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Challenges in Theoretical Chemistry

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**ATMOSPHERIC SCIENCE**

Atmospheric Warming and the Amplification of Precipitation Extremes
R. P. Allan and B. J. Soden
Satellite data show that in the tropics, heavy rain events have increased in warmer months and decreased in colder months, more than predicted by climate models.
10.1126/science.1160787

**BIOCHEMISTRY**

Helical Structures of ESCRT-III Are Disassembled by VPS4
S. Lata et al.
A protein responsible for the final separation of daughter cells or budding viruses forms heteromeric complexes on the inside of the membrane to regulate the abscission step.
10.1126/science.1161070

**EVOLUTION**

Parasite Treatment Affects Maternal Investment in Sons
T. E. Reed et al.
Mother seabirds that are infected by parasitic nematodes are less able to gather food and feed their fast-growing sons, shifting the sex ratio and affecting population viability.
10.1126/science.1159466

**RESEARCH ARTICLES**

**PSYCHOLOGY**

The Rupture and Repair of Cooperation in Borderline Personality Disorder
B. King-Casas et al.
In a game, patients with personality disorder cannot build trust with normal partners, possibly because they cannot distinguish between trusting and distrusting acts in others.
>> Perspective p. 778; Science Podcast

**BIOCHEMISTRY**

The Crystal Structure of a Sodium Galactose Transporter Reveals Mechanistic Insights into Na⁺/Sugar Symport
S. Faham et al.
The structure of a sugar transporter suggests how these proteins may rearrange to permit the sugar to enter and leave the binding site on opposite sides of the membrane.
>> Perspective p. 781

**REPORTS**

**ASTRONOMY**

Gas Disks to Gas Giants: Simulating the Birth of Planetary Systems
E. W. Thommes, S. Matsumura, F. A. Rasio
A model of the evolution of planets from a gas-rich disk shows that the disk’s density and viscosity affect the final distribution of planets and that our solar system is unusual.
>> Perspective p. 777
A Conserved Mutation in an Ethylene Biosynthesis Enzyme Leads to Andromonoecy in Melons
A. Boualem et al.
Melon plants have both hermaphroditic and male flowers, a mating system that results from a mutation involved in ethylene synthesis that is still under positive selection.

Human CHN1 Mutations Hyperactivate cx2-Chimaerin and Cause Duane’s Retraction Syndrome
N. Miyake et al.
A signaling protein that helps nerve fibers find their correct target muscles is required for innervation of the eye muscles and, if defective, causes an eye movement disorder.

Deletional Tolerance Mediated by Extrathymic Aire-Expressing Cells
J. M. Gardner et al.
Cells in the spleen and lymph nodes express self-antigens to detect and remove circulating self-reactive immune cells that have escaped deletion by the thymus.

Dynamic Shifts of Limited Working Memory Resources in Human Vision
P. M. Bays and M. Husain
Working memory is a flexibly allocated, but finite, resource; more attention given to an object means it is remembered more precisely, whereas other objects are remembered less well.

Dichotomous Dopaminergic Control of Striatal Synaptic Plasticity
W. Shen et al.
Contrary to previous assumptions, dopamine helps both strengthen and weaken synapses made by cortical cells onto cells of the subcortical striatum.

Irreplaceable Resource
Hydrogeologists Tap Into Demand for an Irreplaceable Resource

In the Geosciences, Business Is Booming
Geoscientists in High Demand in the Oil Industry
Hydrogeologists Tap Into Demand for an Irreplaceable Resource

In contrast to its stolid image, the Z band of the mature myofibril is a beehive of activity.

FUNDING SOURCES
Browse a list of grants and funding opportunities for cell signaling research and training; in the Resources section.
Science 321 (5890), 741-859.