

From a Violent Collision Comes Celestial Beauty

Beautiful “space gems”—a rare form of meteorite called pallasites—have fascinated scientists since they were first identified as originating from outer space more than 200 years ago.

Now new research by a team led by geophysicist **John Tarduno** indicates that the origins of pallasites are more dramatic and violent than first thought.

In a study published in *Science*, the geophysicists report that pallasites were likely formed when a smaller asteroid crashed into a planet-like body about 30 times smaller than Earth, resulting in the distinctive mix of materials—olive-green crystals embedded in an iron-nickel matrix—that make up the meteorites.

Forged from iron-nickel and the translucent, gem-like mineral olivine, pallasites were thought by many scientists to have formed where those two materials typically come together: at the boundary of the iron core and rocky mantle in an asteroid or other planetary body. Tarduno discovered that tiny metal grains in the olivine were magnetized in a common direction, a revelation that led the researchers to conclude that the pallasites must have been created much farther from the core.

The research also helps to answer affirmatively questions about whether small celestial bodies can have “dynamo action”—a rotating, liquid iron core that can create a magnetic field.

—Peter Iglinski

PRETTY PALLASITES: Rochester geophysicists have found that the unusual materials in a rare form of meteorite likely come from a collision between an asteroid and a planet-like body smaller than Earth.



Neuroticism Can Be Good for Your Health

It may be time to stop worrying about a little anxiety: under certain circumstances, neuroticism can be good for your health, according to a Medical Center study showing that some self-described neurotics also tended to have the lowest levels of interleukin 6, a biomarker for inflammation and chronic disease.

Researchers made the preliminary discovery while conducting research into how psychosocial factors such as personality traits influence underlying biology to predict harmful conditions such as inflammation.

Considered by psychologists to be one of the five basic dimensions of personality—along with openness, extraversion, agreeableness, and conscientiousness—neuroticism is usually marked by moodiness, nervousness, and worry and is linked to hostility, depression, and excessive drinking and smoking.

Nicholas Turiano, a post-doctoral fellow in psychiatry, wondered about the gray area of people with average-to-high levels of neuroticism who are also conscientious. Exhibiting higher levels of conscientiousness as well as neuroticism points to people who tend to be high-functioning in society, very organized, and goal-oriented planners. They're also more likely to be reflective.

"These people are likely to weigh the consequences of their actions, and therefore their level of neuroticism coupled with conscientiousness probably stops them from engaging in risky behaviors," says Turiano, whose study is published online by the journal *Brain, Behavior, and Immunity*.

—Leslie Orr



SWEPT CLEAN: Blind mole rats have a unique biological mechanism that sweeps abnormal cells and nearby cells from their bodies.

A Life Underground—But Cancer-Free

Just a few years after pinpointing a cancer-fighting mechanism in one species of mole rats, biologists have discovered a different anticancer mechanism in another.

Blind mole rats and naked mole rats are the only mammals never known to develop cancer. Three years ago, **Vera Gorbunova**, professor of biology, and **Andrei Seluanov**, assistant professor of biology, determined the anticancer mechanism in the naked mole rat.

Their research found that a specific gene—*P16*—makes the cancerous cells in naked mole rats hypersensitive to overcrowding, and stops them from pro-

liferating when too many crowd together.

They expected blind mole rats to have the same mechanism—but found instead that they have developed one of their own. The precancerous cells in blind mole rats died by a mechanism that kills both abnormal cells and their neighbors, resulting in a “clean sweep.” The findings have been published in the *Proceedings of the National Academy of Sciences*.

While people don't have the same mechanism, researchers hope it may be possible to simulate a similar clean-sweep reaction in cancerous human cells.

—Peter Iglinski

Language Shaped By Brain's Desire for Clarity, Ease

For linguistic purists terrified of the corruption of their mother tongue, cognitive scientists have good news.

A team of researchers from Rochester and Georgetown University has found that many changes to language are simply the brain's way of ensuring that communication is as precise and concise as possible. The study—by lead author **Maryia Fedzechkina**, a doctoral candidate, and coauthors **T. Florian Jaeger**, the Wilmot Assistant Professor of the Sciences, and **Elissa Newport**, the former George Eastman Professor of Brain and Cognitive Sciences—was published in the *Proceedings of the National Academy of Sciences*.

The team used an artificial language in a carefully controlled laboratory experiment to observe the language acquisition process. When faced with sentence constructions that could be confusing or ambiguous, the language learners chose to alter the rules of the language they were taught in order to make their meaning clearer.

The brain's tendency toward efficient communication may also be an underlying reason that many human languages are structurally similar.

Linguists have long identified nearly identical grammatical conventions in seemingly unrelated languages scattered across the globe, but wondered whether these recurrent structures are artifacts of distant common origins, random accidents, or reflections of fundamental aspects of human cognition. This research supports the latter, say investigators.

—Susan Hagen