Cover

Ants live together in highly complex societies, often sacrificing individual gain to achieve common goals such as forming a living bridge. Such cooperation makes evolutionary sense because the ants are all related, as detailed in this month’s Origins essay on page 1196. The essay and two Reports on pages 1269 and 1272 address how cooperation evolves in unrelated individuals and even between species.

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BREVIA

1221 Shor’s Quantum Factoring Algorithm on a Photonic Chip
A. Politi et al.
A quantum algorithm to factor numbers is implemented on an optical chip.

REPORTS

1222 An Ultramassive, Fast-Spinning White Dwarf in a Peculiar Binary System
S. Mereghetti et al.
X-ray observations show that a white dwarf has a mass near the limit above which these stars become gravitationally unstable.

1224 Realization of an Excited, Strongly Correlated Quantum Gas Phase
E. Haller et al.
Confinement of a cloud of ultracold atoms along one dimension creates tunable metastable excited states.

1227 Complete Methods Set for Scalable Ion Trap Quantum Information Processing
J. P. Home et al.
Coupling of different ion creates states that are insensitive to stray magnetic fields and more robust for quantum computing.

1230 A Sulfilimine Bond Identified in Collagen IV
R. Vanacore et al.
An unusual sulfilimine bond provides reinforcing cross-link of an extracellular matrix protein, collagen IV.

1234 Reassessing the Source of Long-Period Comets
N. A. Kaib and T. Quinn
Numerical simulations show that the inner Oort Cloud is a major source of long-period comets that cross Earth’s orbit.

1236 Recent Warming Reverses Long-Term Arctic Cooling
D. S. Kaufman et al.
A 2000-year-long Arctic cooling trend seen in a surface air temperature reconstruction was reversed during the last century.

1240 Poly(ADP-ribose)–Dependent Regulation of DNA Repair by the Chromatin Remodeling Enzyme ALC1
D. Ahel et al.
A chromatin remodeling complex targeted by poly(ADP ribosyl)ation plays a role in DNA repair.

1244 Fundamental Evolutionary Limits in Ecological Traits Drive Drosophila Species Distributions
V. Kellermann et al.
The evolutionary potential of key traits may be restricted by limited genetic variation.

1246 Common Regulatory Variation Impacts Gene Expression in a Cell Type–Dependent Manner
A. S. Dimas et al.
Genetic variation in regulatory elements among humans affects gene expression in a tissue-specific manner.

1250 Rab35 Controls Actin Bundling by Recruiting Fascin as an Effector Protein
J. Zhang et al.
Development of sensory bristles in flies depends on controlling the colocalization of actin assembly on membranes.

1254 Regulation of Histone Acetylation in the Nucleus by Sphingosine-1-Phosphate
N. C. Haït et al.
A phospholipid that binds to nuclear enzymes modifies gene transcription in response to external stimuli.

1258 Perineuronal Nets Protect Fear Memories from Erasure
N. Gogolla et al.
Fearful memories in adults are difficult to erase because of the physical environment of specific neurons in the brain.

1261 Activation of the PI3K Pathway in Cancer Through Inhibition of PTEN by Exchange Factor P-REX2a
B. Fine et al.
Cancer cell growth is stimulated by the inhibition of a previously unknown step in cell signaling for tumor suppression.

1265 Recruitment of Antigen-Specific CD8+ T Cells in Response to Infection Is Markedly Efficient
J. W. J. van Heijst et al.
Lymphocyte proliferation, more than recruitment to the site of an infection, determines the success of the immune response.

1269 Differential Sensitivity to Human Communication in Dogs, Wolves, and Human Infants
J. Topal et al.
Social interactions with humans govern the way dogs and children learn, but wolves learn by focusing on objects.

1272 Positive Interactions Promote Public Cooperation
D. G. Rand et al.
Reward is as good as punishment to promote cooperation, costs less, and increases the share out of resources up for grabs.

CONTENTS continued >>
Response to Comments on “Energy Uptake and Allocation During Ontogeny”
W. Zuo et al.
full text at www.sciencemag.org/cgi/content/full/325/5945/1206-c

SCIENCE SIGNALING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: IL-1 Induces IGF-Dependent Epithelial Proliferation in Prostate Development and Reactive Hyperplasia
T. J. Jerde and W. Bushman
A classically inflammatory mediator, interleukin-1, also functions during development in the prostate.

PERSPECTIVE: Tumor Suppression by LKB1—SIK-ness Prevents Metastasis
R. J. Shaw
Salt-inducible kinase 1 is activated by LKB1 to promote anoikis, thereby blocking metastasis.

REVIEW: Stress at the Synapse—Signal Transduction Mechanisms of Adrenal Steroids at Neuronal Membranes
E. M. Prager and L. R. Johnson
Adrenal steroids regulate neuronal excitability by altering ion channel conductance or gene transcription.

PROTOCOL: Analysis of Signaling Events by Dynamic Phosphoflow Cytometry
G. Fraguayo and J. A. Nunéz
State-specific antibodies combined with flow cytometry detect the activity of signaling pathways.

NETWATCH: Gene Expression Omnibus ( GEO)
Access results from thousands of experiments in a public repository of data sets from high-throughput assays; in Bioinformatics Resources.

NETWATCH: Online Mendelian Inheritance in Man (OMIM)
Explore the connections between genotype and phenotype for inherited human disorders; in Bioinformatics Resources.