Male flowers of Gurania makoyana, a Central American plant in the cucumber family, harbor larvae (not visible) of two species of fly; a third fly species infests female flowers of the same species of plant. Some plant species in this family can host as many as 13 different fly species. See page 928.

Photo: Marty Condon
MOLECULAR BIOLOGY
Activation of the Cellular DNA Damage Response in the Absence of DNA Lesions
E. Soutoglou and T. Misteli
Protein complexes that usually assemble on and repair damaged DNA can form at undamaged sites to halt the cell cycle if several of the proteins are first tethered there.
10.1126/science.1159051

ASTRONOMY
An Eccentric Binary Millisecond Pulsar in the Galactic Plane
D. J. Champion et al.
A rapidly rotating pulsar has a highly eccentric orbit about its companion star, not the usual circular orbit, challenging ideas on how such binary systems form.
>> Science Express Perspective by E. P. J. van den Heuvel
10.1126/science.1157580

PERSPECTIVE: An Eccentric Pulsar: Result of a Threesome?
E. P. J. van den Heuvel
>> Science Express Research Article by D. J. Champion et al.
10.1126/science.1158738

MOLECULAR BIOLOGY
Widespread Translational Inhibition by Plant miRNAs and siRNAs
P. Brodersen et al.
Plant microRNAs and small interfering RNAs, thought to inhibit gene expression by cleavage of their RNA targets, also interfere with the translation of these RNAs into protein.
10.1126/science.1159151

PLANETARY SCIENCE
Mars North Polar Deposits: Stratigraphy, Age, and Geodynamical Response
R. J. Phillips et al.
Radar mapping shows that Mars’ thick north polar ice cap contains four dust-rich layers recording variation in the planet’s orbit and only slightly depresses the underlying crust.
>> News story p. 867

REVIEWS
GEOCHEMISTRY
Transformation of the Nitrogen Cycle: Recent Trends, Questions, and Potential Solutions
J. N. Galloway et al.
>> Review p. 893

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Impacts of Atmospheric Anthropogenic Nitrogen on the Open Ocean
R. A. Duce et al.
>> Review p. 889

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PHYSIOLOGY
The Energetic Cost of Climbing in Primates
J. B. Hanna, D. Schmitt, T. M. Griffin
Large primates expend less energy walking than climbing, but smaller ones walk and climb with similar efficiencies, possibly facilitating an evolutionary shift into trees.

RESEARCH ARTICLES
PHYSICS
Quasi-Particle Properties from Tunneling in the $\nu = \frac{5}{2}$ Fractional Quantum Hall State
I. P. Radu et al.
Tunneling measurements between the conduction channels in the fractional quantum Hall effect confirm that the charge is quantized in units of $\frac{1}{4}$ of an electron charge.

CELL BIOLOGY
Design Logic of a Cannabinoid Receptor Signaling Network That Triggers Neurite Outgrowth
K. D. Bromberg, A. Ma’ayan, S. R. Neves, R. Iyengar
Analysis of transcription data and known signaling networks predict two previously unrecognized regulators of neuronal growth, which were experimentally confirmed.
REPORTS

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Turbulence and Magnetic Fields in the Large-Scale Structure of the Universe
D. Ryu, H. Kang, J. Cho, S. Das

Simulations suggest that shock waves in the early universe could have amplified small magnetic fields into the large, complex intergalactic fields we see today.

APPLIED PHYSICS
Stress and Fold Localization in Thin Elastic Membranes
L. Pocivavsek et al.

Experiments and simulations show that as a supported membrane is shortened, periodic wrinkles are replaced abruptly by sharp folds.

GEOCHEMISTRY
Metasomatized Lithosphere and the Origin of Alkaline Lavas
S. Pilet, M. B. Baker, E. M. Stolper

Experiments imply that a common type of basalt can form from mantle previously altered by a water-rich fluid, and these basalts are not necessarily derived from recycled oceanic crust.

CHEMISTRY
Ultrafast Probing of Core Hole Localization in N₂
M. S. Schöffler et al.

Because of quantum entanglement, the hole produced by removal of an inner electron from diatomic nitrogen can be localized or spread out, depending on the detection angle.

ECOLOGY
Hidden Neotropical Diversity: Greater Than the Sum of Its Parts

Molecular markers reveal that insect species on plants in the cucumber family are unexpectedly diverse, showing specificity for particular hosts and even certain tissues.

BIOPHYSICS
Surface Tension Transport of Prey by Feeding Shorebirds: The Capillary Ratchet
M. Prakash, D. Quéré, J. W. M. Bush

A shorebird moves water droplets containing prey into its throat by repeatedly opening and closing its beak, relying on the physical properties of water to drive the drop upward.

MOLECULAR BIOLOGY
Termination Factor Rho and Its Cofactors NusA and NusG Silence Foreign DNA in E. coli
C. J. Cardinale et al.

A known bacterial protein acts broadly to terminate transcription in order to prevent read-through that can accidentally activate cryptic deleterious viruses.

PLANT SCIENCE
Genome-Scale Proteomics Reveals Arabidopsis thaliana Gene Models and Proteome Dynamics
K. Baerenfaller et al.

The Arabidopsis proteome shifts as the plant develops, and proteins not predicted from genome analysis, some derived from introns and pseudogenes, are expressed.

PLANT SCIENCE
Cell Identity Mediates the Response of Arabidopsis Roots to Abiotic Stress
J. R. Dinney et al.

In Arabidopsis root tips exposed to high salinity or iron deficiency, clusters of genes are induced that are unique to one or both of these stress responses.

NEUROSCIENCE
Early Forebrain Wiring: Genetic Dissection Using Conditional Celsr3 Mutant Mice
L. Zhou et al.

A cadherin molecule on the surface of guidepost neurons in the developing brain marks the pathway for axons to follow from the thalamus to the cortex.

CIRCADIAN RHYTHMS
cAMP-Dependent Signaling as a Core Component of the Mammalian Circadian Pacemaker
J. S. O’Neill et al.

Signaling through cyclic adenosine monophosphate determines the amplitude, phase, and period of the mammalian circadian clock and so may be an integral part of the pacemaker.

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FAK targets p53 for degradation.

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PERSPECTIVE: Focal Adhesion Kinase Versus p53—Apoptosis or Survival?
W. G. Cance and V. M. Golubovskaya
Focal adhesion kinase acts as a scaffold protein to target p53 for degradation in the nucleus, leading to cell proliferation.

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GLOSSARY
Find out what BDNF, NICD, and PARL mean in the world of cell signaling.

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Science 320 (5878), 845-954.