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L. von Ahn, B. Maurer, C. McMillen, D. Abraham, M. Blum
A security system that relies on the superior performance of humans in comparison to computers in reading distorted text can be harnessed for digitized scanned documents. 10.1126/science.1160379

MATERIALS SCIENCE
Polymer Pen Lithography
F. Huo et al.
An array that can support millions of thin, flexible polymer pens can be used to deposit tiny molecular ink dots of variable size over large areas. 10.1126/science.1162193

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Transient Electronic Structure and Melting of a Charge Density Wave in TbTe₃
F. Schmitt et al.
Photoemission spectroscopy is extended to reveal the dynamics of correlated electronic phase transitions, showing how ordered electrons “melt” upon heating of TbTe₃. 10.1126/science.1160778

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full text at www.sciencemag.org/cgi/content/full/321/5891/912c
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ECOLOGY
Spreading Dead Zones and Consequences for Marine Ecosystems
R. J. Diaz and R. Rosenberg

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APPLIED PHYSICS
Optical Negative Refraction in Bulk Metamaterials
J. Yao et al.
An array of silver nanowires placed in a porous alumina matrix forms a three-dimensional material that negatively refracts visible light. >> News story p. 900

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ATMOSPHERIC SCIENCE
Tail Reconnection Triggering Substorm Onset
V. Angelopoulos et al.
Satellite and ground-based data show that reconnection of magnetic field lines in Earth’s magnetotail precedes dramatic aurora displays and is the source of magnetic substorms. >> Perspective p. 920

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Density Multiplication and Improved Lithography by Directed Block Copolymer Assembly
R. Ruiz et al.
An appropriate substrate pattern can direct an even finer pattern of a block copolymer, improving the resolution for lithography by a factor of four, beyond the usual limits. >> Perspective p. 919

MATERIALS SCIENCE
Graphoepitaxy of Self-Assembled Block Copolymers on Two-Dimensional Periodic Patterned Templates
I. Bita et al.
A substrate patterned with a sparse array of nanoscale posts can direct the self-assembly of block copolymers to create a finely ordered lithographic array, even over a large area. >> Perspective p. 919
mounts a microRNA-mediated innate immune defense, which is inhibited by proteins of the bacteria, allowing other infections.

Upon bacterial infection, L. Navarro, F. Jay, K. Nomura, S. Y. He, O. Voinnet

Effector Proteins Suppression of the MicroRNA Pathway by Bacterial MOLECULAR BIOLOGY


Some bacterial genomes contain remnant sequences from previous viral infections, which are transcribed into RNA to guide inactivation of the virus in subsequent infections. >> Perspective p. 922

MOLECULAR BIOLOGY


Shotgun sequencing of 27-base pair segments of messenger RNA from human kidney and immune cells identifies previously undescribed transcriptional units and splice functions.

MOLECULAR BIOLOGY


Upon bacterial infection, Arabidopsis mounts a microRNA-mediated innate immune defense, which is inhibited by proteins of the bacteria, allowing other infections.

MICROBIOLOGY

Arsenic(III) Fuels Anoxygenic Photosynthesis in Hot Spring Biofilms from Mono Lake, California T. R. Kulp et al.

A primitive form of photosynthesis in which arsenic is the electron donor occurs in purple bacteria in a California lake, perhaps a relic of early life forms.

IMMUNOLOGY

In Vivo Imaging Reveals an Essential Role for Neutrophils in Leishmaniasis Transmitted by Sand Flies N. C. Peters et al.

Visualization of the area around a bite from a parasite-infected sand fly shows that the first immune cells to arrive engulf and unexpectedly protect the invading parasite. >> Perspective p. 917

MEDICINE

Tumor Regression in Cancer Patients by Very Low Doses of a T Cell–Engaging Antibody R. Bargou et al.

Tested in a small group of patients, a therapeutic antibody binds to both tumor cells and immune cells, increasing the local concentration and effectiveness of the immune cells.

NEUROSCIENCE


Only 100 synapses are required to accurately code for the animals’ velocity in the mouse cerebellum; the charge transfer into neurons is linearly related to acceleration.
PERSPECTIVE: Dinucleotide-Sensing Proteins—Linking Signaling Networks and Regulating Transcription
H. K. Lamb, D. K. Stammers, A. R. Hawkins
Proteins that bind NAD(H) or NADP(H) may couple cellular redox state to transcription or other signaling pathways.

PERSPECTIVE: Great Times for Small Molecules—c-di-AMP, a Second Messenger Candidate in Bacteria and Archaea
U. Römling
The bacterial checkpoint protein DisA has diadenylate cyclase activity, suggesting that c-di-cAMP acts as a second messenger.

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