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Science



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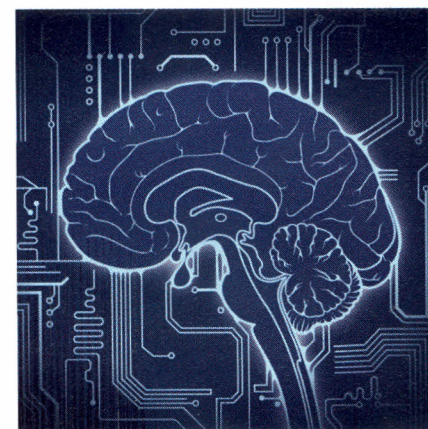
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Computer-generated models of three-dimensional nanostructures that were self-assembled from synthetic DNA strands called DNA bricks. A master collection defines a 1000-voxel "molecular canvas" with a 25-nanometer edge. By selecting subsets of bricks, Ke *et al.* constructed a panel of 102 distinct shapes with sophisticated surface features and intricate interior cavities and tunnels. These nanostructures may find applications ranging from biomedicine to nanoelectronics. See page 1177.

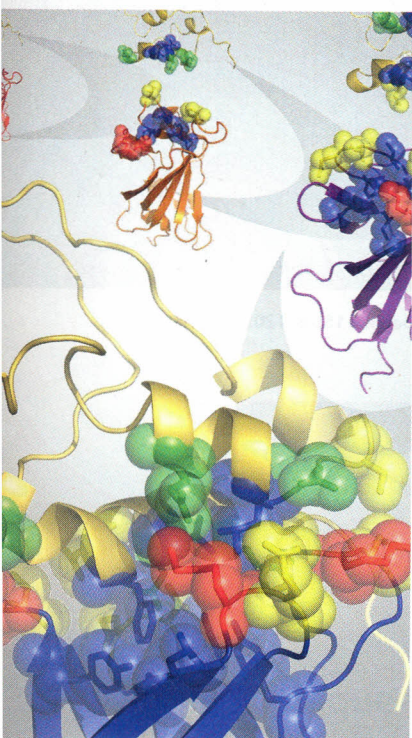
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Stepwise assembly of 32-nucleotide DNA "bricks" can create a wide variety of nanoscale objects.
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Gamma-ray spectra obtained with the Fermi Space Telescope constrain star formation and galaxy evolution over cosmic time.
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- 1193 Superconducting Dome in a Gate-Tuned Band Insulator**
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- 1196 Formation of Regular Satellites from Ancient Massive Rings in the Solar System**
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- 1199 Chemically and Geographically Distinct Solid-Phase Iron Pools in the Southern Ocean**
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C. Eliasmith et al.
Two-and-a-half million model neurons recognize images, learn via reinforcement, and display fluid intelligence.
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Resistance to a damaging disease of soybean is conferred by a cluster of linked genes present in multiple copies.

- 1209 An Exon Splice Enhancer Primes IGF2:IGF2R Binding Site Structure and Function Evolution**
C. Williams et al.
Parental genetic conflict may have exploited changes in the coding of a protein loop in a growth factor receptor.

- 1214 Cytoplasmic ATP Hydrolysis Powers Transport of Lipopolysaccharide Across the Periplasm in *E. coli***
S. Okuda et al.
Transporting lipopolysaccharide from inside the bacterial cell to the surface requires multiple molecules of adenosine triphosphate.

- 1217 Direct Observation of Stalled Fork Restart via Fork Regression in the T4 Replication System**
M. Manosas et al.
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- 1229 A Mutation in EGF Repeat-8 of Notch Discriminates Between Serrate/Jagged and Delta Family Ligands**
S. Yamamoto et al.
A genetic screen identifies an extracellular motif in a conserved signaling receptor that confers ligand specificity.

SCIENCEEXPRESS

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Publication Ahead of Print

The Closing Door of Climate Targets

T. F. Stocker
10.1126/science.1232468

Bright and Dark Polar Deposits on Mercury: Evidence for Surface Volatiles

G. A. Neumann et al.
10.1126/science.1229764

Evidence for Water Ice Near Mercury's North Pole from MESSENGER Neutron Spectrometer Measurements

D. J. Lawrence et al.
10.1126/science.1229953

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Thermal Stability of Volatiles in the North Polar Region of Mercury

D. A. Paige et al.
10.1126/science.1231106

Apatite $^4\text{He}/^3\text{He}$ and (U-Th)/He Evidence for an Ancient Grand Canyon

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10.1126/science.1229390

Crocodile Head Scales Are Not Developmental Units But Emerge from Physical Cracking

M. C. Milinkovitch et al.
10.1126/science.1226265

>> [Science Podcast](#)

Natively Inhibited *Trypanosoma brucei* Cathepsin B Structure Determined by Using an X-ray Laser

L. Redecke et al.
10.1126/science.1229663

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SCINCENOW

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Highlights From Our Daily News Coverage

Making a Flu Vaccine Without the Virus
A new influenza vaccine using only messenger RNA proves successful in animals.
http://scim.ag/New_Vaccine

Putting Themselves to Sleep
A Valium-like compound produced by the brain could make some people super sleepy.
<http://scim.ag/Sleepy-People>

Trees Living on the Edge
Forests are poorly equipped to deal with drought as the climate gets drier.
http://scim.ag/Forests_Drought

SCIENCE SIGNALING

www.sciencesignaling.org
The Signal Transduction Knowledge Environment
27 November issue: <http://scim.ag/ss112712>

RESEARCH ARTICLE: Regulation of Phosphatidylinositol-5-Phosphate Signaling by Pin1 Determines Sensitivity to Oxidative Stress
W.-J. Keune et al.

Increasing the abundance of the phospholipid PtdIns5P protects cells from oxidative stress.

RESEARCH ARTICLE: Lack of the Phosphatase PTPN22 Increases Adhesion of Murine Regulatory T Cells to Improve Their Immunosuppressive Function
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R. Zamojska and A. M. VanHook
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PERSPECTIVE: Remodeling a Tissue—Subtraction Adds Insight

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FORUM: Highlights from Understanding Signaling Pathways in Cancer

L. K. Ferrarelli and N. R. Gough
Understanding the complexities of cell signaling is critical to developing therapies against cancer.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org
Integrating Medicine and Science
28 November issue: <http://scim.ag/stm112812>

FOCUS: Time to Integrate Clinical and Research Informatics

I. L. Katzan and R. A. Rudick
Integration of electronic clinical and research data will ultimately improve patient care.

RESEARCH ARTICLE: Treating Diabetes and Obesity with an FGF21-Mimetic Antibody Activating the $\beta\text{Klotho}/\text{FGFR1c}$ Receptor Complex
I. N. Foltz et al.

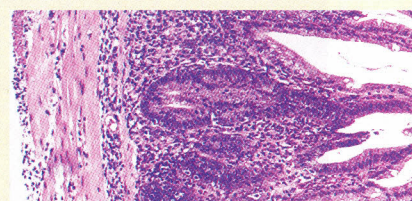
An antibody mimic of FGF21 exerts beneficial metabolic effects in obese monkeys.

RESEARCH ARTICLE: Detection of Chromosomal Alterations in the Circulation of Cancer Patients with Whole-Genome Sequencing

R. J. Leary et al.
Massively parallel sequencing directly detects tumor-derived chromosomal alterations in plasma DNA.

RESEARCH ARTICLE: Tadalafil Treatment for Muscular Dystrophy Patients

E. A. Martin et al.
Tadalafil abrogates muscle ischemia in patients with Becker muscular dystrophy.



SCIENCE SIGNALING
Intestinal colitis.

SCIENCE CAREERS

www.sciencereers.org/career_magazine
Free Career Resources for Scientists
<http://scim.ag/SciCareers30November2012>

Time Off for Dad

S. Gaidos
Paternity leave helps fathers and mothers advance their careers; too bad it is not more common.

Robots, Fish, and Undergrads

S. Webb
John Long and his Vassar undergraduates study fish biomechanics and behavior.

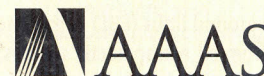
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