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Christoph U Keller & Daphne M Stam

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Brigitte Meyer-Berthaud & Anne-Laure Decombeix

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Danielle M Schultz & John P Wolfe

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EGFR activation explains colorectal cancer resistance to BRAF inhibitors

David B Solit & Pasi A Jänne

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### ARTICLES

#### 47 NEUROSCIENCE Gain control by layer six in cortical circuits of vision

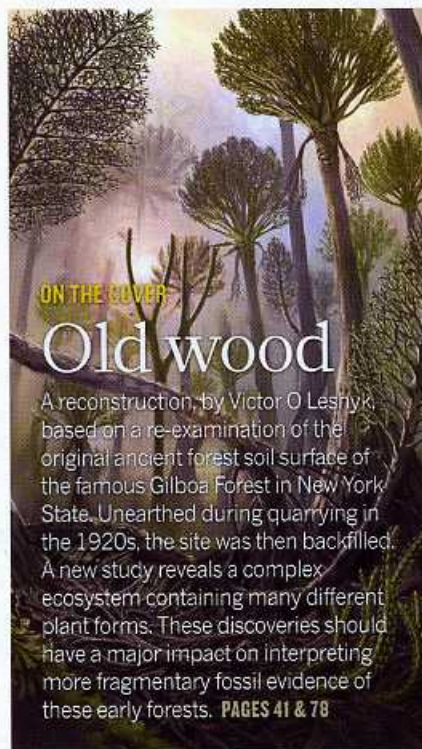
S R Olsen, D S Bortone, H Adesnik & M Scanziani

#### 53 MICROBIOLOGY Structural basis for iron piracy by pathogenic *Neisseria*

N Noinaj et al.

#### 59 MOLECULAR BIOLOGY Recognition of SUMO-modified PCNA requires tandem receptor motifs in Srs2

A A Armstrong, F Mohideen & C D Lima



ON THE COVER

## Old wood

A reconstruction, by Victor O Leshyk, based on a re-examination of the original ancient forest soil surface of the famous Gilboa Forest in New York State. Unearthed during quarrying in the 1920s, the site was then backfilled. A new study reveals a complex ecosystem containing many different plant forms. These discoveries should have a major impact on interpreting more fragmentary fossil evidence of these early forests. **PAGES 41 & 78**

### LETTERS

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M F Sterzik, S Bagnulo & E Pallo

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#### 67 CONDENSED MATTER Re-emerging superconductivity at 48 kelvin in iron chalcogenides

L Sun et al.

#### 70 ORGANIC CHEMISTRY Catalytic functionalization of unactivated primary C-H bonds directed by an alcohol

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#### 78 PALAEOBIOLOGY Surprisingly complex community discovered in the mid-Devonian fossil forest at Gilboa

W E Stein, C M Berry, L V Hernick & F Mannolini

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#### 82 GENOMICS Strict evolutionary conservation followed rapid gene loss on human and rhesus Y chromosomes

J F Hughes et al.

#### 87 NEUROSCIENCE Opposite effects of fear conditioning and extinction on dendritic spine remodelling

C S W Lai, T F Franke & W-B Gan

#### 92 NEUROSCIENCE Repetitive motor learning induces coordinated formation of clustered dendritic spines *in vivo*

M Fu, X Yu, J Lu & Y Zuo

#### 96 CARDIOVASCULAR BIOLOGY Circadian rhythms govern cardiac repolarization and arrhythmogenesis

D Jeyaraj et al.

#### 100 CANCER Unresponsiveness of colon cancer to BRAF(V600E) inhibition through feedback activation of EGFR

A Prasad et al. SEE N&V P.38

#### 104 STRUCTURAL BIOLOGY Structural basis for recognition of H3K56-acetylated histone H3-H4 by the chaperone Rtt106

D Su et al.

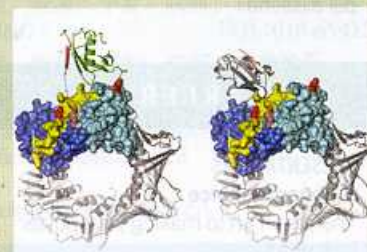
#### 108 STRUCTURAL BIOLOGY Structural and functional conservation of key domains in InsP<sub>3</sub> and ryanodine receptors

M-D Seo et al.

### MOLECULAR BIOLOGY

## Site test

How Srs2 repair enzyme recognizes a SUMO-modified protein. **PAGE 59**

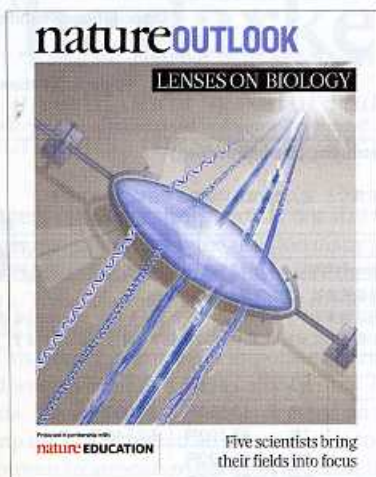




# OUTLOOK

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## LENSES ON BIOLOGY



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### S2 CANCER

#### Solving an age-old problem

Can the latest research on prevention and treatment strategies make cancer a disease of the past?

### S7 Q&A

#### Controversy and intellect

Barbara Dunn

### S8 SYNTHETIC BIOLOGY

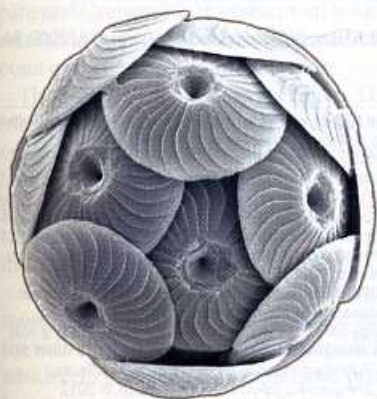
#### Bits and pieces come to life

Engineers are using genes and proteins as building blocks to create new kinds of cells

### S11 Q&A

#### Circuit capacity

James Collins



Earth's climate is changing rapidly and affecting the environment (page S12).

### S12 CLIMATE CHANGE

#### Planet in flux

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### S16 Q&A

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John P. Smol

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Paul Falkowski

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How can scientists exploit the incredible potential of stem cells without falling foul of ethical conflicts?

### S27 Q&A

#### Stemming the tide of misinformation

Nirupama Shevde



**MORE  
ONLINE**

#### NATURE EDUCATION

● Learn more about *Principles of Biology*, an interactive textbook by Nature Education, from which these essays were drawn:  
[go.nature.com/yojjw9](http://go.nature.com/yojjw9)

#### NATURE.COM

● Visit *Nature Climate Change* for the latest research on our changing environment and its impact on policy:  
[go.nature.com/nvnm8x](http://go.nature.com/nvnm8x)