

# Molecular BioSystems

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## IN THIS ISSUE

ISSN 1742-206X CODEN MBOIBW 4(11) 1033-1140 (2008)



### Cover

See Nina Y. Yao and Mike O'Donnell pp. 1075-1084.

The main image, designed by Nina Y Yao, illustrates replisome dynamics and the use of DNA trombone loops to bypass replication blocks. Inset is a picture of Professor Bruce Alberts helping to bring science to life in a San Francisco school. Image reproduced by permission of Professor Bruce Alberts, UCSF Today and, Nina Y Yao and Mike O'Donnell from *Mol. Biosyst.*, 2008, **4**, 1075.

## CHEMICAL BIOLOGY

B81

Drawing together research highlights and news from all RSC publications, *Chemical Biology* provides a 'snapshot' of the latest developments in chemical biology, showcasing newsworthy articles and significant scientific advances.

## Chemical Biology

November 2008/Volume 3/Issue 11

[www.rsc.org/chembiology](http://www.rsc.org/chembiology)

## EDITORIAL

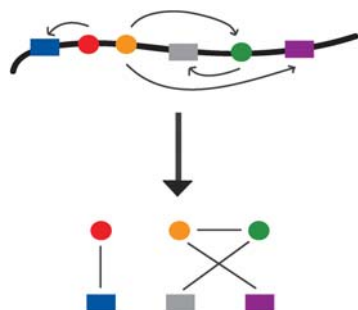
1043

### Rise of the machines: Bruce Alberts and the biochemistry of multi-protein complexes

The chair of the *Molecular BioSystems* Editorial Board, Professor Tom Kodadek, introduces this special issue dedicated to Professor Bruce Alberts.



1046

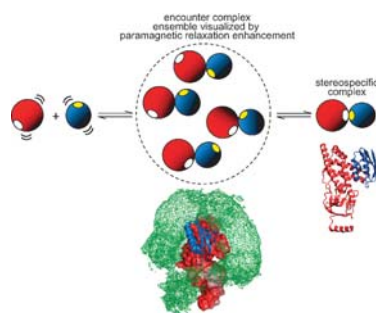


### Long-range chromosomal interactions and gene regulation

Andriana Miele and Job Dekker\*

An overview of recently discovered long-range chromosomal interactions is presented, and a network approach is proposed to unravel gene-element relationships.

1058

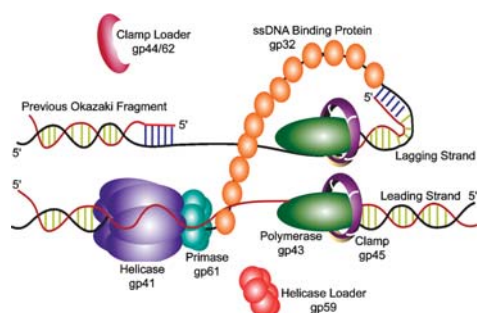


### Visualizing lowly-populated regions of the free energy landscape of macromolecular complexes by paramagnetic relaxation enhancement

G. Marius Clore

Paramagnetic relaxation enhancement can be used to detect and visualize minor transient species, thereby exploring lowly-populated regions of the free energy landscape of biological macromolecules and their complexes that are inaccessible to conventional structural and biophysical techniques.

1070



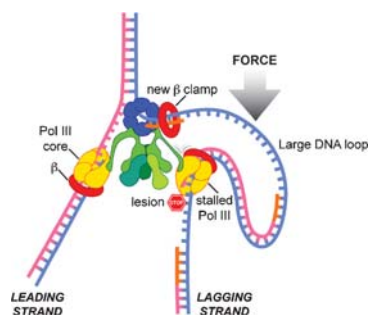
### Repetitive lagging strand DNA synthesis by the bacteriophage T4 replisome

Michelle M. Spiering, Scott W. Nelson and Stephen J. Benkovic\*

In this highlight we address when Okazaki primer synthesis is initiated and how the primer is captured by a recycling lagging strand polymerase.



1075



### Replisome dynamics and use of DNA trombone loops to bypass replication blocks

Nina Y. Yao and Mike O'Donnell\*

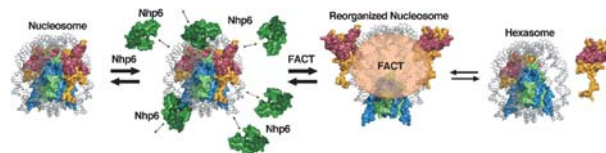
DNA “trombone” loops were first proposed by Bruce Alberts to explain how twin polymerases replicate both strands of duplex DNA simultaneously. DNA trombone loops may also facilitate the ability of a replisome to circumvent blocks to replication.

1085

**FACT and the reorganized nucleosome**

Tim Formosa

An alternative view of FACT activity is proposed in which H2A–H2B histone dimers are not initially displaced from nucleosomes. A role for “reorganized” nucleosomes in forming and removing nucleosomal barriers is discussed.

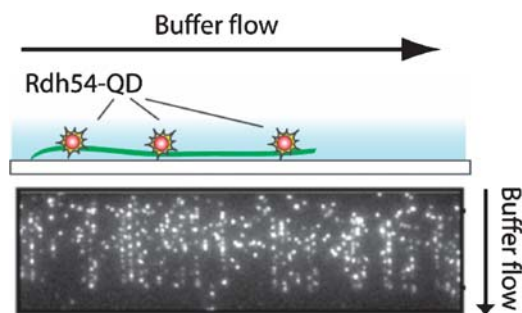


1094

**Single molecule studies of homologous recombination**

Ilya J. Finkelstein and Eric C. Greene\*

This review summarizes single molecule studies of homologous DNA recombination. Single molecule experiments are yielding a picture of DNA processing by repair enzymes that is unobtainable *via* traditional biochemical methods.

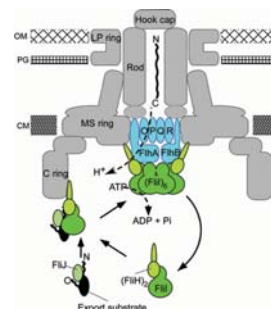


1105

**Mechanisms of type III protein export for bacterial flagellar assembly**

Tohru Minamino, Katsumi Imada and Keiichi Namba\*

Distinct roles of proton motive force and the FliI ATPase with dynamic interactions between component proteins of the flagellar type III protein export apparatus are the keys to efficient self-assembly of the bacterial flagellum.



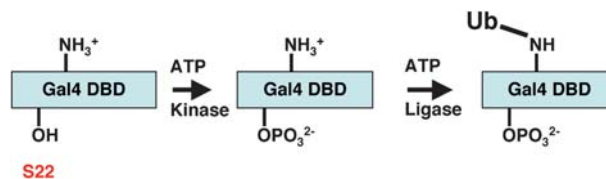
## PAPERS

1116

**Phosphorylation of the Gal4 DNA-binding domain is essential for activator mono-ubiquitylation and efficient promoter occupancy**

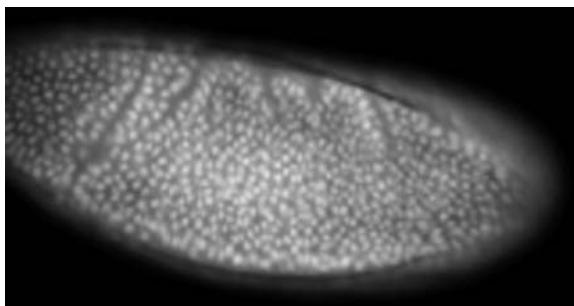
A. Ferdous, M. O'Neal, K. Nalley, D. Sikder, T. Kodadek\* and S. A. Johnston\*

A novel phosphorylation event in the DNA-binding domain of the Gal4 transactivator is reported. Phosphorylation of Ser22 is shown to be essential for the subsequent mono-ubiquitylation of the activator, which, in turn, is essential for stable promoter binding and activity *in vivo*.





1126



**Building proteomic pathways using *Drosophila* ventral furrow formation as a model**

Mamta Puri, Anupam Goyal, Nina Senutovich,  
Susan R. Dowd and Jonathan S. Minden\*

Ventral furrow formation is the first morphogenetic movement during *Drosophila* gastrulation. A screen for ventral proteome changes identified many proteins. Cycles of gene expression manipulation and proteome analysis showed that the proteasome and iron homeostasis form part of a ventral-specific regulatory loop.