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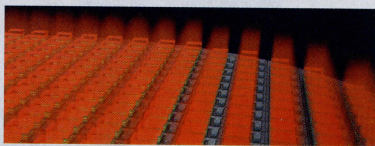
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*Gretchen T Goldman*

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#### 427 LAW

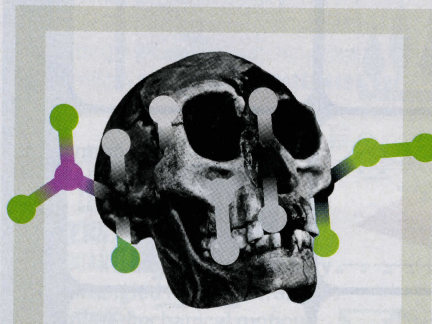
Iranian biologists who tried to export growth factors face trial in US court

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##### Perovskites on trial

A cheap solar-cell material is breaking out of the lab — but will it succeed?



### EVOLUTION

## Move over, DNA

Ancient proteins found in fossils are helping to fill in the gaps in early human history **PAGE 433**

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##### Science in a crisis

Three researchers with a shared goal of saving lives in humanitarian disasters

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#### 444 SATELLITE IMAGING

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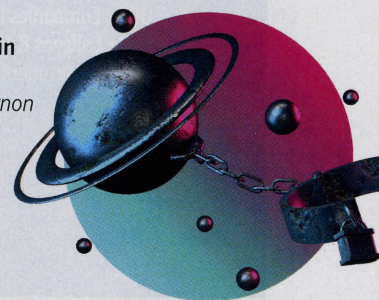
### CORRESPONDENCE

446 License gene editing like medical cannabis / More data needed on air pollution's health impacts / Belt and Road in the Arctic / Carbon uptake by forests

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*S R Algenon*



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The sustained flight of an untethered, insect-sized robot

Kenny Breuer [SEE LETTER P.491](#)

#### 449 ANTIBIOTICS

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Antibiotic-resistant bacteria can be targeted specifically using a toxin

Sanna Koskiniemi & Petra Virtanen

#### 450 PHYSICAL CHEMISTRY

##### Crystallization tracked atom by atom

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Peter G Vekilov

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#### 452 SYNTHETIC BIOLOGY

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A module for robust perfect adaptation

Noah Olsman & Johan Paulsson

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#### 453 MICROBIOLOGY

##### Metabolic mischief as microbes target drugs

Gut bacteria can metabolize a diverse range of therapeutic drugs

Kim Lewis & Philip Strandwitz

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### ARTICLES

#### 455 HYDROLOGY Global analysis of streamflow response to forest management

J Evaristo & J J McDonnell

#### 462 MICROBIOLOGY Mapping human microbiome drug metabolism by gut bacteria and their genes

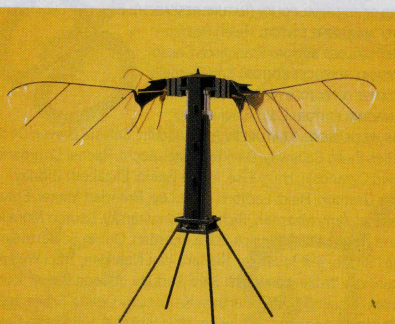
M Zimmermann, M Zimmermann-Kogadeeva, R Wegmann & A L Goodman

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#### 468 IMMUNOLOGY Immunization expands B cells specific to HIV-1 V3 glycan in mice and macaques

A Escolano et al.

#### 474 CANCER Growth dynamics in naturally progressing chronic



ON THE COVER

## Flying solo

Flying a heavier-than-air object is energetically expensive, particularly at very small scales, because of the need to integrate lightweight components for control and propulsion. Noah Jafferis, Farrell Helbling and colleagues introduce RoboBee X-Wing, an insect-sized aerial vehicle capable of untethered flight with a thrust efficiency matching that of similarly sized insects. [PAGES 448 & 491](#)

#### lymphocytic leukaemia

M Gruber et al.

### LETTERS

#### 480 QUANTUM PHYSICS Stationary entangled radiation from micromechanical motion

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#### 484 CONDENSED-MATTER PHYSICS Machine learning in electronic-quantum-matter imaging experiments

Y Zhang et al.

#### 491 ENGINEERING Untethered flight of an insect-sized flapping-wing microscale aerial vehicle

N T Jafferis, E F Helbling, M Karpelson & R J Wood [SEE N&V P.448](#)

#### 496 MATERIALS SCIENCE 45.5-tesla direct-current magnetic field generated with a high-temperature superconducting magnet

S Hahn et al.

#### 500 PHYSICAL CHEMISTRY Observing crystal nucleation in four dimensions using atomic electron tomography

J Zhou et al. [SEE N&V P.450](#)

#### 504 CHEMISTRY A rigorous electrochemical ammonia synthesis protocol with quantitative isotope measurements

S Z Andersen et al.

#### 509 NEUROSCIENCE Specialized coding of sensory, motor and cognitive variables in VTA dopamine neurons

B Engelhard et al.

#### 514 GENETICS Genetic analyses of diverse populations improves discovery for complex traits

G L Wojcik et al.

#### 519 EVOLUTION Pluripotency and the origin of animal multicellularity

S Sogabe et al.

#### 523 NEUROSCIENCE Individual brain organoids reproducibly form cell diversity of the human cerebral cortex

S Velasco et al.

#### 528 IMMUNOLOGY Group 3 innate lymphoid cells mediate early protective immunity against tuberculosis

A Ardain et al.

#### 533 SYNTHETIC BIOLOGY A universal biomolecular integral feedback controller for robust perfect adaptation

S K Aoki et al. [SEE N&V P.452](#)

#### 538 BIOCHEMISTRY Structure and function of Vms1 and Arb1 in RQC and mitochondrial proteome homeostasis

T Su et al.

### EVOLUTION

## Stem cells

Early animal cells transitioned between multiple states. [PAGE 519](#)

