

# Connective Issues

## BSMB Newsletter

British Society for Matrix Biology

**Committee:** Prof. Bruce Caterson (Chairman), Prof. Anthony Hollander (Secretary), Dr. Graham Riley (Treasurer), Dr. Phillipa Callender, Mr. Frank Cheung, Prof. John Couchman, Dr. Ray Boot-Handford, Dr. Malcolm Lyon, Dr. Robert Lauder, Dr. Drew Rowan, Dr. John Tarlton, Dr. Anne Vaughan-Thomas

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## Editorial

*By Anthony Hollander*

Welcome to the 64<sup>th</sup> edition of Connective Issues. We have a busy few weeks ahead with the forthcoming FECTS meeting in July and the Autumn BSMB meeting in September. The arrangements for FECTS are already well advanced and we expect that a large cohort of BSMB members will be going. The meeting is organized by Alberto Calatroni and will be held in the Sicilian resort of Taormina.

We have 4 new members of the committee. John Couchman (Imperial) and Ray Boot-Handford (Manchester) have filled the vacant position plus one secondment. We have also taken on two young scientists. Phillipa Callender (Cardiff) will represent Postdocs and Frank Cheung (Bristol) will speak for students. Please can all young members inundate them with ideas to bring to the committee!

The Autumn 2004 meeting, "Cell-Based Therapy", will be in Bristol on 13<sup>th</sup> and 14<sup>th</sup> September and details can be found below. Please register NOW for this meeting. **All those registering by Friday 16<sup>th</sup> July will be entered into a £10 prize draw.** Late registration (after Friday 30<sup>th</sup> July) will incur a £5 surcharge. So please help the organizers in planning the meeting and help reduce your own costs by registering early. Those of you submitting abstracts for posters and oral presentations should note that your work does NOT have to be on the theme of the meeting. All matrix biology topics are welcome and oral presentations will be chosen on the basis of quality of the science. Young scientists will be eligible for a Poster prize, chosen by delegate voting.

The BSMB has provided several bursaries this year. For the Spring 2004 Manchester meeting we awarded £100 each to Gavin Jones, Nicholas Seyfried & Edward Bastow. For the forthcoming FECTS meeting we have awarded up to £250 each to Miss Vicki Anderson, Dr Emma Blain, Dr Philippa Callender, Dr Eithne Comerford, Dr Clare Curtis, Miss Lindsay Davies, Miss Sophie Flood, Mr Dimitrios Zeugolis, Miss Rhiannon Fish & Dr Magali Le Goff. Your committee is very keen to support young scientists and we

consider helping them travel to meetings as one of the best uses of BSMB resources. Please encourage all eligible students and postdocs to apply for bursaries in future.

## Current BSMB Committee

### Officers:

Chairman, Prof. Bruce Caterson (University of Cardiff; [Caterson@Cardiff.ac.uk](mailto:Caterson@Cardiff.ac.uk))

Honorary Secretary, Prof. Anthony Hollander (University of Bristol; [A.Hollander@bristol.ac.uk](mailto:A.Hollander@bristol.ac.uk))

Honorary Treasurer, Dr. Graham Riley (Addenbrookes Hospital, Cambridge; [gpr1003@cus.cam.ac.uk](mailto:gpr1003@cus.cam.ac.uk))

### Elected and Seconded Members:

Dr. Malcolm Lyon (University of Manchester; [MLyon@PICR.man.ac.uk](mailto:MLyon@PICR.man.ac.uk))

Dr. Robert Lauder (Lancaster University; [r.lauder@lancaster.ac.uk](mailto:r.lauder@lancaster.ac.uk))

Dr. Drew Rowan (University of Newcastle; [A.D.Rowan@newcastle.ac.uk](mailto:A.D.Rowan@newcastle.ac.uk))

Dr. John Tarlton (University of Bristol; [John.Tarlton@bristol.ac.uk](mailto:John.Tarlton@bristol.ac.uk))

Dr. Anne Vaughan-Thomas (University of Liverpool; [avt4460@liverpool.ac.uk](mailto:avt4460@liverpool.ac.uk))

Prof. John Couchman (Imperial College, London; [j.couchman@imperial.ac.uk](mailto:j.couchman@imperial.ac.uk))

Dr. Ray Boot-Handford (University of Manchester; [ray.boot-handford@man.ac.uk](mailto:ray.boot-handford@man.ac.uk))

Dr. Phillipa Callender (University of Cardiff; [callender@cardiff.ac.uk](mailto:callender@cardiff.ac.uk))

Mr Frank Cheung (University of Bristol; [F.Cheung@bristol.ac.uk](mailto:F.Cheung@bristol.ac.uk))

## Publication of Meeting

### Abstracts

A meeting report and abstracts for the Autumn 2003 meeting in London was published in the February 2004 edition of IJEP.

The meeting report and abstracts of the Spring 2004 meeting in Manchester will be published in IJEP shortly. The report can also be read elsewhere in this Newsletter.

## Forthcoming BSMB Meetings

The **Autumn 2004** Meeting is to be held at the University of Bristol on September 13<sup>th</sup>/14<sup>th</sup> and will be run jointly with the UK Tissue and Cell Engineering Society (TCES). The theme will be "Cell Based Therapies" and the meeting organizers are Professor Anthony Hollander and Dr. John Tarlton. Invited speakers will include Bob Nerem (Atlanta GA), Anders Lindahl (Gothenburg), Alessandra Pavesio (Abano Terme), Ivan Martin (Basel), Ranieri Cancedda (Genoa) and John Wozney (Cambridge MA) as well as several UK experts in the field. Full details including instructions for abstract submission and registration can be found at the end of this newsletter.

### Early warning of future meetings:

Spring 2005, Liverpool University; Dr Anne Vaughan-Thomas; "Collagens - from genes to fibrils"

Autumn 2005, (12-13<sup>th</sup> September) University of Manchester; Dr. Mike Briggs and Dr. Ray Boot-Handford; "Pathobiology of Bone and Cartilage. A special meeting to mark the retirement of Professor Mike Grant"

Spring 2006, Queen's College Cambridge; Dr. Graham Riley; "Proteases: the cutting edge of cell biology"

## BSMB Bursaries for the Autumn 2004 Meeting

Members of BSMB may apply for bursaries to assist in travelling to the Autumn BSMB meeting in Bristol. Young members of the Society are encouraged to apply for bursaries (up to a maximum of £100). Eligibility criteria are stated below.

Bursaries will only be considered if they are submitted on a current BSMB Bursary application form. **Applications should be sent to the Society Secretary (Anthony Hollander)** and not to the meeting organiser (but in this case we are one and the same!). The application should be accompanied by a copy of the abstract to be presented at the meeting and a one-page curriculum vitae.

The deadline for receipt of bursary applications to attend this meeting is Friday 30<sup>th</sup> July 2004. The Committee will review the applications rapidly and applicants will be informed of the outcome as soon as possible.

### Criteria for Bursaries

Applicants should have been members of the Society for at least 1 full calendar year prior to the Meeting start date.

Applicants should be submitting an abstract and presenting a poster for the meeting to be attended.

Applicants should be at an early stage of their career (i.e. <5 years from award of PhD) and unlikely to have access to travel funds. Emphasis is always given to young researchers who are generally in short term contract positions, i.e. mainly graduate students and occasionally early post-docs.

The work described in the abstract must be novel and likely to be of a quality that would reflect well as a BSMB supported contribution.

The Bursary Application form can be found on our web site:

<http://www.BSMB.AC.uk/FRAMES/GENERAL/Bursaries.htm>

## BSMB Spring 2004 Meeting Report, Manchester

### "Grappling with the Glycome"

*Report By Gavin C. Jones, Nicholas T. Seyfried & Edward R. Bastow*

The spring 2004 meeting of the BSMB was held at Hulme Hall, University of Manchester on the 5<sup>th</sup>-6<sup>th</sup> April. The theme of the meeting was recent advances in our understanding of the structure and biological function of saccharides, with a particular emphasis on glycosaminoglycans. The meeting was organised by Dr Malcolm Lyon (University of Manchester) and Dr Robert Lauder (University of Lancaster), and was supported financially by Europa Bioproducts, Sigma-Aldrich, Dionex and Calbiochem, who all

exhibited their products. There were 11 invited speakers: one from the USA, three from continental Europe (Sweden, France and the Netherlands) and seven from the UK. The meeting attracted 100 registered delegates evenly split between 50 BSMB members (including 10 students) and 50 non-members (including 14 students). A further nine short presentations were selected from the submitted poster abstracts.

Robert Haltiwanger (State University of New York at Stony Brook, New York, USA) opened the meeting by introducing the glycocalyx at the cell surface and its structural complexity. He highlighted the variety of cell-surface glycans that modulate cellular communications, discussing their importance in signal transduction events, before concentrating on the specific role of O-fucose modifications in modulating the Notch signalling pathway. The extracellular domain of Notch contains 36-tandem epidermal growth factor (EGF)-like repeats many of which are sites for both O-fucose and O-glucose type glycosylation. Comparing the phenotypic similarities between knockouts of O-fucosyltransferase-1 and Notch in *Drosophila* and mice he emphasized the importance of O-fucose modifications in Notch function. He further developed this theme by considering Fringe, a  $\alpha$ -1,3-N-acetylglucosaminyltransferase, that is involved in the elongation of the O-fucose monosaccharide in some EGF-like repeats, and that can further modulate Notch signalling. The sites of Fringe modification may be encoded within the sequences of specific EGF-like repeats. There are suggestions that these enzymatic modifications may influence Notch-ligand interactions. Before concluding, he identified O-glucose modification as an additional, highly conserved modification, clustered at the central EGF-like repeats of Notch that may additionally prove to influence Notch biology.

Paul Crocker (University of Dundee) gave an overview of the siglec family of transmembrane proteins, whose members include sialoadhesin, CD22 and CD33, defining them as adhesive and signalling molecules of the immune system that recognise sialylated proteins. He emphasized the importance of siglec extracellular domain size in regulating *trans* versus *cis* interactions with cell surface ligands, using as an illustration the observed un-masking of siglec binding sites towards external ligands, following sialidase treatment to destroy *cis*-interactions at the cell surface. He then focused on siglec 7, commenting on its un-masked activity when

expressed on CHO cells as compared to its masked activity on natural killer (NK) cells, where it is naturally expressed. He introduced the preference of siglec 7 for  $\alpha$ -2-8-linked disialic acid, a modification found predominantly on b-series gangliosides and the polysialic acid of N-CAM. By comparing siglec 7 with siglec 9, he highlighted the crucial role of the C-C<sub>1</sub> loop within the V domain in this specificity. Playing particular regard to its specificity, the possible functions of siglec 7 were then considered. The high levels of expression of  $\alpha$ -2-8-linked disialic acid on NK cells, the masking of siglec-7 in NK cells by *cis* interactions, and the apparent rapid evolution of the sialic acid-binding domains within the siglec family, suggests that siglec-7 has adapted to engage in *cis*-interactions that regulate NK cell activation.

Anne Imberty (CERMAV-CNRS, Grenoble, France) described how PA-IL and PA-IIL, the galactose and fucose binding lectins of *Pseudomonas aeruginosa*, are associated with the virulence of this bacterium. *P.aeruginosa* colonises the lungs of patients with cystic fibrosis (CF), where it becomes a serious pathogen. Its specific binding is dependent upon the increased fucosylation and high levels of Lewis a epitopes present in CF patients. The crystal structures of PA-IL and PA-IIL bound to their respective monosaccharide ligands were shown. She drew particular attention to two co-ordinated calcium ions that appear to be intimately involved in lectin-ligand recognition. Modelling studies were used to look at the potential binding of PA-IIL to more complex oligosaccharide structures and these, together with the results of enzyme-linked lectin binding assays, suggested that the Lewis a epitope could be the ligand recognised by these lectins in the lungs of CF patients.

Anne Dell (Imperial College, London) gave an overview of mass spectrometric strategies for both high throughput glycomics and glyco-proteomics. She described the application of both MALDI-TOF MS and ES MS/MS, not only for identifying carbohydrates from single proteins, but also from very complex mixtures such as cell and tissue extracts. She then introduced a number of specific applications in which these approaches had proven valuable and instructive. Protocols for comparing resting and activated lymphocytes showed differences in glycosylation patterns of murine T and B cells upon activation. Changes in the O-glycan patterns of activated CD8<sup>+</sup> T-cells during development were also addressed. In addition, MS provided a rapid glycan screening

technique to assess changes in both O- and N-linked glycosylation in the organs of knockout mice, and also for distinguishing core 1 and core 2 antennae O-glycans on the CA125 ovarian cancer antigen. MS techniques have also provided valuable data on sperm-egg interactions. Sequencing and site analysis of the O-glycans on the murine and human forms of the zona pellucida glycoprotein (ZP3), the putative sperm receptor, revealed identical glycosylation patterns when expressed on mouse eggs. Interestingly, human ZP3 in transgenic mice interacted with murine but not human sperm. Therefore, it appears that host specific O-glycosylation is essential for sperm/egg recognition.

Ten Feizi (Imperial College London) described the use of carbohydrate microarrays as a potential high throughput technology to assess the specific carbohydrate-binding properties of proteins. Particular emphasis was given to protein-carbohydrate interactions in the immune system. To prepare microarrays, carbohydrates, either synthesized or released from proteins, cells or tissues, can be conjugated to lipids by reductive amination forming novel, lipid-linked oligosaccharides, or neoglycolipids (NGLs). Such NGLs can easily be immobilised onto nitrocellulose membranes, via their lipid tails, where they can be probed for interaction with a soluble protein. Repertoires of NGLs, either homogeneous species or heterogeneous mixtures, can be assembled as microarrays to allow selection of specific ligands by carbohydrate-binding proteins. Subsequent thin layer chromatography and mass spectrometry can be used to characterise positive binding species. Specific examples used to illustrate the use of such approaches included the interactions of the cytokine INF- $\gamma$  and the chemokine RANTES with sulphated carbohydrate and chondroitin sulphate oligosaccharide microarrays.

Lan Jin (University of Edinburgh) discussed the novel elucidation of the conformation of heparin oligosaccharides by ion mobility mass spectrometry. In this gas-phase technique, ions are impelled to travel, under the influence of a weak electric field, through a very low density of inert gas. Under these conditions, the time of arrival of ions at the detector depends upon their collision frequency, which is related to their molecular cross sections. A heparin disaccharide and three different tetrasaccharides were prepared and studied. Theoretical gas phase conformations were generated by molecular modelling and compared to experimental cross

sectional areas derived by ion mobility MS. A close correlation was obtained with these small structures, and the method clearly holds promise for probing GAG conformation.

Tim Rudd (University of Liverpool) introduced quartz crystal microbalance-dissipation (QCM-D) and its use in the study of protein/GAG interactions. By analysing the damping of oscillation of the crystal, after adsorption of molecules onto its surface, QCM-D can be used to gain new insights into complex formation. QCM-D measures both the mass of the molecules adsorbed to a surface, in addition to the energy dissipated by the surface. Experimentally, heparin oligosaccharides were immobilised onto a gold sputtered QCM-D surface and then exposed to various protein ligands, e.g. FGF-1, FGFR1, HGF/SF. The viscoelastic properties of the resulting complexes could be determined from the measured dissipation, which yields information on their shape / conformation. For example, it was determined that complexes of a heparin octasaccharide with FGF-1 were more dissipative than complexes with HGF/SF. It was suggested that the oligosaccharide may have flexible "hinge" regions, and that differential binding of specific growth factors above, or at, the hinge could radically alter the flexibility, and thus dissipation of the complex. Interestingly, GAG complexes with FGFR1 were less dissipative (more rigid) than those with FGF-1.

Joyce Taylor-Papadimitriou (Guy's Hospital, London) introduced MUC1, the major epithelial mucin expressed by breast carcinomas. Its extracellular domain has a tandem repeat structure bristling with O-glycans. Joyce has shown convincingly that MUC1 exhibits changes in O-glycosylation in breast cancer. Increased levels of ST3 Gal 1 enzyme in breast cancer induces a switch from the addition of mainly core 2-based O-glycans to Sialyl T O-glycans. Although Sialyl T O-glycans can exist in normal cells outside the breast, in the breast they are cancer associated, and their presence increases mammary cancer growth and can be immunosuppressive. In up to 30% of breast cancers O-glycosylation is terminated early, yielding GalNAc (Tn) or Sialyl Tn O-glycans on MUC1. Sialyl Tn glycans, coinciding with increases in the ST6GalNAc I enzyme, are highly tumour specific. Joyce concluded with a very interesting discussion of how this could be exploited for immunotherapeutic intervention in breast cancer. An immunisation protocol using MUC1 bearing Sialyl Tn O-glycans as

immunogen has been used in mice with some success to provide protection against tumour growth. This has encouraged a presently-running clinical trial of a similar strategy in breast cancer patients.

Tony Day (University of Oxford) gave a comprehensive introduction to the massive GAG, hyaluronan (HA). Though it is the simplest GAG in sequence it nevertheless supports a wide range of diverse biological activities. Tony suggested that a key to the behaviour of HA is that it can adopt a variety of different conformational states in solution with potentially fast interchanges between them. He then summarised the many HA-binding proteins (hyaladherins) and suggested that the hyaladherin may determine the particular HA conformation stabilised. He went on to discuss results indicating that changes in the architecture of HA-protein complexes may contribute to the variety of biological functions that are attributed to HA. Particular attention was given to TSG-6 and CD44. Molecular modelling studies indicated significant differences in their HA-binding domains and suggested that much larger perturbations in HA structure ensue following binding to CD44 than to TSG-6. Also the binding of TSG-6 to HA enhances the ability of HA to then bind CD44, suggesting TSG-6 induces favourable alterations in HA organisation. Lastly, Tony discussed the role of TSG-6 in the covalent modification of HA by attachment of “heavy chains” derived from the inter- $\alpha$ -inhibitor. This cross-linking can provide an alternative way of rearranging HA architecture and appears to be important in cumulus cell expansion in ovulation and fertilisation.

Mark Ritchie (Waters MS Technology Centre, Manchester) gave a comprehensive overview of the practise of mass spectrometry, before concentrating on its specific application to the analysis of N-glycosylation in the large, gel-forming, salivary mucin MUC5B. Though O-glycosylation dominates in such mucins there are abundant potential sites for N-glycosylation, though little is known about its structure. He then described how, experimentally, the mucin can be trypsinised and resulting N-glycosylated peptides can be identified by capillary LC Q-TOF MS. Analysis of candidate ions by MS/MS revealed that there is N-linked occupancy of numerous sites as well as microheterogeneity of structure.

Ulf Lindahl (Uppsala University, Sweden) opened the session on “Complex Glycosaminoglycans” with a comprehensive overview of heparan sulphate (HS) structure and

function. Pulling together the major contribution of his own lab, with the work of other groups, on HS biosynthesis, HS-binding specificities of various proteins, and the results of biosynthetic enzyme knock-outs, he challenged the audience with the question: “how regulated does HS structure need to be?” HS clearly is highly regulated in its synthesis and final structure, with much structural diversity existing between HS from different organs. Recent evidence also demonstrates the existence of an extracellular 6-O-sulphatase that can also modulate HS structure post-synthetically. It has been assumed that tightly regulated structure imparts specific protein-binding properties, though antithrombin III still remains the only case in which a precise structure-function relationship between a defined HS sequence and a protein has been elucidated. The essential role of HS in development has clearly been shown by the failure of gastrulation in mouse embryos lacking HS polymerizing enzymes. However, knock-outs of individual enzymes (e.g. NDST-1, 2-OST-1 or GlcA C5-epimerase) responsible for the post-polymeric modification, and thereby the distinctive regulated structure, of HS show lethality only at late stages of embryo development. By then, much, apparently normal, organ development has occurred, even though this must have involved the appropriate co-ordinated activity of known HS-binding morphogens/growth factors. Similarly, transgenic over-expression of the heparanase enzyme, an endo- $\alpha$ -glucuronidase which partially fragments HS chains, gives rise to apparently normal and fertile animals despite their much reduced HS chain length.

John Gallagher (University of Manchester) spoke about the diversity in sulphation patterns within heparan sulphate. HS has regions that are highly N/O- sulphated, termed S-domains, interspersed with low/non-sulphated regions, enriched in N-acetylated disaccharide units, termed NA-domains. Recent studies have looked at the specificity of action upon HS of the K5 lyase enzyme isolated from the K5A bacteriophage. K5 lyase breaks down the glycocalyx of *E.coli* K5 polysaccharide, (GlcNAc 1-4 GlcA)<sub>n</sub>, which has an identical structure to polymeric unmodified heparan, the precursor of HS. This enzyme could partially fragment mature HS, and it has a preference for cleaving within HS sequences containing four or more N-acetylated units. Interestingly, N-sulfation inhibited the enzyme. Therefore, the K5 lyase was able to protect defined and unique regions of alternating

N-acetylated and N-sulfated disaccharides, which are known to be common in the HS chain, but have not been easily accessible for analysis before. These regions would appear to occur as transition zones between the NA-domains and S-domains of HS. Subsequently, he described a fast gel filtration approach for analysing the stability and stoichiometries of complex formation between heparin oligosaccharides of defined length and proteins. For example, as well as being able to investigate binary heparin-FGF1 interactions, it was possible to also investigate the formation of ternary complexes between heparin-FGF1 and the receptor FGFR2A.

Tarja Kinnunen (University of Liverpool) switched emphasis to the *C. elegans* developmental model, and what it can tell us about the role of HS in neuronal migration. Expression of the syndecan-1 HSPG gene (*sdn-1*) in neuronal cells, and the HS 2-O-sulphotransferase gene (*hst-2*) in various (neuronal, hypodermis and gonad) cells, coincide with the start of morphogenesis in mid-embryonic development. A *sdn-1* deletion mutant lacking the HS attachment site had specific neuron and axon path-finding defects. Similarly, *Hst-2* mutants are also defective in neuronal migration, but with a more diverse phenotype. In both *sdn-1* and *hst-2* mutants, specific serotonergic neurons (HSNs) fail to migrate to their positions in the vulva, giving rise to a defective egg-laying phenotype. However, in contrast to *sdn-1* mutants, the *hst-2* mutants have normal migration of canal-associated neurons (CANs), suggesting that 2-O-sulphation of HS is essential for HSN, but not CAN, migration.

Malcolm Lyon (University of Manchester) discussed new approaches for mapping protein-GAG interactions, using HGF/SF as a model protein. GAG oligosaccharides can be fluorescently tagged at their reducing termini using 2-aminoacridone. After incubation with a protein, the mixture can be run in a gel mobility shift assay on a native PAGE gel to assess protein binding. When oligosaccharides bind to the protein, the free oligosaccharide band becomes depleted and a new, slower-migrating band of oligosaccharide-protein complex appears. HGF/SF was shown to bind to a minimal size HS tetrasaccharide, but a hexasaccharide in the case of DS. Two highly truncated variants of HGF/SF, called NK1 and NK2, had identical binding properties to the full-length HGF/SF, which points to the GAG-binding site being located solely in the N-terminal region

encompassed by the smaller NK1 protein. The concept was also discussed of how zero-length cross-linking of fluorescently-tagged minimal oligosaccharides to proteins, followed by proteolytic digestion, can potentially liberate fluorescent neo-glycopeptides. These could be recovered, using their anionic character, and potentially analysed to identify the site of GAG attachment, and thus binding.

Romain Vivès (Institut de Biologie Structurale, Grenoble, France) followed with a demonstration of how a similar approach has been successfully used to map heparin-binding sites on proteins. Proteins can be immobilised onto heparin-linked beads, using the zero length cross-linking method. Subsequent exhaustive proteolysis of the beads with thermolysin, followed by vigorous washing, leaves specific peptides, derived from the GAG-binding site of the protein, remaining cross-linked to the beads. These peptides can then be identified by direct N-terminal Edman sequencing from the beads. This technique, for the identification of heparin-binding regions within a protein, potentially provides an alternative to more complex and time-consuming approaches, such as site-directed mutagenesis, for mapping critical residues. Two examples used to validate the approach were the chemokine RANTES and the gC envelope protein from the pseudorabies virus.

Toin van Kuppevelt (NCLMS University Medical Centre, Nijmegen, The Netherlands) discussed the potential for using phage-display technology to generate antibodies capable of distinguishing between different HS structures. He began by emphasizing the structural complexity of HS and the challenge this presents. The major technical barrier to acquiring a panel of sequence-specific, anti-HS antibodies is the poor immunogenicity of HS. So, he has proposed the use of semi-synthetic antibody phage-display systems, expressing single chain Fvs (scFvs), combined with 'biopanning' techniques, as a potential solution. An additional advantage is that the cDNA encoding a particularly useful scFv can be identified. He described antibodies successfully generated through this procedure that possess differing reactivities toward HS from various tissues. This included antibodies with selectivity towards tumour-associated epitopes, or reactivities with normal, but not rejected, renal tissue. An interesting application was the transfection of tumour cells with cDNA encoding for a specific anti-HS antibody that resulted in a block of HS

expression and a reduction in tumour size when the cells were implanted into mice. Finally, the requirement for well-defined oligosaccharide libraries or microarrays to aid the identification of the epitope specificity of such antibodies was underlined.

Claire Johnson (University of Manchester) discussed the changes in the levels and sulphation patterns of HS, and specific HSPGs, during the differentiation of embryonic stem (ES) cells into neuroectodermal precursors *in vitro*. She began by introducing the process of directed differentiation *in vitro* of ES cells into neural precursors, and also a neural differentiation assay monitored by flow cytometry. A comparison of ES cells and day 6 differentiated cells by FACS analysis, using a HS-specific antibody, revealed an increase in HS expression during differentiation. Parallel structural studies on the extracted HS indicated specific increases in N- and 6-O-sulphation associated with differentiation. She also revealed a characteristic 'plaque'-like patterning of HS upon ES cells, as visualised by immunocytochemistry, which was lost upon differentiation. RT-PCR data highlighted syndecan-4 as being the only HSPG significantly increased upon differentiation. Although there were also increases in NDST-4 and 3-O-ST expression, there was a surprising lack of dramatic alterations in expression of HS biosynthetic enzymes, considering the significant HS structural changes seen.

Briedgeen Kerr (University of Cardiff) reported on the development of a new antibody (BKS-1) specific to a keratanase-generated keratan sulphate (KS) neo-epitope, and its potential applications to the structural analysis of skeletal and corneal KS. The reactivity of BKS-1, which requires keratanase I treatment of KS but is not generated by keratanase II, was contrasted with that of the previously existing anti-KS antibody, 5D4, which recognizes internal linear sequences of disulphated N-acetyl lactosamine disaccharides. Data suggests that BKS-1 recognizes non-reducing N-acetylglucosamine 6-sulphate adjacent to a nonsulphated lactosamine disaccharide. Applications of BKS-1 presented, included the analysis of KS substitution of the CS attachment region of cartilage aggrecan during ageing.

James Fawcett (University of Cambridge) presented 'The Sigma-Aldrich Lecture' in which he considered the roles of proteoglycans (PGs) in the regeneration and plasticity of the central nervous system. He focused upon the chondroitin

sulphate proteoglycans (CSPGs), which are up-regulated following injury and appear to have predominantly inhibitory roles in regeneration and plasticity. He illustrated this with results from animal studies in which the injection of chondroitinase ABC at the site of neural injury enabled partial recovery of function, and commented that the relatively rapid timescale of the observed improvements pointed toward increased plasticity rather than regeneration as the likely cause. After defining plasticity, he developed this theme by introducing the concept of perineuronal nets, emphasizing the number of CSPGs found within these structures. Referring to examples of ocular dominance plasticity, he suggested that the developmental appearance of perineuronal nets coincided with loss of plasticity. Considering the roles of specific CS structures, he defined chondroitin 6-sulphate (C6S) as being more inhibitory than chondroitin 4-sulphate (C4S), and suggested that over-sulphation may promote axon growth. He went on to discuss the up-regulation of CS 6-O-sulphotransferase and HS 2-O-sulphotransferase mRNA expression, and concomitant increases in C6S and HS staining, at sites of injury, and described how the treatment of cells in culture with TGF $\beta$  or  $\alpha$  cytokines known to be released following injury, resulted in similar increases. Finally, he discussed the PGs identified within perineuronal nets, emphasizing PG differences between nets from different brain regions.

Gavin Brown (University of Lancaster) concluded the meeting with an ultrastructural investigation of the corneas of dermatopontin-knockout mice. He described how the collagen fibrils of the cornea are organised into lamellar layers, highlighting the importance of the uniformity of both fibril diameter and interfibrillar spacing, with the near hexagonal lattice arrangement of fibrils, providing corneal transparency. By reference to macular corneal dystrophies, as well as the lumican PG-knockout mouse, which both result in corneal opacity, he introduced the additional major contribution of KS-PGs to the maintenance of corneal transparency. Commenting on the observed KS-mediated interaction between lumican KSPG and dermatopontin, he described the phenotype of the dermatopontin-knockout mouse, emphasizing the loss of lamellar structure and reduction in stromal thickness at the posterior region, and consequent reduced corneal thickness. Though there is a 40% reduction in collagen content within the posterior region of the stroma, and an increase in the

interfibrillar space, there is no change in fibril diameter. The conclusion is that the loss of dermatopontin results in disruption of the long-range order of collagen fibrils.

## **MINUTES OF THE ANNUAL GENERAL MEETING 5<sup>th</sup> April 2004 17:00 Hulme Hall, Manchester**

The Chairman, Professor Bruce Caterson, called the Annual General Meeting of the British Society for Matrix Biology (BSMB) to order at 17:30. There were 18 members in attendance, plus 7 members of the BSMB Committee - Anthony Hollander (Secretary) Jay Dudhia (Treasurer), Graham Riley (Treasurer-elect), John Tarlton, Malcolm Lyon, Robert Lauder and Anne Vaughan-Thomas.

### **1. Minutes**

The draft Minutes of the AGM 2003, held on 31<sup>st</sup> March 2003 at St Catherine's College, Oxford, were sent out to all membership in June 2003. These were taken as a true and accurate record of that meeting and were accepted.

### **2. Matters Arising:**

All matters arising had been discussed at the Committee Meetings held in 2002/2003 and there were no items outstanding.

### **3. Secretary's report**

Membership: A detailed audit of membership had been undertaken by the new Secretary. As of today's AGM meeting, the Society has 464 members on its mailing list. 110 new memberships were received in the last period (AGM 2003- AGM 2004). There were 73 student members. It was noted that in addition there were 200 names on the membership list (including 47 students) with no record of payment of fees. An amnesty has been declared and all of these individuals were being contacted and invited to renew their membership immediately. A follow-up audit would determine the true number of paying members and this will be reported at the next AGM in 2005.

Communications: The Secretary reported that since the last AGM two BSMB Newsletters had been sent out: Connective Issues 62 (June 2003)

and 63 (January 2004). It was noted that in future the newsletter would only be sent out by email in order to save costs. All members with no recorded email address were to be written to requesting they provide an email address or else receive information via the website (<http://www.bsmb.ac.uk/>).

Meetings: The Spring 2003 meeting was held in St Catherine's College, Oxford on 31<sup>st</sup> March-1<sup>st</sup> April. The only Bursary recipient was Theresa Momberger. The IJEP poster competition winners were: Lyle Freeman, Sian Hancock and Alan Wright. The Autumn 2003 meeting was held at Imperial College, London. There were 4 bursary recipients: Aled Jones, Briedgeen Kerr, Hanane Gouizi and Sophie Flood.

The Secretary informed the membership about future BSMB meetings:

- The Autumn 2004 BSMB meeting is to be held at the University of Bristol in conjunction with the UK Tissue and Cell Engineering Society (TCES). The topic is "Cell Based Therapies" and it is being organized by: Professor Anthony Hollander and Dr. John Tarlton.
- The Spring 2005 BSMB meeting will be held at the University of Liverpool. The topic is "Collagens - from genes to fibrils" and it is being organised by: Dr. Anne Vaughan-Thomas.
- The Autumn 2005 BSMB meeting will be held at the University of Manchester. The topic is "Pathobiology of bone and cartilage" and it is organised by: Dr. Ray Boot-Handford and Dr. Mike Briggs.
- The Spring 2006 BSMB meeting will be held at Queen's College Cambridge. The topic is "Proteases - the cutting edge of cell biology and it is being organised by: Dr. Graham Riley.

New Committee Members: The Secretary reported on the process for appointment for new Committee members. Dr. Jay Dudhia had completed his term of office as Treasurer. Dr. Graham Riley had completed his term as an elected committee member but taken over as Treasurer. Two nominations were received for candidates to replace Dr. Riley. These were Dr. Ray Boot-Handford, University of Manchester (nominated by Prof. Mike Grant and Prof. Martin Humphries) and Prof. John Couchman, Imperial College (nominated by Prof. Roger Mason and Dr. Jay Dudhia). After some consideration the committee decided to recommend that instead of

holding a ballot it would appoint both to the committee, one as an elected member and one seconded for 3 years. This was approved unanimously by those members attending the AGM.

Two nominations were received for the position of young person's representative. These were Dr. Phillipa Callender (University of Cardiff) and Mr. Frank Cheung (University of Bristol). The committee had decided to recommend that both are seconded to the committee for 3 years, Dr. Callender as the Postdoc representative and Mr Cheung as student representative. This was approved unanimously by those members attending the AGM.

#### **4. Treasurer's report**

The Treasurer's report of 2003 was accepted as a true record of the financial state of the Society. It is attached as an Appendix to this Newsletter

#### **5. Close of Meeting**

The meeting was closed at 17:50.

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## British Society for Matrix Biology/UK Tissue & Cell Engineering Society

### *CELL BASED THERAPIES*

Wills Memorial Building, University of Bristol  
13<sup>th</sup> & 14<sup>th</sup> September 2004

#### Information

The Autumn meeting of the BSMB is joint with the TCES and will be held at the Wills Memorial Building in the Great Hall, University of Bristol, on Monday 13<sup>th</sup> September and Tuesday 14<sup>th</sup> September 2004. The meeting is organised by Anthony Hollander (University of Bristol; 0117 9595918; [A.Hollander@bristol.ac.uk](mailto:A.Hollander@bristol.ac.uk)) and John Tarlton (University of Bristol; [john.tarlton@bris.ac.uk](mailto:john.tarlton@bris.ac.uk)), who can be contacted for any further details. The meeting will include invited speakers from the USA, Europe and the UK; details are given in the programme.

The venue for the meeting is the grand and popular Great Hall of the Wills Memorial Building which is conveniently situated in the centre of Bristol, adjacent to the Bristol Museum on Queens Road. Posters, trade stands, catering and provision of refreshments will all be located close by, in the same building.

Accommodation will be available at Clifton Hill House (details can be found on the University of Bristol web site). Standard rooms are available.

There will be a Conference Dinner on the Monday evening in the First Class Dining Salon on the SS Great Britain. This is situated in the historic Bristol docks and will be reached by a 500 metre walk from the conference venue and a short ride on a privately rented ferry.

Please note that no lunch will be provided on Monday 13<sup>th</sup> September, prior to the start of the meeting. However, there are many opportunities for obtaining snacks, either while in transit, or within a short walk from the venue itself around the City Centre. For information on disabled persons access, please do not hesitate to contact the organisers.

General directions for getting to the University of Bristol can be found on the internet at <http://www.bristol.ac.uk/university/maps/> and a map of the University campus can be found at [http://www.bris.ac.uk/university/maps/map\\_detail](http://www.bris.ac.uk/university/maps/map_detail) which will allow you to locate Clifton Hill House and the Wills Memorial Building. There is limited car parking provision at Clifton Hill House and if you wish to park near to the Wills Memorial Building there are two NCP car parks located reasonably close by. Upon arrival, please report to Clifton Hill House if you have pre-booked accommodation. The conference registration desk will be situated in the Wills Memorial Building.

All early-bird registrations will be entered into a free draw for £10 prize. The closing date for early-bird registration is Friday 16<sup>th</sup> July 2004. Early registration is greatly appreciated as it reduces the administration burden on us, and aids in the provision of services at the conference. The deadline for the standard rate of registration will be Friday 30<sup>th</sup> July 2004, after which a late registration surcharge of £5 will be levied. The conference dinner will be available for booking on a first come first serve basis. Places will be limited, so book early!

**Poster and oral presentations may cover any area of matrix biology and tissue engineering. Abstracts do NOT have to be within the "Cell Based Therapy" theme.**

Submission of abstracts is strongly encouraged, as there will be a BSMB/IJEP sponsored poster competition (for eligible applicants, i.e. PhD students and young post-doctoral workers in their first three years) with 3 x £150 cash prizes to be awarded. Poster prizes will be awarded on the basis of votes cast by the delegates themselves. Also, significant opportunities exist within the programme for short talks (10 minutes duration + 5 minutes for discussion) to be given, based upon prior selection by the organisers from the submitted abstracts. As usual, all abstracts will be published in the International Journal of Experimental Pathology (IJEP).

**Cell Based Therapies**  
**A combined meeting of the BSMB and the UK TCES**  
**13<sup>th</sup>-14<sup>th</sup> September 2004, Bristol, UK**  
**Organizers: Professor Anthony Hollander & Dr. John Tarlton**

*Monday 13<sup>th</sup>*

**Welcome**

1:15-1:30 Anthony Hollander (BSMB)/Alicia El Haj (CTES)

**Cardiovascular repair**

1:30-2:15 Bob Nerem, Atlanta GA, USA (Vascular tissue engineering)

2:15-3:00 3 short talks

3:00-3:30 Tea and Posters

**Clinical applications-1**

3:30-4:00 Anders Lindahl, Gothenberg, Sweden (ACI)

4:00-4:30 Brian Ashton, Oswestry (Cartilage Repair)

4:30-5:00 Alessandra Pavesio, Abano Terme, Italy (Cartilage tissue engineering)

5:00-6:00 Posters and wine reception

7:30 Conference dinner

Tuesday 14<sup>th</sup>

**Biomaterials**

9:00-9:30 Paul Hatton, Sheffield (Biomaterials for tissue engineering)

9:30-10:00 Kevin Shakesheff, Nottingham (Injectable biomaterials)

10:00-10:30 Dr. Jean-François Clémence, Wolhusen, Switzerland (Natural Biomaterials)

10:30-11:00 Coffee and Posters

**Gene therapy**

11:00-11:30 Andrew Newby, Bristol (Cardiovascular gene therapy)

11:30-12:00 Chris Evans, Boston, MA, USA (Orthopaedic gene therapy)

12:00-12:30 2 short talks

12:30-1:30 Lunch

**Cell regulation**

1:30-2:00 Ivan Martin, Basel, Switzerland (Regulation of chondrocyte differentiation)

2:00-2:30 Ranieri Cancedda, Genoa, Italy (Stem Cells)

2:30-3:00 2 short talks

3:00-3:30 Tea and Posters

**Clinical applications-2**

3:30-4:00 Richard Smith, Bristol (Pancreatic islet transplantation)

4:00-4:30 Sheila MacNeil, Sheffield (Skin equivalents)

4:30-5:00 2 short talks

British Society for Matrix Biology  
BSMB/TCES AUTUMN MEETING, 13<sup>th</sup> & 14<sup>th</sup> September 2004  
Wills Memorial Building, University of Bristol  
CELL BASED THERAPIES

## Registration Form

Early-Bird Registrations will be entered into a free draw for £10 prize. Closing date for early-bird registrations 16<sup>th</sup> July 2004

Standard rate Registrations closing date 30<sup>th</sup> July 2004  
After this date delegates will be charge a late registration surcharge of £5

Title:..... Family/Last name:.....First name:.....

Correspondence Address (please include postcode):.....  
.....  
.....  
.....

Tel:..... Fax:..... Email:.....

Special Dietary Requirements (please specify e.g. vegetarian, none etc):.....

### REGISTRATION FEES

(click which applies. Fee includes coffee/tea both days; lunch on Tuesday):

Registration for BSMB members £50:-.....

Registration for Student BSMB members £40:-.....

Registration for Non-members £60:-.....

Registration for Student Non-members £50:-.....

Late Registration surcharge (after 30<sup>th</sup> July 2004) £5:-.....

ACCOMMODATION: at Clifton Hill House (includes English/continental breakfast):

(Single,Standard,Student,Study bedroom - £20 per night) 13<sup>th</sup> September:- .....

14<sup>th</sup> September:- .....

CONFERENCE DINNER: Monday 13<sup>th</sup> September, SS Great Britain: £35:-.....

TOTAL ENCLOSED: \*£.....

\*(All cheques should be made payable to "British Society for Matrix Biology")\*

Please return registration form with payment to:

Jane Lohmann

University of Bristol Academic Rheumatology

Department of Clinical Science at North Bristol

Avon Orthopaedic Centre

Southmead Hospital

Bristol BS10 5NB UK

For further information please contact Anthony Hollander or Jane Lohmann on Tel +44 (0)117 959 5918

or email [J.M.Lohmann@bristol.ac.uk](mailto:J.M.Lohmann@bristol.ac.uk) or [john.tarlton@bris.ac.uk](mailto:john.tarlton@bris.ac.uk)

## INSTRUCTIONS FOR SUBMISSION OF ABSTRACTS

BSMB AUTUMN MEETING 13<sup>th</sup>–14<sup>th</sup> September 2004  
**British Society for Matrix Biology/Tissue & Cell Engineering Society**  
**CELL BASED THERAPIES**

Wills Memorial Building, University of Bristol

Abstracts should be submitted by email and structured according to the format below using **Times New Roman font, text size 12-point as a MS Word document.**

The text should fit within a box size of 16cm x 26cm.

**Abstracts not conforming to these specifications or with incomplete information may NOT be published.**

### Information for Poster Presenters

**The deadline for submission of abstracts is Friday, 16<sup>th</sup> July 2004**

The poster boards will be **1m high by 1.5m wide**. Posters must be fixed with Velcro. Some Velcro will be available at the meeting, but please try and bring your own!

Please indicate whether you wish your abstract (i) to be submitted for the Poster Prize competition (presenter must be a PhD student member or be within their first three year post-doc appointment) and (ii) to be considered for an oral presentation (10 mins. + 5 mins. discussion).

**Please ensure that you also complete a Registration form and return your payment as detailed on the Registration Page.**

**Title in bold**

**Authors in bold**

Affiliations

Introduction

Materials and methods

Results

Discussion

**References**

Authors (Date) title Journal Name vol. xx-xx

Submit abstracts as an email attachment to the email address below.

Email abstracts to: Professor Anthony Hollander, [A.Hollander@bristol.ac.uk](mailto:A.Hollander@bristol.ac.uk)

When you submit your abstract by email, please indicate the name of **Corresponding Author, with fax and telephone numbers.**

# APPENDIX

## **ANNUAL REPORT AND ACCOUNTS**

**BRITISH SOCIETY FOR MATRIX BIOLOGY**  
**ANNUAL REPORT AND ACCOUNTS**  
**FOR THE YEAR ENDED 31<sup>ST</sup> DECEMBER 2003**

**n.g.lachman & co**  
**Chartered Accountants**  
**14 Meadow Road Pinner Middx. HA5 1EB**

## BRITISH SOCIETY FOR MATRIX BIOLOGY

### ANNUAL REPORT FOR THE YEAR ENDED 31<sup>ST</sup> DECEMBER 2003

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#### Legal and Administrative Information

The British Society for Matrix Biology is governed by its constitution adopted on 19<sup>th</sup> September 1980, and is a registered charity No 281399. Its address is at the Royal Veterinary College, Department of Veterinary Basic Sciences, Royal College Street, London NW1 OTU. The charity's trustees during the year to 31<sup>st</sup> December 2003 were:

Professor Bruce Caterson	(Chairman )
Professor Anthony Hollander	(Honorary Secretary)
Dr. Jayesh Dudhia	(Honorary Treasurer)
Dr. Anthony J. Day	(Elected Member)
Dr. Alison Reith	(Elected Member)
Dr. Graham Riley	(Elected Member)
Dr. Malcolm Lyon	(Elected Member)
Dr. John Tarlton	(Elected Member)
Dr. Drew Rowan	(Elected Member)
Professor Timothy E Hardingham	(Ex-Officio)
Dr. Rose Maciewicz	(Ex-Officio)

The object of the charity is to advance the science of connective tissue and related subjects; to further public education therein; to promote study and research work on connective tissues and related areas and to publish the results of such study and research.

The trustees' policy is to act as necessary on behalf of the Society; and report on such actions, as indicated, to the next meeting of the Society.

The charity is dependent on an annual subscription from Ordinary Members engaged in or directing work of the nature indicated above, and on sponsorship money obtained as donations for holding Scientific Meetings and Symposia.

#### Review of Financial Activities

The Society's assets at the end of 2003 totalled £52,400, represented by our NatWest Bank Charity Bond, and by Current and Deposit accounts.

Following the redemption of the Society's National Savings Deposit Bonds with a cash value of £31,900, I have invested £30,000 into a NatWest Charity Bond scheme offered by our bankers Nat West Bank Plc.

This is a risk free investment of our surplus funds, offering an attractive interest rate of 3.4% (paid gross and tax-free) which will earn £1,028 in the first year. There is also sufficient slack in our reserve account to allow a further £10,000 to be added to the NatWest Charity Bond in 2004.

This year saw the return to our normal format of a spring and autumn meeting after having hosted the XVIIIth FECTS meeting. I am pleased to announce that the final accounts for the FECTS meeting show a smaller loss (£241) than I had estimated at the AGM in 2003. This cautious overestimate was not borne out in the final settlement of invoices with the professional conference organisers used for the meeting. The current account (number 2) specifically opened for this meeting has now been closed.

This year the Spring meeting was held in Oxford and the Autumn meeting at Imperial College, London. Both meetings were of an excellent standard and the organisers did a splendid job in raising sufficient sponsorship to run their respective meetings within their budget.

Once again we had a modest number of bursary requests to attend the BSBM meetings this year; 5 were awarded totalling £515, and a further 3 totalling £300 were awarded for the best poster at the Oxford meeting. The International Journal of Experimental Medicine (IJEP) has very kindly continued to sponsor these poster competitions.

Finally as this will be my last financial report before I step down as Honorary Treasurer of the Society, I would like to take this opportunity to thank all the committee members over the past few years who have been fantastic to work with and helped to make my task easier. And of course thanks to all the Meeting Organisers who managed to keep my book-keeping in the black.

This concludes my financial report for 2003.

On behalf of the board of trustees

.....  
**J. Dudhia (Honorary Treasurer)**

**Dated:**

**BRITISH SOCIETY FOR MATRIX BIOLOGY**

**INDEPENDENT EXAMINER'S REPORT TO THE TRUSTEES OF THE  
BRITISH SOCIETY FOR MATRIX BIOLOGY**

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We have carried out an independent examination of the accounts set out on pages 4 to 7 for the year ended 31<sup>st</sup> December 2003.

**Respective responsibilities of trustees and examiner**

As the charity's trustees, you are responsible for the preparation of the accounts; you consider that the audit requirement of Section 43(2) of the Charities Act 1993 (the Act) does not apply. It is our responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under Section 43(7) of the Act, whether particular matters have come to our attention.

**Basis of independent examiner's report**

Our examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the accounts presented with those records, It also includes consideration of any unusual items or disclosures in the accounts, and seeking explanations from you as trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently, we do not express an audit opinion on the view given by the accounts.

**Independent examiner's statement**

In connection with our examination, no matter has come to our attention

1. which gives us reasonable cause to believe that in any material respect the requirements,
  - to keep accounting records in accordance with Section 41 of the Act; and
  - to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the Act.

have not been met; or

- 2 to which, in our opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

**n. g. lachman & co.**  
**Chartered Accountants,**  
**14 Meadow Road,**  
**Pinner,**  
**Middlesex HA5 1EB**

**Dated:**

**BRITISH SOCIETY FOR MATRIX BIOLOGY**

**Statement of Financial Activities  
For the year ended 31<sup>st</sup> December 2003**

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		<b>2003</b>		<b>2002</b>	
	<b>Notes</b>	<b>£</b>	<b>£</b>	<b>£</b>	<b>£</b>
<b>Incoming Resources</b>					
Subscriptions and donations		3,213		3,309	
Income from meetings	2	43,355		100,661	
Interest receivable		454		779	
Sundry income		605		-	
		<hr/>		<hr/>	
<b>Total incoming resources</b>		<u>47,627</u>		<u>104,749</u>	
		47,627		104,749	
<b>Resources expended</b>					
FECTS Meeting expenses	2	(4,836)		105,738	
Other Meetings expenses		38,951		380	
Bursaries and grants		815		1,750	
Committee travelling expenses		819		-	
General Expenses		64		220	
Printing postage and stationery		107		-	
Subscription refunds		-		112	
Secretarial fees		150		265	
Accountancy fees		391		747	
		<hr/>		<hr/>	
		(36,461)		(109,212)	
Net incoming / (outgoing) resources for the year		<hr/>		<hr/>	
		11,166		(4,463)	
Fund balances as at 1 <sup>st</sup> January 2003		41,234		45,697	
<b>Fund balances as at 31<sup>st</sup> December 2003</b>		<hr/>		<hr/>	
		£52,400		£41,234	

**BRITISH SOCIETY FOR MATRIX BIOLOGY**

**Balance Sheet**

**as at 31<sup>st</sup> December 2003**

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		<b>2003</b>		<b>2002</b>	
	<b>Notes</b>	<b>£</b>	<b>£</b>	<b>£</b>	<b>£</b>
<b>Investments</b>	3		30,000		-
<b>Current assets</b>					
Debtors	4	300		3,275	
Bank deposit accounts		23,495		35,909	
Bank current account		(895)		10,792	
		<u>22,900</u>		<u>49,976</u>	
<b>Liabilities</b>					
Creditors	5	(500)		(8,742)	
		<u>          </u>		<u>          </u>	
			22,400		41,234
			<u>          </u>		<u>          </u>
<b>Total assets less liabilities</b>		<u>£ 52,400</u>		<u>£ 41,234</u>	
		<u>          </u>		<u>          </u>	
<b>Funds</b>					
Unrestricted funds at 31 <sup>st</sup> December 2003		<u>£ 52,400</u>		<u>£41,234</u>	
		<u>          </u>		<u>          </u>	

The accounts were approved by the trustees on

and signed on their behalf by:

.....  
**Trustee: Dr. J. Dudhia**

**Dated:**

**BRITISH SOCIETY FOR MATRIX BIOLOGY**

**Notes to the accounts  
for the year ended 31<sup>st</sup> December 2003**

**1. Accounting policies**

The accounts have been prepared under the historical cost convention, on the accruals basis, and in accordance with the Statement of Recommended Practice "Accounting by Charities".

<b>2. Meeting</b>	<b>Oxford 2003</b>	<b>Imperial 2003</b>	<b>FECTS 2003</b>	<b>FECTS 2002</b>
	<b>£</b>	<b>£</b>	<b>£</b>	<b>£</b>
<b>Income from Meeting</b>				
Registration	15,357	12,056		93,310
Sponsorship and Advertising	<u>6,043</u>	<u>9,900</u>		<u>7,351</u>
	<u>21,400</u>	<u>21,956</u>		<u>100,661</u>
<b>Meeting Expenses</b>				
Speakers travel	1,144	3,674		4,647
Hall hire, lunches and dinner /accommodation	16,583	16,421		30,117
Audio visual costs	-	-		20,167
Medical centre and stewards	-	-		2,008
Conference organisers costs	-	-	(4,836)	19,362
Accommodation deposits	-	-		21,154
Postage printing and website costs	-	657		6,159
Bursaries and grants	-	-		1,050
Committee travel expenses	-	-		763
Refunds	473	-		311
	<u>18,200</u>	<u>20,752</u>	<u>(4,836)</u>	<u>105,738</u>
<b>Surplus/(Deficit) on Meetings</b>	<b><u>£ 3,200</u></b>	<b><u>£1,204</u></b>	<b><u>£4,836</u></b>	<b><u>£(5,077)</u></b>

**3. Investments**

The investments by the society, in two National Savings Bonds, were redeemed on 28<sup>th</sup> June 2002 at a value of £31,900. The society has now invested the sum of £30,000 with a Nat West Charity Bond.

<b>4 Debtors</b>	<b>2003</b>	<b>2002</b>
	<b>£</b>	<b>£</b>
Index Communications	-	2,765
Oxford Meeting (payment in advance)	-	510
Sponsorship	300	-
	<u>300</u>	<u>3,275</u>

**BRITISH SOCIETY FOR MATRIX BIOLOGY**

**Notes to the Accounts  
for the year ended 31<sup>st</sup> December 2003**

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<b>5. Creditors</b>	<b>2003</b>	<b>2002</b>
	<b>£</b>	<b>£</b>
Oxford Meeting (receipts in advance)	-	2,243
Imperial Meeting (receipts in advance)	-	500
Accruals:		
Index Communications	-	4,836
Accountancy fees	350	600
Secretarial fees	150	250
Due to HM Customs and Excise	-	284
Brighton Dome	-	29
	<hr/>	<hr/>
	500	8,742
	<hr/>	<hr/>