RESEARCH ARTICLE

662 The Placental Mammal Ancestor and the Post–K-Pg Radiation of Placentals
M. A. O’Leary et al.
Fossil and DNA phylogenies suggest that placental mammals diversified in the Cenozoic and reconstruct the ancestral form.
>> Perspective p. 656

REPORTS

668 Gravity Field of the Moon from the Gravity Recovery and Interior Laboratory (GRAIL) Mission
M. T. Zuber et al.
The Moon’s gravity field reveals that impacts have homogenized the density of the crust and fractured it extensively.

671 The Crust of the Moon as Seen by GRAIL
M. A. Wieczorek et al.
The Moon’s gravity field shows that the lunar crust is less dense and more porous than was thought.

675 Ancient Igneous Intrusions and Early Expansion of the Moon Revealed by GRAIL Gravity Gradiometry
J. C. Andrews-Hanna et al.
The Moon’s gravity map shows that the crust is cut by extensive magmatic dikes, perhaps implying a period of early expansion.

678 Proton Donor Acidity Controls Selectivity in Nonaromatic Nitrogen Heterocycle Synthesis
S. Duttwyler et al.
Acids of different strengths propel a common intermediate to a diverse array of compounds sought in pharmaceutical research.

682 A Functional [NiFe]Hydrogenase Mimic That Catalyzes Electron and Hydride Transfer from H2
S. Ogo et al.
a bimetallic complex mimics a widely studied enzyme class of particular interest in renewable energy research.
>> Perspective p. 658

684 Time Scales of Critical Events Around the Cretaceous-Paleogene Boundary
P. R. Renne et al.
Radiometric dating establishes the mass extinction that killed the dinosaurs as synchronous with a large asteroid impact.
>> Perspective p. 655

687 Stress State in the Largest Displacement Area of the 2011 Tohoku-Oki Earthquake
W. Lin et al.
Borehole stress measurements indicate a nearly total stress drop in the region of largest slip.

690 Paramyxovirus V Proteins Disrupt the Fold of the RNA Sensor MDA5 to Inhibit Antiviral Signaling
C. Motz et al.
The crystal structure of a viral protein core complex reveals how paramyxoviruses inhibit the innate immune response.

694 Structural Basis for Hijacking of Cellular LxxLL Motifs by Papillomavirus E6 Oncoproteins
K. Zanier et al.
Crystal structures show how a key oncoprotein in human papillomavirus binds host proteins.

A Histone Mutant Reproduces the Phenotype Caused by Loss of Histone-Modifying Factor Polycarbom
A. R. Pengelly et al.
Histone genetics provides functional evidence for the importance of histone modifications in gene regulation.

700 53BP1 Regulates DSB Repair Using Rif1 to Control 5’ End Resection
M. Zimmermann et al.
In mammalian cells, Rap1-interacting factor 1 protects DNA ends against resection.
>> Perspective p. 652; Report p. 711

704 Regulation of Flowering by Trehalose-6-Phosphate Signaling in Arabidopsis thaliana
V. Wahl et al.
Specific sugar signals integrate carbohydrate status with day length and developmental age to regulate flowering.
>> Perspective p. 659

708 Host-Derived Nitrate Boosts Growth of E. coli in the Inflamed Gut
S. E. Winter et al.
During inflammation, Escherichia coli uses nitrate respiration to gain a growth advantage over other gut bacteria.

Rif1 Prevents Resection of DNA Breaks and Promotes Immunoglobulin Class Switching
M. Di Virgilio et al.
In mammalian cells, Rap1-interacting factor 1 protects DNA ends against resection.
>> Perspective p. 652; Report p. 700