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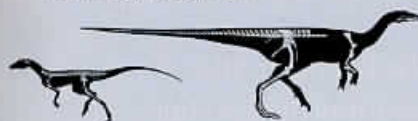
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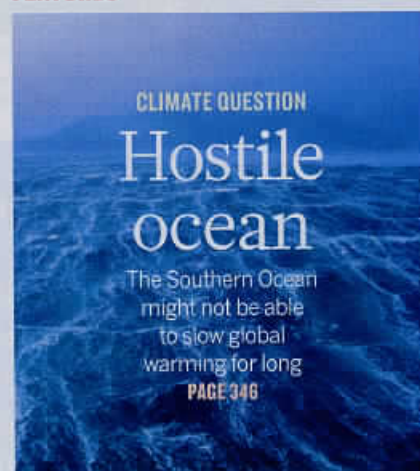
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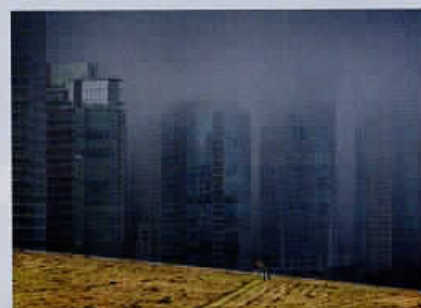
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## nature INDEX 2016 COLLABORATIONS

Institutions and countries responsible for some of the highest-quality science tend to form the strongest partnerships. *Nature Index 2016 Collaborations* highlights some of the most fruitful alliances, such as those resulting from the bonds between China and the United States. The two countries produce the most high-quality science publications, and collaborate more than any other international pairing.

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#### 361 MOLECULAR BIOLOGY

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An expanded role for the Hsp70 chaperone protein  
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### ARTICLES

#### 378 NEUROSCIENCE Forward-genetics analysis of sleep in randomly mutagenized mice

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### ON THE COVER

## High stakes

A Seattle cannabis worker cradles a resin-dusted bud of a strain called Blueberry Cheesecake. Michael Bloomfield et al. review the conflicting evidence between clinical and animal research studies of the effects of  $\Delta^9$ -tetrahydrocannabinol (THC), the psychoactive compound in marijuana, on neural networks, such as the dopamine-driven reward system.

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396 MICROBIOLOGY Thermophilic archaea activate butane via alkyl-coenzyme M formation  
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416 ATMOSPHERIC SCIENCE Amazon boundary layer aerosol concentration sustained by vertical transport during rainfall  
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420 GEOCHEMISTRY Implications for metal and volatile cycles from the pH of subduction zone fluids  
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425 ECOLOGY Variability in plant nutrients reduces insect herbivore performance  
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428 NEUROSCIENCE Neuromodulators signal through astrocytes to alter neural circuit activity and behaviour  
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437 IMMUNOLOGY PI3K $\gamma$  is a molecular switch that controls immune suppression  
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443 IMMUNOLOGY Overcoming resistance to checkpoint blockade therapy by targeting PI3K $\gamma$  in myeloid cells  
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448 MOLECULAR BIOLOGY Alternative modes of client binding enable functional plasticity of Hsp70  
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452 GENE REGULATION Local regulation of gene expression by lncRNA promoters, transcription and splicing  
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456 CORRIGENDUM An early geodynamo driven by exsolution of mantle components from Earth's core  
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456 CORRIGENDUM An essential receptor for adeno-associated virus infection

LYNN JOHNSON/NATIONAL GEOGRAPHIC CREATIVE