False-colored scanning electron microscopy image of innate immune cells and the parasite Trypanosoma brucei (purple; length: 15 micrometers) in an infected mouse liver. The parasite is transmitted between mammalian hosts, including humans, by the bite of infected tsetse flies and is responsible for human sleeping sickness, a lethal disease that is a serious problem in Africa. See page 463.

Image: Gilles Vanwalleghem, Daniel Monteyne, Etienne Pays, and David Pérez-Morga, Laboratory of Molecular Parasitology and Center for Microscopy and Molecular Imaging, Université Libre de Bruxelles, Gosselies, Belgium
REVIEW

431 New Paradigms in Type 2 Immunity
B. Pulendran and D. Artis

BREVIA

436 Explosive Backpacks in Old Termite Workers
J. Šobotník et al.
As Neocapritermes taracua termites age, they develop a suicidal toxic apparatus that bursts during aggressive encounters.

RESEARCH ARTICLE

437 The Connectome of a Decision-Making Neural Network
T. A. Jarrell et al.
The complete wiring structure of the synaptic network governing mating behavior of male nematodes is revealed.

REPORTS

444 Binary Interaction Dominates the Evolution of Massive Stars
H. Sana et al.
Analysis of a sample of massive stars in our Galaxy implies that most will interact with a nearby companion.

446 Excitation of Orbital Angular Momentum Resonances in Helically Twisted Photonic Crystal Fiber
G. K. L. Wong et al.
Adding chirality to the structure of a photonic crystal fiber may provide another route to controlling light transmission.

450 Plasmonic Nanolaser Using Epitaxially Grown Silver Film
Y.-J. Lu et al.
An atomically smooth layer of silver enhances the performance of nanophotonic devices.

453 Predictive Self-Assembly of Polyhedra into Complex Structures
P. F. Damasceno et al.
Two parameters relating to particle shape and nearest neighbors reveal the preferred packing of complex structures.

457 The Tides of Titan
L. Iess et al.
Gravity measurements by the Cassini spacecraft suggest that Saturn’s moon Titan hosts a subsurface ocean.

459 Isotropic Events Observed with a Borehole Array in the Chelungpu Fault Zone, Taiwan
K.-F. Ma et al.
High-pressure fluids induce fracturing along preexisting cracks near the site of a recent earthquake.

463 Adenylate Cyclases of Trypanosoma brucei Inhibit the Innate Immune Response of the Host
D. Salmon et al.
Parasites release cyclic adenosine monophosphate when swallowed up by myeloid cells, thereby turning off a host defense pathway.

467 GFAJ-1 Is an Arsenate-Resistant, Phosphate-Dependent Organism
T. J. Erb et al.
Absence of Detectable Arsenate in DNA from Arsenate-Grown GFAJ-1 Cells
M. L. Reeves et al.
Claims of arsenic substitution for phosphorus in the biomolecules of a Mono Lake bacterium are not independently reproduced.

470 The Structure and Catalytic Cycle of a Sodium-Pumping Pyrophosphatase
J. Kellosalo et al.
Structures of a Thermotoga maritima sodium ion-pumping, membrane-integral pyrophosphatase provide a model of the pumping mechanism.

473 Human α-Defensin 6 Promotes Mucosal Innate Immunity Through Self-Assembled Peptide Nanonets
H. Chu et al.
Rather than killing bacteria directly, a gut antimicrobial peptide forms netlike structures that ensnare invading bacteria.

477 Human α-Defensin 6 Promotes Mucosal Innate Immunity Through Self-Assembled Peptide Nanonets
H. Chu et al.
Rather than killing bacteria directly, a gut antimicrobial peptide forms netlike structures that ensnare invading bacteria.

481 dSarm/Sarm1 Is Required for Activation of an Injury-Induced Axon Death Pathway
J. M. Osterloh et al.
Mutations in a scaffold protein block the Wallerian degeneration of axons in flies and mice.

485 Memory’s Penumbra: Episodic Memory Decisions Induce Lingering Mnemonic Biases
K. Duncan et al.
It takes time for the hippocampus to switch between laying down new memories and recalling old ones.
SCIENCEONLINE

SCIENCEEXPRESS
www.sciencexpress.org
UV Dosage Levels in Summer: Increased Risk of Ozone Loss from Convectively Injected Water Vapor
J. G. Anderson et al.
Convective injection of water vapor into the stratosphere increases the rate of ozone destruction there.
10.1126/science.1222978

A Mechanism of Extreme Growth and Reliable Signaling in Sexually Selected Ornaments and Weapons
D. J. Emlen et al.
Rhinoceros beetle horns, a sexually selected weapon, are more sensitive to nutrition and reliably indicate male quality.
10.1126/science.1224286

Identification of the Cdc48–20S Proteasome as an Ancient AAA+ Proteolytic Machine
D. Barthelme and R. T. Sauer
The AAA+ enzyme Cdc48 combines with the 20S peptidase to function as an alternative type of proteasome.
10.1126/science.1224352

Compartmentalized Control of Skin Immunity by Resident Commensals
S. Naik et al.
The skin microbiota plays a selective role in modulating immunity in the skin of mice.
10.1126/science.1225152

Transforming Fusions of FGFR and TACC Genes in Human Glioblastoma
D. Singh et al.
A fusion gene detected in a small subset of human brain tumors encodes a potentially druggable target.
10.1126/science.1220834

SCIENCENOW
www.sciencenow.org
Highlights From Our Daily News Coverage

Bats Catch Mating Flies in the Act
A study reveals that bats home in on noises emitted by mating flies.
http://scim.ag/Mating-Flies

Selfish Sheep Seek the Center
GPS tracking provides evidence to back up biology’s selfish herd theory.
http://scim.ag/SelfishSheep

Artificial Jellyfish Swims Like the Real Thing
Cell-silicone hybrid may inform the design of replacement hearts.
http://scim.ag/Artificial-Jellyfish

SCIENCESIGNALING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: p53 Functions in Endothelial Cells to Prevent Radiation-Induced Myocardial Injury in Mice
C.-L. Lee et al.
The transcription factor p53 protects the heart from radiation-induced damage.

RESEARCH ARTICLE: Distinct Spatial and Molecular Features of Notch Pathway Assembly in Regulatory T Cells
L. R. Perumalsamy et al.

PERSPECTIVE: Notch and the Survival of Regulatory T Cells—Location Is Everything!
L. M. Minter and B. A. Osborne
A cytosolic function of Notch helps regulatory T cells survive.

GLOSSARY
Find out what CTX, Rag, and Rhb mean in the world of cell signaling.

EVENTS
Plan to attend a signaling-relevant meeting, with more than 30 new meetings and conferences added in July.

SCIENTRANSLATIONAL MEDICINE
www.sciencetranslationalmedicine.org
Integrating Medicine and Science

FOCUS: In the Public Interest?
L. C. Sayres et al.
Restrictive patenting and licensing for cell-free fetal DNA testing has serious consequences for technology advances and benefits to public health.

RESEARCH ARTICLE: MHC-Resident Variation Affects Risks After Unrelated Donor Hematopoietic Cell Transplantation
E. W. Petersdorf et al.
The success of HLA-matched unrelated donor hematopoietic cell transplantation depends on non-HLA MHC region genetic variation.

RESEARCH ARTICLE: Temsirolimus Activates Autophagy and Ameliorates Cardiomyopathy Caused by Lamin A/C Gene Mutation
J. C. Choi et al.
Cardiomyopathy arising from lamin A/C mutations in mice can be corrected by enhancing autophagy through blockade of mTOR with temsirolimus.

RESEARCH ARTICLE: Rapamycin Reverses Elevated mTORC1 Signaling in Lamin A/C–Deficient Mice, Rescues Cardiac and Skeletal Muscle Function, and Extends Survival
F. J. Ramos et al.
Rapamycin treatment of a mouse model for a human laminopathy improves cardiac and muscle function, suggesting a therapy for human patients.

SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists

Experimental Error: Help Not Wanted
A. Ruben
The United States faces a severe shortage of qualified scientists—so why are there so many unemployed scientists?
http://scim.ag/EE_NotWanted

Q&A: A Career on the Fence
E. Pain
A graduate school dean and former Olympic athlete reflects on science, fencing, and how the two activities have benefited each other.
http://scim.ag/OnTheFence

SCIENCEPODCAST
www.sciencemag.org-multimedia/podcast
Free Weekly Show

SCIENCEINSIDER
news.sciencemag.org/scienceinsider
Science Policy News and Analysis

Published by AAAS
www.sciencemag.org  SCIENCE  VOL 337  27 JULY 2012  387