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## CLIMATE SCIENCE

## Urban Air Quality

The oxidation of volatile organic compounds (VOCs) is an important step in the formation of photochemical smog in urban areas, but the rate at which VOCs are oxidized has been difficult to quantify. A reliable way to measure this rate would lead to improved prediction of smoke/fog events.

Volkamer *et al.* used differential optical absorption spectroscopy (DOAS) to make direct measurements of atmospheric glyoxal concentrations over Mexico City in the spring of 2003. They show that VOC oxidation, of which glyoxal is a product, begins about an hour after sunrise and continues throughout the day. These observations allow a lower limit to be placed on the rate of VOC oxidation and reveal that VOC chemistry is active throughout sunlit hours. On the basis of these results, satellite measurements of glyoxal appear to be feasible, which would support the identification of photochemical hot spots in the atmosphere. — HJS



Smog above Mexico City.

*Geophys. Res. Lett.* 32, 10.1029/2005GL022616 (2005).

## CELL BIOLOGY

## Complex Cellularization

Early insect development involves multiple nuclear divisions within a single cytoplasm to form syncytial embryos. The syncytium is divided into separate cells (each with a single nucleus) in a process termed cellularization, which involves the generation of membrane furrows between adjacent nuclei and produces a polarized cortical cell layer. The formation of the cleavage furrow requires concerted delivery (from the Golgi complex) of membrane components to the growing furrow. This delivery increases the cell surface area by 20-fold and is directed by the microtubule network. Papoulas *et al.* followed the apically directed movement of Golgi complexes toward the sites of furrow formation, which depended on the activity of the microtubule-based molecular motor dynein. The Golgi membranes themselves interacted with dynein and other motility factors via a peripheral Golgi membrane protein of the golgin family, Lava lamp. These interactions were disrupted and cellularization blocked when domains from the Lava lamp protein that bound to dynein or the motility factors were injected into living embryos. — SMH

*Nat. Cell Biol.* 10.1038/ncb1264 (2005).

## PSYCHOLOGY

## Is That Your Final Answer?

Taking a multiple-choice test or patronizing a crowded supermarket, we may find ourselves in a predicament, after having made a selection, in deciding whether to stick with it or to switch. The widespread belief is that it's better to stay put

## BIOMEDICINE

## Weeding Out Osteoclasts

More than half of individuals age 50 and older are at risk for osteoporosis, a disorder characterized by low bone mass. One of the principal cell types regulating skeletal growth and integrity is the osteoclast, which functions to resorb bone. Several drugs currently in clinical use for osteoporosis, such as the bisphosphonates, act by inhibiting osteoclast activity.

A surprising new molecular player in bone growth and remodeling is identified by Idris *et al.*, who find that mutant mice deficient in cannabinoid type 1 (CB<sub>1</sub>) receptors have increased bone mass that appears to be caused by aberrant apoptosis (cell death) of osteoclasts. Moreover, mutant female mice were protected against bone loss induced by ovary removal, which is a model of postmenopausal bone loss in women, and this protective effect could be reproduced pharmacologically in wild-type mice by the administration of

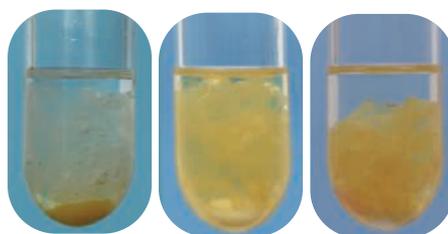
cannabinoid antagonists. Thus, osteoporosis joins a growing list of human disorders, including obesity and nicotine dependence, that may be treatable by drugs targeting the cannabinoid receptors, a class of proteins originally discovered as the binding sites for the major psychoactive ingredient of marijuana. — PAK

*Nat. Med.* 10.1038/nm1255 (2005).

## CHEMISTRY

## Recovered on Tape

A central challenge in homogeneous catalysis is achieving facile separation and recovery



Tape and catalyst (orange) before reaction (left), at 55°C (center), and after cooling (right).

of the catalyst once the reaction is over. An increasingly common solution is to

append fluorocarbon chains to the catalyst. Because fluorocarbons are poorly miscible with most organic solvents, this modification makes it possible to remove the catalyst by extraction into a fluorosolvent or, in some cases, simply by cooling the reaction mixture to induce precipitation. However, both of these methods can be inefficient at low catalyst loadings.

Dinh and Gladysz show that a rhodium catalyst for hydrosilylation of ketones can be recovered efficiently and easily using Teflon tape. The catalyst, bearing three fluoroalkylphosphine ligands, was dissolved with the reagents in dibutyl ether at 55°C, with a strip of tape added to the flask. Upon cooling, the orange catalyst stuck to the tape (and not to the stir bar!) and could be recycled two more times by heating in a fresh reaction mixture. — JSY

*Angew. Chem. Int. Ed.* 10.1002/anie.200500237 (2005).