Welcome to this second edition of the JoCB Bulletin containing items of information for the Chemical Biology Community

The range of subject areas included in the conferences below reflects the wider range of specialisms of the extended editorial board as well as the expanding interest in this field of study.

There are two book reviews included below and a new item called Co-workers Corner where papers or items of particular interest to researchers can be brought to your attention.

Dr C A Rosser
Director of Studies
Rye St Antony School
Oxford, OX3 0BY, United Kingdom
email: crosser@ryestantony.co.uk

Gordon Research Conferences

Molecular Energy Transfer
Building A Molecular Picture Of Nature

Date: January 18–23, 2009

Venue: Four Points Sheraton / Holiday Inn Express Ventura, CA

Chair: Floyd Davis

Understanding how energy flows within and between molecules is essential to the development of a fundamental understanding of the nature of all chemical processes. The deepest understanding can be achieved when phenomena are studied at the molecular level, connecting quantum-state, time-resolved and other modern methods of experimentation to ab initio theoretical study. The Gordon Research Conference on Molecular Energy Transfer will bring together scientists concerned with a wide variety of topics spanning chemistry, physics and biology, yet unified by the idea that developing a molecular picture of chemical dynamics is a central goal of their endeavors.

Further information:
http://www-ref.usc.edu/~krylov/grcomet2009/index.html
Gordon Research Conferences
Metals In Biology

Date: January 25–30, 2009
Venue: Four Points Sheraton / Holiday Inn Express Ventura, CA
Chair: Peter M. Kroneck

Metals play key roles in maintaining life. You will have a hard time finding one important process within the living cell that does NOT depend on a metal ion in the context of either function or structure. Metals are located at the heart of sophisticated molecular machines, ready to conserve energy, ready to cope with toxic gases, or ready to send out signals to trigger or terminate important reactions. The highly interdisciplinary Metals in Biology Gordon Conference (MIB) is one of the longest-running in the GRC family. It provides a forum for leading researchers with expertise that spans from physical techniques and synthetic chemistry through biology and biomedicine to meet and discuss topics of common interest.

Further information:
http://www.grc.org/programs.aspx?year=2009&program=metalsbio

Further information:
http://www.antiangio2009.com/abstract
6th International Conference on Biomedical Applications of Nanotechnology

The Nanobiophysics & Chemistry Conference addresses progress and prospects in Nanobiophysics & Chemistry including nano and microfluidics, single molecule techniques, biomimetics and sensing, biomolecules in confined environments, in vivo imaging, forces in biomolecular systems, manipulation of biomaterials, spectroscopy of biomaterials, nanoparticles in biological environments, force microscopies, simulation of biomolecules and biomolecular assemblies at the atomic and coarse grained scales. The conference will also provide an overview of the latest developments in bionano physics and chemistry.

Further information:
http://nm09.nanoevents.de/

The Biophysical Society’s 53rd Annual Meeting

Date: February 28 – March 4, 2009
Venue: Boston Convention and Exhibition Center
415 Summer Street Boston, MA 02210

The largest gathering of biophysicists around the world, this meeting includes Symposia, Workshops, Minisymposia, Subgroup Programs, and the National Lecture, as well as Educational Exhibits, Exhibitor Presentations, and Committee Events.

Further information:
http://www.biophysics.org/Default.aspx?alias=www.biophysics.org/2009meeting
The Molecular Basis of Schizophrenia and Bipolar Disorder

Date: March 6–10, 2009
Venue: Keystone Resort, Keystone, Colorado

This meeting brings together experts in a range of disciplines to discuss the molecular bases of bipolar disorder and schizophrenia. Among the topics to be explored include emerging data from genetics implicating new genes and genetic variation in disease; the current status of the epidemiology, including environmental factors, and boundaries of the disorders; the genetics and neurobiology of several current candidate genes and pathways; and the relevance of advances in neurogenesis, fast-evolving brain genes, and cerebral circuitry development. The overall goal of this meeting is to integrate molecular studies across basic and clinical disciplines and facilitate the development of new approaches.

Further information:
http://www.keystonesymposia.org/Meetings/ViewMeetings.cfm?MeetingID=1008&utm_source=0910Catalog&utm_medium=1008&AllowFutureView=1&CFID=3402849&CFTOKEN=59397970

ACS National Meeting & Exposition Spring 2009

Date: Sunday, March 22 – Thursday, March 26
Venue: Salt Lake City, UT, USA

Join us in Salt Lake City for a rich program of scientific papers on a variety of multidisciplinary topics, including thematic programming around nanoscience highlighted by a keynote and a plenary session. As always, the meeting will offer a wide array of networking opportunities, continuing education activities, and specialized student programs, as well as the ACS Career Fair and National Exposition.

Further information:
http://www.portal.acs.org/portal/acs/corg/content

Synthetic Biology, Systems Biology and Bioinformatics

Date: 23–25 March 2009
Venue: West Road, University of Cambridge, UK

Further information:
http://conferences.theiet.org/biosysbio/
Meeting on Nanotechnology, Liposomes and Health

Date: April 17–20th 2009
Venue: Club Med Itaparica Island, Bahia, Brazil

The congress will focus on recent advances and trends in the research of natural and artificial membranes with special emphasis on nanomedicine. This international gathering of academic and industrial researchers and students from around the world will feature plenary sections and posters.

Further information:
http://www.liposomes.org/2008/12/meeting-on-nanotechnology-liposomes-and.html

RSC Advances in Biocatalysis

Date: 21 April 2009 09:30–16:45
Venue: University College London IZ Young Lecture Theatre Anatomy Department Gower Street London United Kingdom

The RSC Biotechnology Group and Chemistry Biology Interface Forum would like to invite you to participate in this exciting 1-day symposium. The purpose of the meeting is to highlight recent achievements and to identify future challenges and drivers in the field of biocatalysis. As will be seen, analytical and process engineering, genetics, biochemistry, and not least—chemistry, are being harnessed to deliver a new generation of highly selective cellular and enzyme catalysts for synthesis.

Further information:
http://www.homepages.ucl.ac.uk/~ucbepad/RSCbiocatalysis.html
**PI 3-Kinase Signaling in Disease**

**Date:** April 22–27, 2009  
**Venue:** Resort at Squaw Creek, Olympic Valley, CA  

Further information:  
http://www.keystonesymposia.org/Meetings/ViewMeetings.cfm?MeetingID=963

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**43rd European Symposium on Bio-Organic Chemistry Vitamins and Cofactors**

**Date:** April 24–26th 2009  
**Venue:** Gregynog, Powys, Wales, UK

Further information:  
http://www.esboc.org

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**Gordon Research Conferences**

**Bioorganic Chemistry**

**Date:** June 14–19, 2009  
**Venue:** Proctor Academy Andover, New Hampshire USA  
**Chairs:** Nicole S. Sampson & Stewart L. Fisher  

The Gordon Research Conference on Bioorganic Chemistry was founded in 1992 to bring together scientists from a range of disciplines to present and discuss cutting-edge research at the interface between chemistry and biology. Both fundamental and applied research relevant to academia and industry are highlighted. To maintain a balance between these areas, the conference is organized by two co-chairs, one from academia and one from industry. The conference emphasizes the presentation of techniques or approaches that are broadly applicable across multiple areas of chemical and biological research. Traditionally, small molecules that probe, modulate, or mimic cellular components or processes as well as studies of biology at the molecular level have been of particular interest.

Further information:  
http://www.grc.org/programs.aspx?year=2009&program=bioorg
It is our great honor to host ICBIC 14 in Nagoya, Japan in July 25–30, 2009. The Major Subjects currently planned in ICBIC 14 includes the traditional bioinorganic subjects, in addition, we will organize metal-protein assemblies as nano-biomaterials as well as bioinspired architectures.

Further information:
http://icbic14.chem.nagoya-u.ac.jp/

The 23rd Annual Symposium of The Protein Society

Proteins In Motion

Date: July 25–29, 2009

Venue: Boston, Massachusetts, Boston Marriott Copley Place

Two Plenary Sessions will be featured on the topics of “Dynamics and Thermodynamics” and “Allostery.” The 2009 Society Awards will be presented in two Awards Plenary Sessions, and awardees will present plenary lectures. Scientific sessions will address folding, design, trafficking, membrane remodeling, therapeutics and targets, dynamics of protein nucleic acid interactions, disorder, drug resistance, cytoskeleton dynamics, dynamic complexes and networks, signaling, and translocation and transport.

Further information:
http://www.proteinsociety.org/symposium23rd/proteininmotion.htm
Gordon Research Conferences

Natural Products

Date: July 26–31, 2009
Venue: Tilton School Tilton, New Hampshire USA
Chair: Marvin M. Hansen

The 58th Natural Products Gordon Research Conference will continue a tradition of excellence in a broad range of areas relating to natural products chemistry and isolation, novel synthetic methods, chemical biology, bioorganic and medicinal chemistry. The speakers in this year’s outstanding lineup will deliver lectures in topics as diverse as catalytic synthetic methodology, the use of natural product like molecules as tools to probe and better understand biological systems, and recent advances in drug discovery. The conference will have geographically diverse representation and will include speakers from both academic and industrial settings. This year’s Natural Products GRC will also include a series of poster presentations that will afford an ideal opportunity the exchange of findings and ideas in an informal setting.

Further information:
http://www.grc.org/programs.aspx?year=2009&program=natprod

The scientific programme will be prepared by the European Crystallographic Association and the leading persons of the Special Interest Group network. The congress will cover all topics of crystallography, including Biological and Macromolecular Crystallography, Materials and Minerals, Chemical Crystallography, Experimental and Computational Techniques and Fundamental Crystallography. Internationally renowned speakers will be invited to present these topics, in order to create an enjoyable scientific atmosphere for interactive discussions.

Further information:
http://ecm25.ecanews.org/
Date: September 19–20, 2009,
Venue: The Royal Sonesta Hotel, Cambridge, MA, USA

The 2009 symposium will explore how chemical biology is opening up new avenues for identifying therapeutic targets and discovering small molecule drugs. This 2-day meeting will address the following topics, across a range of diseases:

- Cell-based screening and target deconvolution
- Targeting pathways and systems
- Expanding druggable chemical space
- Expanding druggable targets

If you want us to send you further information about the meeting, send an email to: nchembioconf@nature.com

Further information:
http://sebbm.bq.ub.es/XXXIICongreso/

10th International Symposium on Applied Bioinorganic Chemistry

Further information:
http://www.isabc10.unideb.hu
Chemical Biology: The Role of Chemistry in our Fundamental Understanding of Biology

Date: 25–28 September, 2009
Venue: Debrecen, Hungary

A new series of 18 talks on Chemical Biology is now available—online and streamed to your desk with username and password access. It is the most recently released series in The Biomedical and Life Sciences Collection.

The entire Biomedical and Life Sciences Collection, which now numbers over 800 talks by world leading experts, can be accessed at www.hstalks.com <http://frallc.msgfocus.com/c/11DlxAmvvs3G3krBH>.

Full information can be obtained at the collection website www.hstalks.com <http://frallc.msgfocus.com/c/11DlzSzGoHUwldnG8>.

Individual and research group licenses for The Biomedical and Life Sciences Collection are now available, take a quick look by clicking here <http://frallc.msgfocus.com/c/11DICaMRhXLmD6jKz>.

Biophysical Chemistry by James P. Allen

ISBN: 978-1-4051-2436-2
Hardcover
512 pages
August 2008
Wiley-Blackwell
£45.00/€56.30/$70

‘Biophysical Chemistry’ aims to give the reader an understanding of the fundamental physical chemistry concepts and show how they be applied to biological problems. It is primarily aimed at undergraduate biochemistry students, but is also deemed suitable for those who study biology, chemistry, physics and mathematics.

The book is well organized and structured, with its content being divided into three sections: Thermodynamics and Kinetics, Quantum Mechanics and Spectroscopy and Understanding Biological Systems using Physical Chemistry. Within these sections the book manages to cover a wide range of self contained chapters including enzyme kinetics, X-ray diffraction, signal transduction and molecular imaging. The book builds on the basic principles conveyed in the first section to reinforce the more complex material found in the later parts. The final section ‘Understanding Biological Systems using Physical Chemistry’ seeks to apply the principles taught in the initial chapters to broad scale biological systems, such as photosynthesis.

Learning is often facilitated through the understanding of raw scientific data and real-life examples. For example, the Heisenberg Uncertainty Principle is applied to the sport baseball. Clear, colourful and often eye-catching diagrams are successfully used throughout the book to demonstrate each principle to the reader. The quantitative and qualitative problems presented to the reader at the end of each chapter, along with the detailed answers that follow at the end of the book, will act as a comprehensive revision aid for students.
In contrast to many other biophysical textbooks, the author manages to communicate mathematical derivations to the reader in a clear and accessible manner. A step-by-step approach, where basic mathematical concepts are explained throughout the derivation, is used to great effect. However, for the less mathematically inclined, the more demanding derivations are shown within large self contained boxes, which can easily be skipped.

The authors use of ‘Research Directions’ to convey the latest research as applied to each topic is a highlight of the book. Research concepts covered include both relatively specialised research, such as the application of protein folding and prions to statistical thermodynamics, and more broad topics, such as global climate, as described in the context of the first law of thermodynamics. Importantly, the book also offers the reader an overview of the main historical developments of each topic.

Overall, ‘Biophysical Chemistry’ is an outstanding book that delivers both fundamental and complex biophysical principles, along with an excellent overview of the current biophysical research areas, in a manner that makes it accessible for mathematically and non-mathematically inclined readers. The book can be considered essential reading for any undergraduate student who wishes to gain an insight into the biophysical world.

By Jessica Knott.
Chemical Biology Centre, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.
jessica.knott05@imperial.ac.uk

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**Essentials of Chemical Biology: Structure and Dynamics of Biological Macromolecules**
by Andrew D. Miller, Julian Tanner

As an emerging discipline, chemical biology faces something of an identity crisis. There has been much debate about what chemical biology is, or even whether it just represents a rebranding exercise: an inevitable consequence as traditional subject boundaries are blurred and new disciplines evolve. Furthermore, the “cultural gap” between the physical and biological sciences provides an additional barrier to establishing a holistic definition of the field.

Andrew Miller and Julian Tanner adopt a strictly reductionist approach in their textbook “Essentials of Chemical Biology: Structure and Dynamics of Biological Macromolecules” by focusing on molecular structure, characterisation and quantitative interactions. The initial chapters of the book consider the structure and synthesis of biologically relevant macromolecules. A chapter is devoted to key techniques in molecular biology before the book moves on to spectroscopy and characterisation techniques, molecular recognition, and enzyme kinetics. The final chapter is devoted to molecular selection and evolution.

The book is written in a clear and concise style with extensive illustrations to aid the reader’s understanding. References are provided for those readers looking for more detail on a particular topic. According to the authors, this book is aimed at final
years graduate students and junior researchers with a chemical background, however this audience is likely to be familiar with much of this material, in particular the early sections on the structure and synthesis of biological macromolecules.

By contrast, several techniques widely encountered in chemical biology are given little or no coverage. Only one brief paragraph is assigned to the use of small molecules to study protein function (“chemical genetics”) and little attention is paid to molecular modelling and computational techniques. In a wide-ranging field such as chemical biology an introductory textbook must necessarily sacrifice some coverage, however these topics would arguably be of significant interest to the target audience. Nevertheless, the succinct and lucid presentation style of “Essentials…” will likely make it a popular resource for undergraduate and graduate students interested in the structure and interaction of biologically relevant macromolecules.

By Richard M. Gunn.
Chemical Biology Centre, Imperial College London, Exhibition Road, London, SW7 2AZ, UK. richard.gunn05@imperial.ac.uk

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Co-workers Corner

Resolving cadherin interactions and binding cooperativity at the single-molecule level

PNAS January 6 2009 vol. 106, no. 1, 109–114 [1]

E-cadherins: cis, trans or both?

Researchers from the University of California have attempted to demystify the controversy surrounding the mechanism of homophilic binding of E-cadherin, a membrane cell adhesion molecule. E-cadherin plays an important role in neuronal development and tissue organisation, functioning by binding homophilically via its extracellular domains (EC1-5). Methods including X-ray crystallography, electron microscopy, chemical crosslinking and gel filtration have been deployed previously to determine the oligomerisation state of E-cadherin, although the domains involved in these interactions is highly disputed. In this research fluorescence resonance emission transfer (FRET) was carried out on fluorophore-labelled EC1-5 of E-cadherin to determine whether the monomeric units form cis or trans dimers. The research revealed that dimeric trans units are formed, mimicking an in vivo situation where an E-cadherin molecule on the surface of one cell would bind to another on the surface of the opposing cell. Atomic force microscopy revealed that forced clustering of E-cadherin in cis increased the probability of later trans cadherin binding.

Figure taken from [1] with permission. Copyright 2009 National Academy of Sciences, U.S.A

A review by Kate Bowman.
Chemical Biology Centre, Imperial College London, Exhibition Road, London, SW7 2AZ, UK. k.bowman06@imperial.ac.uk

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Identification of novel small-molecule histone deacetylase inhibitors by medium-throughput screening using a fluorogenic assay

Biochem J 2008 413, 143–50 [2]

Inhibitors of histone deacetylases (HDACs) have attracted attention in recent years as potential anticancer agents by decreasing levels of histone acetylation and repressing transcription of cell growth and survival genes. Using medium-
throughput screening of a synthetic compound library against a bacterial HDAC-like aminohydrolase (HDAH) as a model enzyme, researchers in Germany and Russia have identified 10 novel small-molecule HDAC inhibitors. Half of the novel inhibitors belong to different structural classes from the known HDAC inhibitors, with all exhibiting IC$_{50}$ values of less than 10 µM. Inhibitor 46F08, a trifluoromethyl ketone (a compound class known to inhibit zinc-dependent enzymes) was also found to block rat liver HDAC activity. 46F08 was also found to reduce the metabolic activity of SHEP neuroblastoma cells but had no effect on normal human fibroblasts, indicating a tumour-cell specificity by the compound. These novel HDAC inhibitors will potentially provide the basis for further derivitisation and development of increased efficiency anticancer drugs.

Figure taken from [2] with permission

A review by Kate Bowman.
Chemical Biology Centre, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.
k.bowman06@imperial.ac.uk

Targeted polypharmacology: discovery of dual inhibitors of tyrosine and phosphoinositide kinases

Nature Chemical Biology Vol 4, No. 11, 2008

The therapeutic potential of PI(3)K inhibitors in cancer treatment has been highlighted recently, with some molecules being entered into clinical trials. Collaboration between the University of California, the MRC laboratory of Molecular Biology and Invitrogen has been carried out to find novel, dual activity inhibitors of both PI(3)Ks and tyrosine kinases. Previously using tyrosine kinase inhibitors has lead to downstream reactivation of PI(3)K signalling, therefore undoing any inhibitory effect on the cell cycle. The researchers found two pyrazolopyrimidines, S1 and S2, which served as lead compounds, which were further derivitised revealing inhibitors of PI(3)Ks and tyrosine kinases with IC$_{50}$ values in some cases, of less than 0.1 µM. Crystal structures of S1 and S2 bound to p110γ showed that the promiscuity of the inhibitors is achieved by a rotatable bond, which allows binding in a conserved hydrophobic pocket of the enzymes. The discovery of this interesting chemical feature may allow the elucidation of further promiscuous kinase inhibitors.

A review by Kate Bowman.
Chemical Biology Centre, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.
k.bowman06@imperial.ac.uk