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1650 The Wnt/β-Catenin Pathway Is Required for the Development of Leukemia Stem Cells in AML
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10.1126/science.1185837
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Protein Kinase C-θ Mediates Negative Feedback on Regulatory T Cell Function
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10.1126/science.1186068

Asian Monsoon Transport of Pollution to the Stratosphere
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Satellite observations of atmospheric hydrogen cyanide reveal that the Asian monsoon transports air deep into the stratosphere.
10.1126/science.1182274

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Obscured and unobscured quasars represent two sequential phases of gas-rich mergers of massive galaxies.
10.1126/science.1184246

SCIENCE CAREERS
www.sciencecareers.org
Free Career Resources for Scientists
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Pharmaceutical companies are hiring researchers for their early drug-development programs.

Structuring a Career Around Gallium Nitride
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RESEARCH ARTICLE: Gain-of-Function Enhancement of p40 Receptor Modal Gating by Familial Alzheimer’s Disease-Linked Presenilin Mutants in Human Cells and Mouse Neurons
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PERSPECTIVE: ER Calcium and Alzheimer’s Disease—In a State of Flux
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Mutations in presenilin 1 may exaggerate Ca2+ signaling in neurons, increasing their vulnerability.
RESEARCH ARTICLE: Regulation of Zap70 Expression During Thymocyte Development Enables Temporal Separation of CD4 and CD8 Repertoire Selection at Different Signaling Thresholds
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PERSPECTIVE: Two Receptors, Two Kinases, and T Cell Lineage Determination
B. Alarcón and H. M. van Santen
Specification of T cell lineage in the thymus is controlled by the timing and strength of signaling of the tyrosine kinase Zap70.

SCIENCE SIGNALING
www.signaltransductionscience.org
The Signal Transduction Knowledge Environment
RESEARCH ARTICLE: Cross-Neutralization of 1918 and 2009 Influenza Viruses—Role of Glycans in Viral Evolution and Vaccine Design
C.-J. Wei et al.
Sites targeted by antibodies against both 1918 and 2009 influenza viruses are blocked by sugars, which could inform future vaccine design.
RESEARCH ARTICLE: A Conformal, Bio-Interfaced Class of Silicon Electronics for Mapping Cardiac Electrophysiology
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NEW TECHNOLOGY COULD TAKE SALT OUT OF OCEAN WATER
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The Best Refrigerator Magnet Ever?
Flexible electronics and sensors that stick to moving tissues can enable cardiac electrical activity mapping in animals.

The known limits for magnetism. A compound of iron and nitrogen exceeds the Best Refrigerator Magnet Ever?
E. C. Settembre et al.
2009 influenza viruses are blocked by sugars, which could inform future vaccine design.
Be Broken?
E. C. Settembre et al.
Flexible electronics and sensors that stick to moving tissues can enable cardiac electrical activity mapping in animals.
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Flexible electronics and sensors that stick to moving tissues can enable cardiac electrical activity mapping in animals.
Science 327 (5973), 1552-1662.