A biodegradable integrated circuit (length: ~2.54 centimeters) shown partially dissolved by a droplet of water. This demonstration system includes transistors; diodes; inductors and capacitors, with magnesium for the electrodes/interconnects; magnesium oxide for the gate/interlayer dielectrics; silicon nanomembranes for the semiconductor; and silk as a thin, flexible substrate. The dissolution characteristics can be tuned to address applications such as bioresorbable implants, biodegradable environmental monitors, and compostable consumer electronics. See page 1640.

Image: Beckman Institute, University of Illinois, and Tufts University
BREVIA

1628 Next-Generation Digital Information Storage in DNA
G. M. Church et al.
Digital information can be stored in DNA at densities higher than digital media such as flash memory or quantum holography.

RESEARCH ARTICLES

1629 Out of the Tropics: The Pacific, Great Basin Lakes, and Late Pleistocene Water Cycle in the Western United States
M. Lyle et al.
Precipitation source regions for western North America changed substantially over the last deglaciation.

1634 Parallel Molecular Evolution in an Herbivore Community
Y. Zhen et al.
Parallel mutations in the alpha subunit of the sodium pump allow insects to specialize on host plants that produce ouabain.

REPORTS

1638 The Precise Solar Shape and Its Variability
J. R. Kuhn et al.
Observations with NASA’s Solar Dynamics Observatory show that the shape of the Sun does not vary with the 11-year solar cycle.

1640 A Physically Transient Form of Silicon Electronics
S.-W. Hwang et al.
A platform of materials and fabrication methods furnishes resorbable electronic devices for in vivo use.

1644 Gold-Catalyzed Direct Arylation
L. T. Ball et al.
A gold catalyst can link together aromatic rings under very mild conditions.

1648 Synthesis and Characterization of a Rhodium(I) σ-Alkane Complex in the Solid State
S. D. Pike et al.
Hydrogenation of a crystalline precursor enables structural characterization of a commonly evoked reaction intermediate.

1651 Toward Peace: Foreign Arms and Indigenous Institutions in a Papua New Guinea Society
P. Wiessner and N. Pupu
A case study shows that controlling conflict depends on local institutions.

1654 Adaptive Sleep Loss in Polygynous Pectoral Sandpipers
J. A. Lesku et al.
Male pectoral sandpipers go without sleep for days in order to mate as often as possible in the high Arctic.

1658 Mutations in the neverland Gene Turned Drosophila pachea into an Obligate Specialist Species
M. Lang et al.
A few changes made the fly Drosophila pachea reliant on the steroid precursors produced by the senita cactus.

1661 Fermentation, Hydrogen, and Sulfur Metabolism in Multiple Uncultivated Bacterial Phyla
K. C. Wrighton et al.
Near-complete reconstruction of the genomes of 21 widespread uncultured environmental bacteria reveals metabolic novelties.

1665 Disulfide Rearrangement Triggered by Translocon Assembly Controls Lipopolysaccharide Export
S.-S. Chng et al.
Protein-protein interactions promote oxidative protein folding during assembly of a bacterial lipopolysaccharide exporter.

1668 Sedlin Controls the ER Export of Procollagen by Regulating the Sar1 Cycle
R. Venditti et al.
Sedlin, the product of the gene mutated in spondyloepiphyseal dysplasia tarda, acts to expand cargo containers to fit bulky procollagen.

1672 Radical SAM-Dependent Carbon Insertion into the Nitrogenase M-Cluster
J. A. Wiig et al.
The carbon atom in the middle of a large metal cluster originates from the one-carbon donor S-adenosylmethionine.

1675 Evidence of Abundant Purifying Selection in Humans for Recently Acquired Regulatory Functions
L. D. Ward and M. Kellis
Diversity in human-specific regions of the genome has been reduced by functional constraints.

1678 An Immunosurveillance Mechanism Controls Cancer Cell Ploidy
L. Senovilla et al.
Polyploid cancer cells trigger an immune response owing to proteins aberrantly exposed on their outer surfaces.

1684 Mycobacterial Disease and Impaired IFN-γ Immunity in Humans with Inherited ISG15 Deficiency
D. Bogunovic et al.
A mutation that accounts for adverse reactions to the Bacille Calmette-Guérin vaccine against tuberculosis is identified.
SCIENCEONLINE

SCIENCEEXPRESS
www.scienceexpress.org
Publication Ahead of Print

Status and Solutions for the World’s Unassessed Fisheries
C. Costello et al.
10.1126/science.1223389

Coagulation Factor X Activates Innate Immunity to Human Species C Adenovirus
K. Doranin et al.
10.1126/science.1226625

Gene Loops Enhance Transcriptional Directionality
S. M. Tan-Wong et al.
10.1126/science.1224350

The APC/C Inhibitor XErap1/Emi2 Is Essential for Xenopus Early Embryonic Divisions
T. Tischer et al.
10.1126/science.1228394

Jet-Launching Structure Resolved Near the Supersmassive Black Hole in M87
S. S. Doelemen et al.
10.1126/science.1224768

TECHNICAL COMMENTS

Comment and Response on “The Geometric Structure of the Brain Fiber Pathways”
Comment: M. Catani et al.
http://dx.doi.org/10.1126/science.1223425
Response: V. J. Wedeen et al.
http://dx.doi.org/10.1126/science.1223493

SCIENCENOW
www.sciencenow.org
Highlights From Our Daily News Coverage

Compared With Chimps, Humans Slow to Insulate Nerve Fibers
Prolonged development may make our brains more malleable—and more susceptible to illness.
http://scim.ag/Prolonged_Development

Korean Eunuchs Outlived Uncastrated Peers
A study of 16th to 19th century eunuchs suggests more malleable—and more susceptible to illness. http://scim.ag/Biofilm_Folds

A Wrinkle in Slime: Cell Deaths Form Biofilm Folds
Researchers harness the secrets of bacterial wrinkling.
http://scim.ag/Biofilm_Folds

SCIENCE SIGNALING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment
25 September issue: http://scim.ag/ss092512

RESEARCH ARTICLE: Superbinder SH2 Domains Act as Antagonists of Cell Signaling
T. Kaneko et al.

PERSPECTIVE: Peptide-Binding Domains—Are Limp Handshakes Safest?
N. J. Haslam and D. C. Shields
Engineered, high-affinity SH2 domains inhibit cell signaling, which may have therapeutic potential.

RESEARCH ARTICLE: Phosphorylation of Cytohesin-1 by Fyn Is Required for Initiation of Myelination and the Extent of Myelination During Development
J. Yamauchi et al.
Transgenic and knockout mice reveal a pathway that controls myelination by Schwann cells.

RESEARCH ARTICLE: The Tumor Suppressor PTEN Is Exported in Exosomes and Has Phosphatase Activity in Recipient Cells
U. Putz et al.
A tumor suppressor protein with lipid phosphatase activity travels to target cells in microvesicles.

PERSPECTIVE: Where EGF Receptors Transmit Their Signals
N. L. Lil and N. J. Sver
Trafficking of activated receptors controls the transcriptional response to epidermal growth factor.

PERSPECTIVE: Cell Responses to Growth Factors—The Role of Receptor Tyrosine Kinase Intracellular Domain Fragments
G. Carpenter and A. Pazi
Protoelastic fragments of receptor tyrosine kinases have distinct roles in growth factor signaling.

SCIENCE TRANSLATIONAL MEDICINE
www.sciencetranslationalmedicine.org
Integrating Medicine and Science
26 September issue: http://scim.ag/stm092612

RESEARCH ARTICLE: Quantitative Analysis of the Human Airway Microbial Ecology Reveals a Pervasive Signature for Cystic Fibrosis
P. C. Blainey et al.
A distinctive, stereotyped microbiome is present in the lungs of cystic fibrosis patients.

RESEARCH ARTICLE: An mRNA Profile Identifies Two Subsets of Multiple Sclerosis Patients Differing in Disease Activity
L. Ottoboni et al.
Multiple sclerosis patients that relapse more often show distinct mRNA profiles in blood immune cells.

RESEARCH ARTICLE: Vascular Catheters with a Nonleaching Poly-Sulfobetaine Surface Modification Reduce Thrombus Formation and Microbial Attachment
R. S. Smith et al.
A coating for catheters inhibits microbial adherence and thrombosis in vitro and in vivo.

PERSPECTIVE: Pharmacogenomics and Patient Care—One Size Does Not Fit All
K. M. Giacomini et al.
Pharmacogenomics research points to a personalized approach for prescribing and dosing medications.

REVIEW: Biomaterial-Associated Infection—Locating the Finish Line in the Race for the Surface
H. J. Buscher et al.
Infection-reducing biomaterials must balance host tissue integration and prevention of microbial attachment.

SCIENCE CAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists

Experimental Error: The Audacity of Graduate School
A. Ruben
The overworked grad student seems to embody the most pointless aspects of graduate school.

Big Pharma Ramps Up Postdoc Programs
M. Price
After years of layoffs, drug companies are turning to the youngest Ph.D. scientists for fresh ideas.

Content Collection: Getting Your Research Published
E. Pain
Proficiently publishing scientific articles is among the attributes that determine academic success.

SCIENCEPODCAST
www.sciencemag.org/multimedia/podcast
Free Weekly Show for 28 September 2012
Melt-away electronics, scientific thinking in kids, climate change in Mongolia, and more.