

PSYCHOLOGY

I'm Free, You're Not

A seemingly universal belief is that people consider that their capacity to act freely is greater than that of others. Pronin and Kugler supply a set of experiments in support of this proposition. Ivy League undergraduates reported that their own past (choice of college to attend and choice of field of concentration) and futures (place to live and profession) were less predictable than those of a roommate, and a similarly broader scope of futures was claimed by restaurant waiters for themselves in comparison to a co-worker. These asymmetries could not be explained simply as self-optimism, because the larger set of future scenarios comprised both positive and negative outcomes. Finally, and in contrast to the tendency to attribute one's own actions to situational influences and another's actions to dispositional traits, they found that where the undergraduates differed from their roommates was in the apportionment of causal motivations to intentions versus personality; that is, we see our actions as the product of changeable desires, and the sense that we could have acted otherwise had we so desired is what underpins our belief in free will. — GJC
Proc. Natl. Acad. Sci. U.S.A. **107**, 22469 (2010).

GEOCHEMISTRY

Caves in 2D

Vast expansive underground caves start out meagerly as small fractures in carbonate-rich bedrock such as limestones or dolostones. As slightly acidic water, which is undersaturated in carbonate, slowly percolates through the rock, carbonate dissolves according to the direction of flow. Geochemical models, however, predict this scenario to break down at depth because undersaturated solutions have very low penetration depths. Models designed to overcome this discrepancy are successful at explaining cave formation but treat fractures as simplified one-dimensional (1D) objects from which dissolution uniformly propagates, and rely on complicated chemical kinetics. By performing simulations of dissolution using a 2D model, Szymczak and Ladd observed that uniform dissolution fronts generated in just one dimension are mathematically unstable as soon as the fracture has any width. Instead, the model predicts that dissolution along fractures



occurs at smaller, highly localized hot spots spaced out along a semi-regular wavelength. These hot spots can eventually develop into channels according to the size and orientation of the fracture relative to the flow direction. Over time, a single channel can eventually grow into a large cave or system of caves. — NW

Earth Planet. Sci. Lett. **301**, 424 (2011).

CLIMATE SCIENCE

First Warm, Then Wet

Data derived from Asian loess sequences and stalagmites from caves in China have provided a valuable record of changes in the East Asian monsoon since the Last Glacial Maximum but have not been equally informative about the relationship between the timing of monsoon precipitation and warming in that region. Knowing the relative timing of those changes is an important part of understanding how climate changed during the last deglaciation. Peterse *et al.* present a record of temperature in central China for the past 34,000 years, in an effort to better define its relation to monsoon activity there. They find that the intensification of east Asian summer monsoon precipitation lagged deglacial warming and the increase of Northern

Hemisphere summer insolation by about 3000 years. Intense soil formation, which depends on both higher temperatures and available moisture, lagged deglacial warming by even longer, around 7000 years. — HJS

Earth Planet. Sci. Lett.

301, 256 (2011).

DEVELOPMENT

Enucleation Regulation

Mammalian mature red blood cells lack nuclei. Enucleation results from asymmetric cell division in which the condensed nucleus, surrounded by a plasma membrane, buds off from the immature erythroblast. Micro- (mi) RNAs are important regulators of erythroid cell development and homeostasis; thus Zhang *et al.* used RNA-seq technology to examine whether they also regulate erythroid maturation. Their analysis revealed that the majority of miRNAs are down-regulated during this process. In particular, expression of miR-191 decreased sharply. Overexpression of miR-191 resulted in defective cell enucleation, but differentiation was unaffected. Reduction of miR-191 expression allowed for the expression of target erythroid genes *Riok3* and *Mxi1*, which are required for chromatin condensation and enucleation. — BAP

Genes Dev. 10.1101/gad.1998711 (2010).

**AAAS is here –**

increasing diversity in the scientific work force.

AAAS is working to ensure that every student with an aptitude for science, technology, engineering, and mathematics gets an opportunity to pursue a chosen profession, no matter what the challenges. For over 30 years AAAS's ENTRY POINT! program has placed talented, differently abled students in paid internships with leading scientific employers. As a AAAS member your dues support these efforts.

If you're not yet a AAAS member, join us. Together we can make a difference.

To learn more, visit aaas.org/plusyou/entrypoint

