



## ECONOMICS

## Speaking Up Saves Lives

Each year, almost twice as many people die as a result of injuries suffered in road traffic accidents as from malaria. Most of these deaths occur in developing countries, and inexpensive and easy-to-implement measures to reduce this toll could offer a big payoff. Habyarimana and Jack describe a simple nudge applied to the minibus-based long-distance transport system linking major towns to Nairobi, Kenya. Stickers encouraging passengers to speak up if they were subject to bad driving and a lottery to discourage drivers from removing the stickers combined to halve the number of insurance claims at a cost of less than 6 USD per year of life saved, which is comparable to the cost of childhood vaccinations. — GJC

*J. Public Econ.* **95**, 1438 (2011).

## PLANT SCIENCES

## To Grow or Not to Grow

A pollen grain that lands on a compatible pistil (the central female reproductive organ of flowering plants) still has a ways to go before it can achieve successful fertilization. Pollen grains contain plant sperm cells, but must also grow a tube through which the sperm cells migrate from the pistil surface to the more distant ovule. The factors that regulate this process are not well defined. Qin *et al.* have now identified a small diffusible compound from the *Arabidopsis* pistil that encourages pollen germination. After mass spectrometry analysis identified the key compound, the authors synthesized structural mimics: *N*-methanesulfinyl 1- and 2-azadecalins. Although flavonols can trigger germination of tobacco pollen, they do not have that effect on *Arabidopsis* pollen. *Arabidopsis* pollen germination instead seems to be enhanced by the sulfinylated azadecalins, which have no such effect in tobacco. These findings, along with quantitative differences in responses of pollen from Columbia and Landsberg accessions of *Arabidopsis*, hint at some level of divergence and specificity in how these signals interact with pollen of diverse species. — PJH

*Plant J.* **68**, 800 (2011).

## BIOMEDICINE

## A Recipe for Brain Injury

Type 2 diabetes, hypertension, heart disease, stroke, osteoarthritis, cancer. In case the list of health issues associated with a poor diet and obesity is not daunting enough, new research has uncovered another candidate—brain injury. Studying rodent models susceptible to diet-induced obesity, Thaler *et al.* examined the

effect of a high-fat diet on a brain region called the hypothalamic arcuate nucleus, which has a well-established role in feeding and energy balance. Consumption of a high-fat diet caused a spike in hypothalamic inflammation and was accompanied by gliosis, an activation of astrocytes and microglia that normally occurs in response to brain injury. In contrast to high-fat diet-induced peripheral tissue inflammation, which primarily occurs in response to weight gain, brain inflammation occurred rapidly upon high-fat diet initiation. Although initially transient, hypothalamic inflammation reappeared with prolonged consumption of a high-fat diet along with other indicators of brain injury such as increased abundance of neuronal stress proteins, increased neuronal autophagy, and ultimately neuronal loss. In a preliminary analysis, the authors saw radiologic evidence of gliosis in the hypothalamus of obese but not lean humans, consistent with the rodent studies. One hypothesis is that the hypothalamic injury caused by a high-fat diet actively contributes to the progression of obesity and its associated metabolic disorders, but this remains to be experimentally established. — PAK

*J. Clin. Invest.* **122**, 153 (2012).

## DEVELOPMENT

## Methylate for Males

For some fish and reptiles, the genetic sex of an individual can be overridden by extreme temperature shifts, an effect that results in skewed sex ratios. One such species, the European sea bass, shows a male-biased sex ratio in response to high temperatures experienced before gonad development. How temperature affects sex

ratios at a molecular level, however, is not well understood. Navarro-Martín *et al.* investigated this and found enhanced methylation of the promoter of the *cyp19a* gene in males as compared to females. *cyp19a* encodes gonadal aromatase, the enzyme that converts male hormones into the female hormones that are



required for ovarian development. Increased methylation of the aromatase promoter was associated with reduced expression of the aromatase enzyme in males. Temperature increases resulted in increased methylation of the aromatase promoter in females, which was accompanied by a decrease in gene expression. On the basis of these results, the authors conclude that aromatase probably controls temperature sex determination in the European sea bass. Whether these results have implications for sex determination in other species remains to be determined. — LMZ

*PLoS Genet.* **7**, e1002447 (2011).