The dynamic nature of the master calcium signaling protein, calmodulin, schematically illustrated by snapshots from an interpolation between its calcium-bound state (blue) and its structure bound to both calcium and a peptide derived from one of its downstream cellular targets, myosin light chain kinase (red), generated using the Yale Morph Server and PyMol software. See the special section beginning on page 197.

Image: Robert Smock and Lila Gierasch
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Exomic Sequencing Identifies PALB2 as a Pancreatic Cancer Susceptibility Gene
S. Jones et al.
Mutations in a gene previously implicated in breast cancer are a contributing factor in hereditary pancreatic cancer.

RESEARCH ARTICLE

Genome-Wide Analysis in Vivo of Translation with Nucleotide Resolution Using Ribosome Profiling
N. T. Ingolia et al.
Profiling the position of ribosomes on messenger RNA allows rapid, high-precision investigation of cellular protein translation.

REPORTS

Elastic Shear Anisotropy of Ferropericlase in Earth’s Lower Mantle
H. Marquardt et al.
A minor phase of the deep mantle causes marked differences in seismic travel times in different directions.

A Great Earthquake Rupture Across a Rapidly Evolving Three-Plate Boundary
K. P. Furlong et al.
This event revealed plate dynamics in the Solomon Islands and showed that subduction of young crust can produce great quakes.

Curved Plasma Channel Generation Using Ultraintense Airy Beams
P. Polynkin et al.
Propagating intense structured laser beams through air creates self-focused “light bullets” that take a curved trajectory.

Solar Power Wires Based on Organic Photovoltaic Materials
M. R. Lee et al.
A transparent polymer coating allows optics to compensate for the shadowing effects of a metal wire electrode.

Running Droplets of Gallium from Evaporation of Gallium Arsenide
J. Tersoff et al.
Oscillation of gallium droplets is driven by a disequilibrium between the droplets and the gallium arsenide surface.

Total Synthesis of (+)-11,11'-Dideoxyverticillin A
J. Kim et al.
The key step in the synthesis of this complex fungal metabolite replaces four introduced hydroxyl groups with thiols.

Pulsatile Stimulation Determines Timing and Specificity of NF-κB–Dependent Transcription
I. Ashall et al.
The frequency of pulses of cytokine simulation of a cell can determine the spectrum of genes whose transcription is regulated.

Antibody Recognition of a Highly Conserved Influenza Virus Epitope
D. C. Ekiert et al.
A broadly neutralizing antibody binds the hemagglutinin stalk of pathogenic influenza viruses to block membrane fusion.

Wingbeat Time and the Scaling of Passive Rotational Damping in Flapping Flight
T. L. Hedrick et al.
Morphology and flapping motion are combined in a model that predicts turn dynamics for flying animals ranging in size from fruit flies to cockatoos.

Coding-Sequence Determinants of Gene Expression in Escherichia coli
G. Kudla et al.
RNA structure, rather than optimal codon usage, determines translation efficiency in Escherichia coli.

Leucine-Rich Repeat Protein Complex Activates Mosquito Complement in Defense Against Plasmodium Parasites
M. Povelones et al.
A family of molecules, apparently unique to mosquitoes, binds to invading parasites and initiates innate immune responses.

Glioma-Derived Mutations in IDH1 Dominantly Inhibit IDH1 Catalytic Activity and Induce HIF-1α
S. Zhao et al.
Mutations in isocitrate dehydrogenase-1 compromise enzyme function and activate a signaling pathway that helps brain tumors grow when oxygen is limited.

Demonstration of Genetic Exchange During Cyclical Development of Leishmania in the Sand Fly Vector
N. S. Akopyants et al.
Diversity among Leishmania parasites is not just a product of divergent mutation but also of genetic exchange.

Green Evolution and Dynamic Adaptations Revealed by Genomes of the Marine Picoeukaryotes Micromonas
A. Z. Worden et al.
An anciently derived clade of photosynthetic picoeukaryote, ubiquitous in the world’s oceans, possesses surprising genetic diversity.
Perspective: Partitioning the Synaptic Landscape—Distinct Microdomains for Spontaneous and Spike-Triggered Neurotransmission
M. A. Sutton and E. M. Schuman
Spontaneous and evoked release of glutamate activates distinct NMDA receptor pools.

Perspective: BxR Shines a Light on the Route from Hyperosmolarity to NFAT5
J. Aramburu and C. López-Rodríguez
The guanine nucleotide exchange factor BxR mediates an early event in lymphocytes exposed to osmotic stress.

Perspective: Parkinson’s Disease—To Live or Die by Autophagy
I. Ircher and D. S. Park
The autophagic degradation of a neuronal survival factor is inhibited by a protein encoded by a Parkinson’s disease–linked gene.

Podcast
B. D. Manning and A. M. Vankoot
The sets of kinases required by different cancer cell lines are highly divergent.

Development of a Second-Generation Antiandrogen for Treatment of Advanced Prostate Cancer
C. Tran et al.
A drug that binds to the androgen receptor acts by disrupting its activity in the cell nucleus.

Cell Movements at Hensen’s Node
Establish Left/Right Asymmetric Gene Expression in the Chick
J. Gros et al.
Asymmetric gene expression is passively set up in the early chick embryo by cell rearrangements.

Double Amputees Shed Light on Brain’s Flexibility
Brain reorganizes itself to accommodate new left and right hands.

Oldest Stone Blades Uncovered
Sophisticated cutting tools predate Homo sapiens.

Tropical Parents More Likely to Hear, ‘It’s a Girl!’
First global study on human sex ratios finds more girls born at warmer latitudes.

Perspective: Brx Shines a Light on the Route from Hyperosmolarity to NFAT5
J. Aramburu and C. López-Rodríguez
The guanine nucleotide exchange factor BxR mediates an early event in lymphocytes exposed to osmotic stress.

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