member	£340	❑
Non-resident BSCB member	£240	❑
Non-resident non-member	£280	❑

En-suite room preferred	❑
Vegetarian	❑
Other dietary needs	❑
	please state ...
Any other requirements	❑
	please state ...
Car park space required	❑
Poster abstract attached	❑

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Signature: ..... Date: .....

This form should be sent to: **The Meetings Office, The Biochemical Society, 59, Portland Place, London W1N 3AJ.** (Tel: 0171 580 3481)

Epithelial Cell Biology '98

Abstract form

Please type within the grey frame. Abstracts will be published as typed.

The format for abstracts is:

- Use all capital letters for the abstract title, in sans-serif typeface
- Type authors names on line following title.
- Type affiliation on the following line.
- Leave one line between address and beginning of abstract text.
- Type abstract in one paragraph.

Name .....

Address .....

.....

.....

Telephone .....

Fax .....

E-mail .....

Category for abstract (check <u>ONE</u> only)

Growth factors and epithelial cell fate ❑
Epithelial morphogenesis ❑
Signalling through ECM and rho proteins ❑
Catenins, APC and wnts ❑
Epithelial proliferation and apoptosis ❑

I do not want to give a talk ❑

The Development of Sense Organs

BSDB Autumn Meeting, University of Sussex, 16–18 September 1998

The British Society for Developmental Biology is devoting its 1998 Autumn Conference to the **Development of Sense Organs**.

The meeting will last two days, from mid-day on **Wednesday 16th September** 1998 **to** mid-day on **Friday 18th September**, and will be held at the University of Sussex.

The programme will include talks on the development of sense organs both of vertebrates and of invertebrates, including eyes, ears, noses, bristles and skin. Recent advances in our understanding of the molecular mechanisms of sense-organ development have been spectacular, and several of these structures have become important paradigms for wider issues in developmental biology.

At the meeting, we hope both to take stock of the rich variety of types of sense organs, and to see to what extent one can now identify unifying themes and conserved mechanisms in their development, with emphasis on the peripheral organs rather than the central connections.

Speakers include:

M. Freeman (Cambridge)
V. van Heyningen (Edinburgh)
S. Wilson (London)
A. Jarman (Edinburgh)
D. Fekete (Purdue)
C. Haddon (London)
K. Steel (Nottingham)
M. Fitzgerald (London)
L. Barlow (Denver)
P. Mombaerts (New York)
D. Strutt (Sheffield)
W. Harris (Cambridge)
Y-N. Jan (San Francisco)
A. Ghysen (Montpellier)
T. Whitfield(Sheffield)
G. Richardson (Sussex)
G. Lewin (Berlin)
E. Macagno (New York)
F. Guillemot (Strasbourg)
J. Lewis (London)

In addition, a few contributed papers will be selected for talks, based on abstracts submitted.

Registration and abstract submission deadline: **1 July 1998.**

For further information and registration forms, contact:

Ms Amrit Khalsa (BSDB Conference),
ICRF, P.O. Box 123,
Lincoln's Inn Fields,
London WC2A 3PX, UK.
Tel: (0171)-269-3356
Fax: (0171)-269-3417
e-mail: khalsa@icrf.icnet.uk

Forthcoming meetings

15–16 July 1998
Antimicrobial Agents
University of Hertfordshire
A two-day introductory laboratory course

Details from:
Dr Ian Morrissey,
Department of Biosciences,
University of Hertfordshire,
College Lane, Hatfield,
Herts AL10 9AB, UK.

Tel: (01707) 285163
Fax: (01707) 285046
E-mail: i.morrissey@herts.ac.uk

20–24 July 1998
Epitope Mapping
University of Hertfordshire
A laboratory course

Details from:
Professor John M Walker,
Department of Biosciences,
University of Hertfordshire,
College Lane, Hatfield
Herts AL10 9AB, UK.

Tel: (01707) 284546
Fax: (01707) 284510
E-mail: j.m.walker@herts.ac.uk

July 1998
Cellular Senescence: the future of ageing
Oriel College, Oxford University
BSCB workshop. Dates to be confirmed.

Local organizer: Lynne Cox (Oxford). Other organizers: David Kipling (Cardiff), Richard Faragher (Brighton), Ian Kill (Brunel).

Limited to 50 places; early applications welcomed. Please mail enquiries to Lynne Cox on lscox@bioch.ox.ac.uk

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15 September 1998
Molecular Probes in Diagnostics
University of Hertfordshire
Nucleic acid and protein techniques

Details from:
Dr Ralph Rapley,
Department of Biosciences, University of Hertfordshire,
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The American Society for Cell Biology
38th Annual Meeting
San Francisco, December 12-16, 1998

Symposia

Understanding Disease at the Cellular and Molecular Level
Richard Klausner, Richard Lifton, Susan Lindquist*

Mitosis and Meiosis: Integrating Parts with the Whole
R. Bruce Nicklas, Anthony Hyman, Shirleen Roeder*

Emerging Technologies at the Interface Between Chemistry and Cell Biology
Gerald Crabtree, Patrick Brown, Roger Tsien*

Temporal and Spatial Control of Membrane Traffic at the Cell Surface
Peter Novick, Thomas Martin, Sandra Schmid*

Complexity Within Cell Signaling Pathways
Richard Assoian, Roger Brent, Martin Schwartz*

Signal Transduction to Cell Death
Herman Steller, Xiaodong Wang, Junying Yuan*

Sensory and Mechanotransduction
Donald Ingber, David Julius, Erkki Ruoslahti*

Signal Cascades in Organogenesis
Daphne Preuss, Paul Sternberg, additional speaker to be confirmed

Chromosomal Basis of Gene Control
Alan Wolffe, Rudolph Jaenisch, Mitzi Kuroda*

**denotes Chair*

Minisymposia Topics

Nuclear Trafficking: the Ins and Outs of the Nucleus

Centrosomes, Cilia, Flagella: Assembly and Function

RNA Trafficking and Localization

Cytoskeleton in Polarity and Development

Microtubule Motors, the Cytoskeleton and Membrane Traffic

Cytoskeletal Assembly and Organization

Structural Studies of Cytoskeletal Proteins

Quality Control in the Early Secretory Pathway

Chromatin, Telomeres and Growth Control

Fertilization

Endocytosis and Cell Signaling

Membrane Sorting and Polarity

Small GTPases and Control of the Cytoskeleton

Mechanisms of Membrane Fusion and Resealing

Proteases and Tissue Remodeling

Cell Adhesion and Signaling in Development and Disease

Extracellular Matrix/Growth Factors

Cell Migration and Invasion

Apoptosis and Growth Control

Developmental Gradients and Specificity of Cell Fate

Roles of Adapters/Coats in Protein Traffic

Host-Pathogen Interactions

Altering Genomes

Checkpoints Controlling Cell Cycle Progression

Abstracts Due August 1, 1998

Contact:
The ASCB, 9650 Rockville Pike, Bethesda MD 20814, USA
Telephone (301) 530-7153; Fax (301) 530-7139; ascbinfo@ascb.org; *www.ascb.org/ascb*

Minutes of the BSCB Annual General Meeting

5 pm, 1st April 1998, University of Lancaster

1. Apologies for absence were recieved from L Cramer, A Hall, T Bloom and C Hawes.

2. President's Report

(i) The President, Ron Laskey, welcomed attendees to the conference and to the AGM, and announced that next year's BSCB main meeting will be held in Manchester.

(ii) An international European Life Sciences Committee has been formed which will organise a series of large annual European cell biology meetings, the first one to be held in Geneva in 2000. The intention is to create a forum for presentation of scientific excellence, parallel to the ASCB meetings, and thus fill a niche in European cell biology. The BSCB committee had greeted this proposal with cautious optimism on the grounds that it is unlikely to directly affect our ability to continue running the present BSCB meetings in the UK.

(iii) A proposal to establish a BSCB annual medal for achievement in cell biology in the UK was put to the membership and was greeted with enthusiasm. Terms for the award were briefly discussed. The name "The Robert Hooke Medal" was suggested, and an age limit of 40 was suggested. This idea will be developed further.

3. Secretary's report

(i) The Secretary, Birgit Lane, reported that the membership had risen by 121 since the last AGM. New members were welcomed and it was noted this number represented a significant increase in the rate of applications over the last few years.

(ii) Some Committee Membership changes were announced. Charles Streuli (University of Manchester) was welcomed as the Meetings Secretary to take over from Murray Stewart. Alan Hall (UCL) is taking over from David Edgar as the administrator of the Honor Fell Travel Awards, as David retires from the committee this year. Katherine Ayscough (Dundee), Robert Insall (UCL) and Chris Hawes (Oxford) were elected as new committee members. Kathryn Ayscough will hopefully take over editorship of the newsletter from Louise Cramer. Louise Cramer will become Publications Editor.

(iii) The membership was reminded of the constitution's provision for up to 10 honorary members of the society. Nominations were discussed briefly and it was agreed that suggestions for nominations from the membership should be supported by a paragraph of text and sent, with names of suggested proposer and seconder, to the Secretary prior to the AGM (see note below*).

(iv) It was announced that the Society is to have a Schools Liaison Officer, and that David Archer (Reading) has agreed to act in this capacity.

All outgoing committee members and officers are thanked for their greatly appreciated efforts for the Society.

4. Treasurer's Report

(i) The Treasurer, Stuart Kellie, presented a summary of the cash flow for this year. The Society is in strong financial health, partly due to having a reduced outlay last year since the ECBO meeting took the place of the annual BSCB symposium. Members were invited to suggest ways of spending some of the surplus.

(ii) Conversion of members to direct debit is proceeding but still only about half the membership pays this way; Steve Winder, Stuart Kellie and Margaret Clements are gradually updating the membership subscriptions.

5. Meetings Secretary's Report

(i) The local organizers of the Lancaster meeting were thanked for their efforts in producing a truly excellent scientific programme for the present meeting.

(ii) The outgoing Meetings Secretary, Murray Stewart, introduced Charles Streuli as his replacement.

(iii) It was announced that the next annual meeting will be 13–16 April 1999 at the University of Manchester. Also this year the next Epithelial Biology meeting, organized by Charles Streuli and Paul Edwards, will be held on 13–16 September in Oxford.

There was no other business.
E B Lane

*[Note: Our current 3 honorary members are Drs LM Franks, MH Salaman and Prof FJA Prop. To qualify for election, a nominee must be supported by nine-tenths of the Members who take part in the voting at the AGM. Formal nominations need to be made to the AGM by a member of the Executive Committee. *EBL*]

Trustees' Report for the year ended 31 December 1997

The trustees have pleasure in presenting their report for the year ended 31 December 1997.

Trustees
Prof. R. Laskey (*President*), Dr. D. Critchley, Prof. E. B. Lane (*Secretary*), Dr. D. Edgar, Dr. S. Kellie (*Treasurer*)
Prof. A. Hall, Dr. M. Stewart (*Meetings Secretary*)
Dr. S. Hughes, Dr. S. Winder (*Membership Secretary*)
Dr. C. Isacke, Dr. L. Cramer (*Newsletter Editor*)
Prof. N. LaThangue, Dr. V. Allan, Dr. P. Shaw
Dr. T. Bloom, Prof. M. Whitaker

Contact address
The contact address of the Society is c/o Margaret Clements, Dept. of Zoology, Downing St., Cambridge, CB2 3DY.

Status
The Society is a registered charity, number 265816

Objects
The object of the Society is to promote the knowledge of cell biology

Review of activities
The financial results of the Society are set out in the following pages. Reports on the Society's meetings and other activities are to be found in the six-monthly Newsletter.

S. Kellie, Trustee.

Independent Examiners Report to the Trustees of The British Society for Cell Biology on the Financial Statements for the year ended 31 December 1997

We have carried out an independent examination of the financial statements set out on the following pages under Section 43 Charities Act 1993. We confirm that the financial statements are in accordance with the books and records supplied to us, and that no matters have come to our attention giving us reasonable cause to believe that in any material respect proper accounting records have not been kept, or that they do not comply with accounting regulations.

We further confirm that no matter has come to our attention to which, in our opinion, attention needs to be drawn in order to obtain a proper understanding of the accounts.

David Cooke MA (Oxon) FCA
David Cooke and Co.
Chartered Accountants
6 Seacourt Road
Botley
Oxford OX2 9LD

4 March 1998

Statement of Financial Activities for the Year Ended 31 December 1997

	£	1997 £	£	1996 £
Income				
Subscriptions		19696		19934
Mailing list		1910		624
Interest		2410		1906
Advertisements and fliers (Newsletter)		1575		3026
Sponsored lectures		–		2000
Capitation grant from Company of Biologists		14811		14188
Meetings grant from Company of Biologists		–		12810
Meetings returns		1075		3473
Other		198		–
		41675		57961
Less: expenses				
Direct Charitable				
Meetings	4300		19310	
Newsletter	5118		5664	
Honor Fell Travel Awards	10375		14107	
	19793		39081	
Administration and other expenses				
Secreterial	1330		1176	
Committee travel and expenses	1585		886	
Subscriptions	4419		3353	
Post and stationary	1003		1361	
Fax and phone	71		71	
Bank charges	245		367	
Accountancy and audit	294		282	
Miscellaneous	28		2140	
	8975		9636	
Total expenses		28768		48717
Surplus/(Deficit) for year	**12907**		**9244**	

Treasurer's report for 1997: Main points

• We had an operating surplus of £12,907 this year. This was mainly because we did not have an Annual Meeting to fund, on which we normally make a net loss once speaker's accommodation etc are paid for.

• Subscriptions were relatively steady; a number of untraceable/old members have resigned, but these have been replaced with new members, mainly students. Out of a membership of about 1800, more than 900 are paying by Direct Debit.

• All our other expenses for 1997 were steady compared with 1996. About £10,000 was spent on Honor Fell Travel Awards (down on £14,000 in 1996), however £4,000 was spent on travel awards administered directly by ECBO for BSCB members,

so our total levels of travel awards were again relatively stable. I would again like to thank David Edgar for administering the Travel Awards.

• Our major source of income, other than subscriptions, was our Capitation grant from the Company of Biologists. We are grateful to the COB for their continuing support.

• Our major expenditure, other than meetings, is the six-monthly Newsletter at about £6,000 including postage. However the Newsletter generated £3,500 income from adverts and mailing lists.

• Other major expenditure was subscriptions to ECBO, the Institute of Biologists, and the UK Life Sciences Committee, and the Association of Women in Science, all these totalling about £4,000.

BSCB Balance sheet as at 31 December 1997

	1997 £	1996 £
Current assets		
Amounts receivable	–	–
National Savings Bank Investment A/C	44301	32163
Abbey National Five Star A/C	15705	5434
Midland Bank current A/C	7963	17453
	67969	55050
Less: Current Liabilities		
Creditors and accruals	294	282
Net Assets	**67675**	**54768**
Financed by:		
Accumulated Fund brought forward	54678	45524
Surplus/(deficit)	12907	9244
	67675	**54768**

Approved: E. B. Lane, Trustee
S. Kellie, Trustee
4 March 1998

New BSCB Members from April 1997

(Approved at 1998 AGM)
Abranches, R.
Akers, I.A.
Banbury, D.N.
Barnes, L.M.
Bayliss, R.
Bermano, G.
Bess, K.L.
Betson, M.
Bobe, R.
Boudonck, K.
Bowers, K.
Brannan, M. G.T.
Bray, S.E.
Bromley, I.M.J.
Brown, J.D.
Byrne, C.
Camp, V.L.
Chan, J.
Chappell, S.
Charge, S.
Clarke, E.
Coffey, E.
Coldwell, M.J.
Conlon, I.
Cotter, L.
Cronshaw, J.M.
Cuttle, G.
Da Silva, R.P.
Dewar, H.
Dupree, P.
Edwards, R.L.
Emery, P.
Fairley, E.
Finian, M.
Firth, K.M.
Fisher, R.J.
Flood, P.L.
Gibbs, D.
Glaves, P.
Gleave, T.L.
Gonzalez-Melendi, P.
Hall, A.
Hardman, M.J.
Hardwick, K.G.
Hardy, K.A.
Harris, B.S.
Harrisingh, M.
Hassan, P.
Hawley, S.
Haynes, L.
Heath, C.
Hesketh, J.
Horsnell, W.
Hutchison, C.J.
Ibrahim, O.
Jenkins, R.
Johnston, R.C.
Jones, P.F.
Kaneez, S.
Keerthisingam, C. B.
Kirchem, A.
Kypta, R.
Lang, P.
Larman, M. G.
Legg, J.
Leir, S-H.
Lewis, C.
Lewis, H.C.
Li, X.
Locate, S.
Lowell, S.
Lown, F.J.
Lu, X.
Massat, N.
May, R. C.
McCrossan, M-C.
McCutcheon, S.
McNeill, H.
Meesaq, A.
Merritt, A.
Monkley, S.
Montgomery, S.
Morgan, C.
Morley, S.M.
Morrison, E.E.
Morrisroe, L.
Murphy, C.
Murphy, T.
O'Doherty, A.
O'Luanaigh, N.
Ogg, S.C.
Parry, H.
Patel, J.
Peake, M.
Peckham, M.
Platani, M.
Salinas, P.C.
Shaw, M.
Shearer, J.
Singh, S.
Slater, C.R.
Smart, P.
Smith, A.
Sun, T.
Sun, W.
Tekotte, H.
Thompson, G.J.
Trinkle-Mulcahy, L.
Tzima, E.
Uziyel, Y.S.
Vemuri, S.
Watson, J.A.
Webster, S.
Wilde, J.I.
Wilkie, G.
Wilkinson, C.R.M.
Wilkinson, R.
Williams, R.
Woolley, K.

Honor Fell Travel Awards

Honor Fell Travel Awards are made, up to a limit of £250, to provide financial support for young BSCB members to attend meetings. Applications are considered for any meetings relevant to cell biology.

Applications (including a copy of the meeting registration form) should be sent to Alan Hall (MRC Laboratory for Molecular Cell Biology University College London, Gower Street, London WC1E 6BT)) using a copy of the form below.

The following rules usually apply (at the discretion of the Committee):

- Awards are not normally made to applicants aged over 35
- Applicants must have been BSCB members for at least a year.
- No applicant will receive more than one award per year or three *in toto*.
- The applicant must be contributing a poster or talk.

Application for an Honor Fell travel award

Name: .....

Age: .....

Work address: .....

.....

.....

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

E-mail address: .....

Degrees (with dates):

.....

.....

Present position (graduate students give start year of PhD): .....

.....

.....

Date of joining BSCB: .....

Record the years of previous Honor Fell awards (if any): .....

Key publications (2) or research interests:

.....

.....

.....

.....

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

.....

.....

Estimated expenses: Travel: .....

Subsistence: .....

Registration: .....

Other: .....

Have you submitted any other applications for financial support?: YES NO

If yes, please give details: .....

.....

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

Supporting statement by Head of Department:

The applicant requires these funds and is worthy of support

Name: .....

Signature: .....

Applicant's signature: .....

Date: .....

Application to join the BSCB

Please complete and return this form and the direct debit form to:
Steve Winder, Institute of Cell and Molecular Biology, University of Edinburgh, Michael Swann Building, Kings Buildings, Mayfield Road, Edinburgh EH9 3RJ.

Name: ..... Sex: .....

Position: .....

Academic qualifications: .....

Tel: ..... Fax ..... E-mail: .....

Work address: .....

.....

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

Research interests (5 keywords): .....

.....

Membership of other scientific societies: .....

.....

BSCB member proposers (names and signatures):

1) .....

2) .....

Applicants without proposers should enclose a brief curriculum vitae.

Applicant's signature: ..... Date: .....

The Society does not employ professional administrators, so payment by **DIRECT DEBIT** would be appreciated (**please photocopy and fill in the form on the next page**). Those members who do not have a UK bank account should send a bankers draft in pounds sterling, payable to 'the British Society for Cell Biology', toSteve Winder (address above). Members will be responsible for renewals without reminders.

INSTRUCTIONS TO YOUR BANK/BUILDING SOCIETY TO PAY DIRECT DEBITS

British Society for Cell Biology

DIRECT Debit

Please complete parts 1 to 6 to instruct your branch to make payments directly from your account. Then return the form to: **British Society for Cell Biology, c/o Dr Steve Winder, Institute of Cell and Molecular Biology, University of Edinburgh, Michael Swann Building, Kings Buildings, Mayfield Road, Edinburgh EH9 3RJ..**

To The Manager, Bank/Building Society

.....

Address

.....

.....

..... Postcode .....

Originator's identification number | 9 | 4 | 1 | 4 | 5 | 1 |

FOR BSCB USE ONLY
This is not part of the instruction to your bank/building society

5. Originator's reference number (for office use only) BRITSO | | | | |

1. Please write the full postal address of your branch in the box above.

2. Name of account holder

.....

3. Account number | | | | | | | | |

4. Sort code | | | — | | | — | | |

Banks/Building Societies may refuse to accept instructions to pay direct debits from some types of account.

6. Instructions to the Bank or Building Society

Please pay the British Society for Cell Biology Direct Debits from the account detailed on this Instruction subject to the safeguards assured by the Direct Debit Guarantee.

Signature .....

Date .....

Standing order cancellation

Please cancel any standing order payable to the British Society for Cell Biology WITH IMMEDIATE EFFECT.

Name of Bank/Building Society

Account Number | | | | | | | | |

Customer's Account Name

Branch Sort Code | | | — | | | — | | |

Signature .....

Date .....

This guarantee should be detached and retained by the payee

The Direct Debit guarantee

- This guarantee is offered by all Banks and Building Societies that take part in the Direct Debit scheme. The efficiency and security of the scheme is monitored and protected by your own Bank or Building Society.
- If the amounts to be paid or the payment dates change, the BSCB will notify at least 14 days in advance of your account being debited or as otherwise agreed.
- If an error is made by the BSCB or by your Bank/Building Society, you are guaranteed a full and immediate refund from your branch of the amount paid.
- You can cancel a Direct Debit at any time, by writing to your Bank or Building Society. Please also send a copy of the letter to the BSCB.

British Society for Cell Biology Committee Members 1997

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Tel: 0118 9264494
Fax: 0118 9731402

down. . .side . . .up

up. . .side . . .down

It's flexible, I'll say that. Look how it interchanges between both upright and inverted microscopes - always using the shortest possible light path.
Compact too. They tell me there are six detectors inside, but it looks far too small.
With four simultaneous confocal channels, each with its own computer controlled pinhole, it's ideal for my multi-parameter fluorescence work.
Let's have a look at the operating system. Windows NT, the latest, with multi-user software. 'Open' software too, for me to build my own application programmes. It seems perfect for everybody.
What about the image? They say 2048 x 2048 pixels and 12 bit dynamic range - the ultimate resolution with highest possible sensitivity.
Let's take a look. Wow! That's sharp, what depth and range: just what I need for my experiments!
Integration, oversampling, quasi-photon counting - the people at Carl Zeiss have thought of everything.
Now, which way round shall I use my new LSM 510. . .
. . .Down?. . Side?. . Up?

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