

PSYCHOLOGY

Managing Terror

Our awareness that we exist exposes us, unfortunately, to the inescapable terror of dying. Jonas and Fischer have explored the role of religious beliefs in allowing people to manage their terror in situations where mortality is made salient. In particular, they focus on the distinction between extrinsic (searching for safety and solace) and intrinsic (searching for meaning and value) religious beliefs. Just after the November 2003 bombings in Istanbul, customers in a Munich coffee shop were more likely to rise in defense of their cultural worldview (to disagree with newspaper articles that were inconsistent with their own assessments of the likelihood of an attack in Germany) if they scored low on an intrinsic religiousness scale than if they scored high; this difference in behavior dissipated with time as the reminder of death became less salient. In follow-up experiments involving students from a Jesuit school and a local university, they found that intrinsically religious people did not think more about dying when reminded of mortality (in contrast to extrinsically oriented individuals) and that this capacity to buffer one's state of mind contributed to their not having to mobilize terror management defenses in the face of death. — GJC

J. Pers. Soc. Psychol. **91**, 553 (2006).



BIOMEDICINE

Gastric Distress for Obestatin

In a developed world suffering an obesity epidemic, new reports of molecules that regulate appetite and body weight inevitably attract broad interest, and the secreted peptide obestatin (Zhang *et al.*, Research Articles, p. 996, 11 November 2005) was no exception. Derived from the same precursor as ghrelin (a peptide that promotes food intake and obesity in rodent models), obestatin was shown to have activities that oppose the effects of ghrelin: It suppressed food intake, delayed gastric emptying, and decreased body weight gain in rodents. These intriguing effects were mediated by its interaction with a G-protein-coupled receptor called GPR39.

Subsequent experiments in other laboratories suggest that obestatin may be regulating energy balance in a manner distinct from that originally proposed and/or that its effect on food intake is subtle. Moechars *et al.* found that mice genetically deficient in GPR39, the putative receptor for obestatin, gain weight more readily than their wild-type littermates, but they attributed this to the inhibitory effects of GPR39 on gastrointestinal motility rather than appetite, as food intake was similar for the mutant and wild-type mice. Nogueiras *et al.* injected rats with obestatin obtained from three different suppliers and found that obestatin had no effect on food intake, body weight, or other physiological parameters involved in energy balance. Importantly, neither group was able to detect expres-

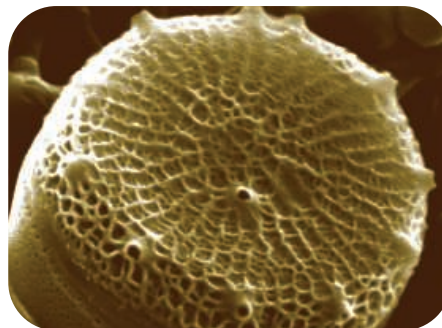
sion of the GPR39 gene in the hypothalamus, the region of the brain targeted by most hormones associated with appetite control. — PAK

Gastroenterology **131**, 1131 (2006); *Endocrinology* **10.1210/en.2006-0915** (2006).

MATERIALS SCIENCE

Small and Strong

The intricate silica cell walls fabricated by the unicellular algae known as diatoms are highly porous and are produced with high fidelity. Diatoms have therefore been viewed as a possible platform for nanostructured materials synthesis. Hildebrand *et al.* have probed cell wall synthesis in the nanostructured form of *Thalassiosira pseudonana*, an organism whose genome has recently been sequenced. They studied a series of structural intermediates to unravel the chemical formation sequence and to ascertain when certain proteins come into play. At the earliest



T. pseudonana cell wall.

stages, they observed an outline of the valve with silica ribs radiating from the center. The rim structure then thickens, followed by a thickening of the rest of the valve structure. As the ribs form and fuse together, they give rise to a nanoporous structure with larger, more irregular pores than those formed earlier in the process. These observations confirm that the structure of *T. pseudonana* has been optimized to maximize strength with minimized material requirements, all the while allowing for the uptake and efflux of metabolites during this process. The authors hope in the long term to replicate and control many of these features through modification of the genome or through mixing of an appropriate array of polypeptides and polyamines to foster silica polymerization in vitro. — MSL

J. Mater. Res. **21**, 2689 (2006).

GEOCHEMISTRY

Postdiluvian Pb

Lead contamination of exposed soils in residential areas is a strong concern because of the danger that ingestion of the heavy metal can pose to children's health. One promising remediation strategy is the addition of a clean soil layer to the surface. Before Hurricane Katrina in August 2005, Mielke *et al.* had undertaken a study in which they were monitoring soil lead levels at 25 contaminated New Orleans properties after treatment with 15 cm of clean alluvium drawn from the Mississippi River. They now report the impact of flooding caused by the hurricane on these lead

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levels. Although erosion and soil mixing might have been expected to substantially elevate surface lead levels, the authors found that the general increase on the flooded properties was relatively small, and consistent with a steady but slow rise observed in the series of measurements before the hurricane. Median lead levels were reduced from 1051 to 6 mg/kg by the treatment, subsequently rose to 10 mg/kg before the flooding, and were elevated after the hurricane to 16 mg/kg. The authors attribute this steady rise to resuspension and deposition of lead-bearing dust across the city. — JSY

Environ. Sci. Technol. **40**, 10.1021/es061294c (2006).

ATMOSPHERIC SCIENCE

Clean Competition

Concern has arisen about air quality during planning for the August 2008 Olympic Games in Beijing, China, as so many of the scheduled competitions are intensely aerobic, and summer pollution levels in Beijing can be high. Both the national and municipal governments there have introduced a range of measures to reduce locally generated air pollution, a strategy almost certain to have a positive effect. However, air pollution can also arise



View of Beijing.

from remote generation sources, and thus local mitigation efforts may not be sufficient to meet the stated objectives of the Chinese officials toward air quality improvement. Streets *et al.* assess the importance of outside sources as contributors of two significant regional and urban air pollutants: fine particulate matter and ozone. Using a combination of emissions data and modeling, they conclude that sources far from the city exert a substantial influence on air quality in Beijing, and that fine particulate matter and ozone could exceed healthful levels in the unfortunate event of unfavorable meteorological conditions, even if local sources were eliminated entirely. The authors suggest that additional emission control measures in Beijing's populous, industrialized neighboring provinces should be considered. — HJS

Atmos. Environ. 10.1016/j.atmosenv.2006.08.046 (2006).

IMMUNOLOGY

Strengthening A Weak Choice

The cell surface co-receptors CD8 and CD4 define two classes of T cells and facilitate the recognition of antigens presented by the class I and class II major histocompatibility complex (MHC) proteins, respectively. They are also critical in the development and selection of T cells in the thymus. One model proposes that in double-positive thymocytes (those expressing both CD4 and CD8), the stronger signals delivered by CD4 direct T cells toward a single positive CD4 fate, whereas weaker signals emanating from CD8 contribute to class I recognition, resulting in a program of continued CD8 expression and loss of CD4. Erman *et al.* generated transgenic mice in which a chimeric CD8 protein carrying the intracellular CD4 domain was expressed under the normal CD8 regulatory elements. The increase in signal strength via the co-receptors in class I-restricted thymocytes did not alter lineage choice; rather, an increase in the number of cells entering the single positive CD8 T cell pool was seen. Hence, the more potent (in terms of downstream Lck kinase activation) intracellular CD4 domain could explain the familiar bias in the number of CD4 over CD8 T cells seen in the mammalian thymus. — SJS

J. Immunol. **177**, 6613 (2006).

BIOCHEMISTRY

Grabbing a Helping Strand

Helicases are a highly conserved class of enzymes that use ATP to unwind or destabilize DNA and RNA double helices. These enzymes are thought to latch onto a single-stranded (ss) region of the duplex, the "loading strand," and then to motor along the strand, either in the 5' or 3' direction, peeling apart the duplex as they go. Puzzlingly, some RNA helicases can unwind duplexes regardless of which strand they start from. Yang and Jankowsky have analyzed the unwinding activity of the yeast RNA helicase Ded1, which is involved in translation initiation. Although Ded1 cannot unwind DNA-DNA duplexes, it can load onto ssDNA (of either polarity), "travel" across a short region of double-stranded DNA (without unwinding it), and tease apart a DNA-RNA duplex on the far side. Indeed, the loading strand need only be nearby and not necessarily covalently linked to the target duplex. Thus, the loading strand may serve to increase the concentration of Ded1 in the vicinity of the target. An unwinding mechanism in which the enzyme doesn't travel extensively may be well suited for local conformational changes in protein-nucleic acid complexes, something this class of helicases specializes in. — GR

Nat. Struct. Mol. Biol. **13**, 981 (2006).

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