pISSN 2372-8191
eISSN 2329-5856

Science INSIGHTS®

09 MAY 2015, VOLUME 12, NO 2

The Bonoi Academy of Science & Education (BASE)


When life starts,
It is so fresh.
Who knows the future?
Sunny
Rainy
Droughty
Or
……

Science INSIGHTS®: the Real Journal of Science and Education

►Mission: Let science reach the far corner by education

EDITORS (Alphabetically)

Editorial Office

Monica R. **Silber** (*Editor Assistant*): monica.silber@bonoi.org
Susan J. **Song** (*Secretary*): susan.song@bonoi.org
Amie S. **Cahill** (*Technician*): amie.cahill@bonoi.org
Editorial Office: editorial-office@bonoi.org

Founding-Committee of the BASE

Regional Office

CHINA (Mainland)

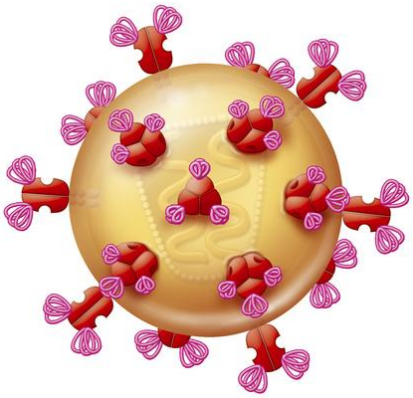
Contact Info: **Haibo (Herbert) Wu**, No.123, Tianfeixiang, Nanjing 210004, Jiangsu, China

Tel: +86-25-150 6228 2214

Email: herbert.wu@bonoi.org

Science Tests Idea | Science Speaks Truth | Science Makes Difference
Education On Science | Education For Advancement | Education To Future

NEWS



page 396

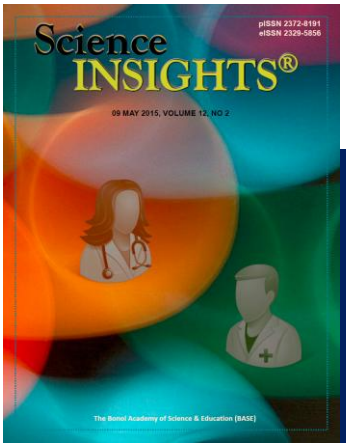
EDITOR'S CHOICE

PICTURE STATION

page 411

REVIEW

COMMON SCIENCE



COVER
Psychological maneuver designed with strategic procedures displayed interesting effect in managing pain. Although different types of psychological interventions have been found producing distinct results in pain relief under various clinical environments, the clinical value of psychological interventions in the postoperative condition is still not clear. See page 406.
Image: BASE illustrating group

p-ISSN: 2372-8191
e-ISSN: 2329-5856
DOI: 10.15354/issn.2329-5856

BASE MEMBERSHIP

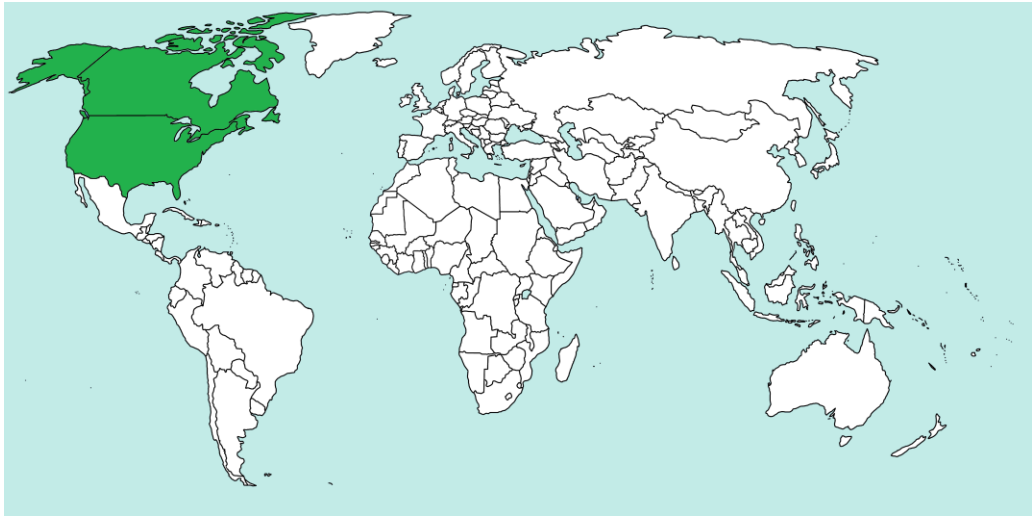
Join us as a member of The BASE
http://www.basehq.org/machform/view.php?id=12340

Membership Benefits for you
http://www.basehq.org/node/15

Renew your membership
http://www.basehq.org/machform/view.php?id=11462

Cleveland, USA

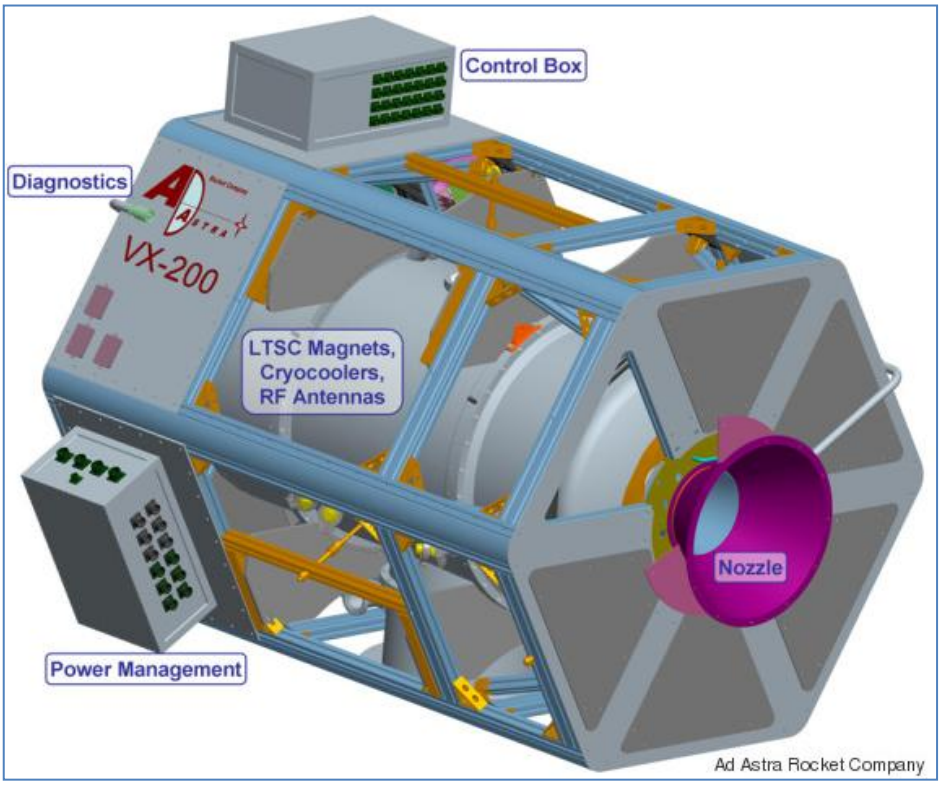
Lowering Salt Intake: More Harm than Good?



For years, Americans, especially those with high blood pressure, have been told that too much salt is bad for their health. But a growing chorus of medical and nutritional experts has begun to push back on that claim. “We have been stuck in a time warp with this advice,” said Dr. Steven Nissen, the chairman of cardiovascular medicine at the Cleveland Clinic in Ohio. "There is no solid evidence to support the current recommendations." Nissen pointed to several recent studies that chip away at the American Heart Association guidelines calling for people with high blood pressure to limit their salt intake to no more than 1,500 milligrams daily. One such study was published in the New England Journal of Medicine in 2011. Examining the sodium intake of nearly 30,000 people, Irish researchers found that those with a very high intake of salt -- 6,000 to 7,000 milligrams daily -- were at higher risk for cardiovascular problems such as heart attack and stroke. But they also found that those with low salt intake were equally at risk. This finding is important because it raises questions about whether someone with an average American intake of about 3,000 milligrams of sodium a day would benefit from making any reduction, Nissen said. More and better investigations should be done to determine if someone with high blood pressure would be helped or harmed by the current recommendation, he added. It could be that subjects with low sodium intake in studies have health problems that skewed the results in the Irish study and others, according to Alice H. Lichtenstein, the director of the Cardiovascular Nutrition Laboratory at Tufts University and an AHA spokeswoman. “When we looked at studies for the National Institutes of Medicine, we couldn’t rule out the strong possibility that people with lower sodium intake were sicker subjects and had a greatly diminished food intake in general, and might have been misreporting their intake,” she said. But Lichtenstein admitted that, while the data supports lowering sodium intake down to about 2,300 milligrams daily, there isn't yet much evidence for going down to 1,500. Like Nissen, she said there needs to be more research to get a definitive answer. The consumer advocacy group, Center for Science in the Public Interest, said in a statement it believes there is not enough evidence to change the current salt recommendations. "There is a near-global scientific consensus that most people consume too much salt, largely from packaged and restaurant foods," said Bonnie Liebman, CSPI's director of nutrition. "Given that two out of three American adults has either hypertension or prehypertension, it would be foolish to reverse that advice based on recent flawed studies." The current government recommendation on sodium intake for a healthy person is no more than 2,300 milligrams of sodium per day, or about a teaspoon. People over 50, African Americans and anyone with high blood pressure or kidney problems should limit their intake to 1,500 the guidelines state. Those sodium intake guidelines, followed by millions of Americans, were recently scrutinized by a panel of health and nutrition experts known as the “2015 Dietary Guideline Advisory Committee” with an eye towards possible revision. But Nissen said he doesn’t expect the recommendations to change any time soon. “These ideas are so entrenched it will be difficult to get people to let go of such long held beliefs,” he said. By Liz Neporent. The original article from *Good Morning America*.

Webster, USA

VASIMR Rocket Could Send Humans



to Mars in Just 39 Days

A new type of rocket that could send humans to Mars in less than six weeks instead of six months or longer may be one step closer to reality. NASA has selected Texas-based Ad Astra Rocket Company for a round of funding to help develop the Variable Specific Impulse Magnetoplasma Rocket, or VASIMR. The new rocket uses plasma and magnets, not to lift spacecraft into orbit but to propel them further and faster once they've escaped the planet's atmosphere. “It is a rocket like no other rocket that you might have seen in the past. It is a plasma rocket," Dr. Franklin Chang-Díaz, a former shuttle astronaut and CEO of Ad Astra said in a video describing the rocket. "The VASIMR engine is not used for launching things into space or landing them back but rather it is used for things already there. We call this ‘in-space propulsion.'" While missions near Earth would be able to use solar energy to power the rocket, a mission to Mars would require something far more powerful -- most likely nuclear power, which the company has called "an ideal power source in space." In ideal conditions, the rocket could propel a spacecraft to Mars in just 39 days. The NASA contract, worth about $10 million over three years, would go toward creating a prototype that could operate at high power for a minimum of 100 hours, the company said in a news release. The project is being funded as part of the space agency's Next Space Technologies for Exploration Partnerships program. The goal is for the prototype to reach a technology readiness level (TRL) greater than 5 on NASA's 9-level scale. “We are thrilled by this announcement and proud to be joining forces with NASA in the final steps of the technology maturation,” Chang-Diaz, who took part in seven shuttle missions, said in a news release. “We look forward to a very successful partnership as we jointly advance the technology to flight readiness." Critics have called VASIMR unrealistic, with Mars Society president Robert Zubrin saying last year that to bring humans to Mars, the rocket would need "nuclear electric power systems with 10,000 times the power and 1/100th the mass per unit power as any that have ever been built." By Ed Mazza. The original article from *The Huffington Post*.

Boston, USA

Europeans' White Skin May Have Developed As Recently As 8,000 Years Ago

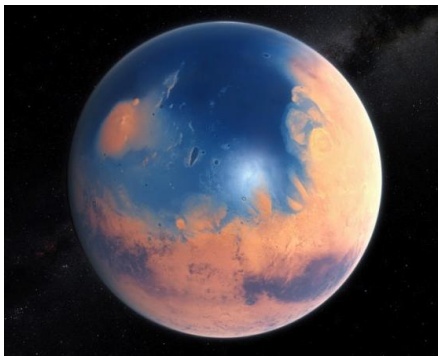
A new report presented at the annual meeting of the American Association of Physical Anthropologists suggests that Europeans' light skin and height may be genetic traits that developed much more recently than scientists previously thought. Dr. Iain Mathieson from Harvard University led the research, which included the study of 83 samples from Holocene Europe. The researchers discovered that for most of the time humans inhabited Europe, they had dark skin, and genes carrying light skin traits only appeared in Europe in the last 8,000 years. The study is published in the journal BioRxiv. "The modern humans who came out of Africa to originally settle Europe about 40,000 years are presumed to have had dark skin, which is advantageous in sunny latitudes," Science magazine explains. "And the new data confirm that about 8,500 years ago, early hunter-gatherers in Spain, Luxembourg, and Hungary also had darker skin: They lacked versions of two genes — SLC24A5and SLC45A2 — that lead to depigmentation and, therefore, pale skin in Europeans today." The researchers believe that when Near East farmers arrived in Europe, they interbred with the indigenous people,

passing on their genes for light skin.SLC45A2 gained frequency about 5,800 years ago, Science notes. The findings are of particular importance because natural selection doesn't normally happen so quickly, Ancient Origins explains. Having light skin would have helped Europeans living in regions with less sunlight, and the gene variants spread in a relatively short amount of time.

Washington DC, USA

NASA Scientist Says They Could Find Alien Life First

Take a good look at all of the planets and the most-prominent moons in our solar system and ask yourself which one is most ideal for life. Would Earth be your first pick? If you know what to look for, the lush green continents and deep blue oceans adorning our planet's surface would be a dead giveaway that water, and life, are already here. Unfortunately, for astrobiologists like Chris McKay, Earth is the only place that's blooming with signs of life visible from space. If aliens are hanging out somewhere nearby in our cosmic neighborhood, they're going to be much harder to find than a quick fly by.False-color image showing plumes erupting from Enceladus's surface.We need to start looking underground, according to McKay. "Things are better below the surface," McKay, who's a senior scientist with NASA's Planetary Systems Branch and investigates where else life could exist in our solar system, told Business Insider. "And so where we really want to go is below the surface." The big problem with this is that designing and dispatching a lander that can dig deep beneath the surface of a planet to search for signs of life is incredibly difficult, not to mention, expensive. So far, the only places we've drilled, collected, and examined samples beneath the surface is the Moon and Mars. The one exception where we wouldn't need to dig and drill is on Saturn's tiny moon Enceladus, which harbors a massive ocean underneath a thick layer of ice on its surface. Enceladus was recently in the news for the compelling evidence two different teams of scientists found indicating active volcanoes lining the seafloor, but that's not why McKay is so excited about this tiny moon. In 2005, the Cassini spacecraft flew by Enceladus and spotted plumes of water vapor and other materials gushing out its surface. If there's life in the solar system, the first place we're likely to find it is inside of those plumes, McKay said. Sadly, Cassini is not equipped with the right instruments to detect signatures of life in these plumes. And right now, NASA has no plans to dispatch another probe to Saturn or its moons anytime soon. But, that's not stopping McKay and others from discussing what they'd look for if they had the chance. "I'd suggest that the best molecules to measure are amino acids, the building blocks of proteins," McKay said during a live webcast hosted by The Kavli Foundation in January. "...life on Earth has made specific choices in amino acids. It uses a set of just 20 amino acids to build proteins, and those amino acids are all left-handed." Left-handed amino acids are chemically identical (means it has all the same atoms in the same amounts) to right-handed animo acids, they are just structured in a way that they are mirror images, like your right and left hands are the same shape but don't line up when you put one on top of the other. One of the outstanding mysteries in astrobiology is why RNA and DNA is only constructed from proteins built by left-handed amino acids. Regardless of why or how, this fact will come in handy during potentially future studies

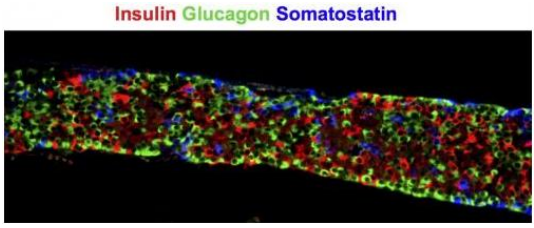


of Enceladus. "If Chris were to find amino acids in the plume of Enceladus, the challenge becomes determining whether they are the products of a biological process," Steven Benner, who is the president and distinguished fellow at the Foundation for Applied Molecular Evolution in Florida, said during the webcast. "If he were to find that they're all the same hand, that would be convincing, because that's what makes the protein evolvable." For McKay, the excitement of the hunt is not just about discovering whether aliens exist. It's discovering unique alien life that is completely different from life on Earth, which might be quite a bit harder since the building blocks of life are so complex. This artist's impression shows how Mars may have looked about four billion years ago. "To my mind that's the real question: Not 'is there life on these other worlds' but 'is there a second genesis of life on these other worlds'," McKay told Business Insider. "That's a subtlety that's not obvious until you think about it." A second-genesis of alien life could, in theory, have a completely different biomolecular structure from life we see on Earth. Right now, scientists debate over whether or not life on Earth originated on another celestial object, like Mars, that then hitched a ride to Earth inside of a meteorite. That is not a stretch to imagine, researchers say, since Mars was covered with liquid water around the same time that life is believed to have begun on Earth. If we do find evidence of life on Mars and it has the same DNA as us, then it's probably our cousins, McKay told Business Insider. If we want to find truly unique alien life, then we'll have to travel farther than next door. "As we go from Mars to Europa to Enceladus to Titan, as the worlds get farther away from Earth the conditions get less and less like Earth," McKay said. "We're more likely to find life that's not related to us the farther out we go." By Jessica Orwig. The original article from *Business Insider*.

Vancouver, CANADA

Stem Cells Show Promise for Reversing Type 2 Diabetes

Scientists at the University of British Columbia and BetaLogics, part of Janssen Research & Development, LLC have shown for the first time that Type 2 diabetes can be effectively treated with a combination of specially-cultured stem cells and conventional diabetes drugs. Stem cells – generic cells that haven't yet taken on specialized form and function – have recently been used by scientists at UBC and elsewhere to reverse Type 1 diabetes in mice. In Type 1 diabetes, which usually begins in childhood, the pancreas produces little or no insulin, the hormone that enables cells to metabolize sugar. These new results, published today in *Stem Cell Reports*, hold much broader potential because Type 2 diabetes – which usually arises in adulthood and often stems from poor diet, lack of exercise and obesity – accounts for more than 90 per cent of diabetes cases. Timothy Kieffer, a professor in the department of cellular and physiological sciences, and scientists from BetaLogics simulated Type 2 diabetes in mice by putting them on a high-fat, high-



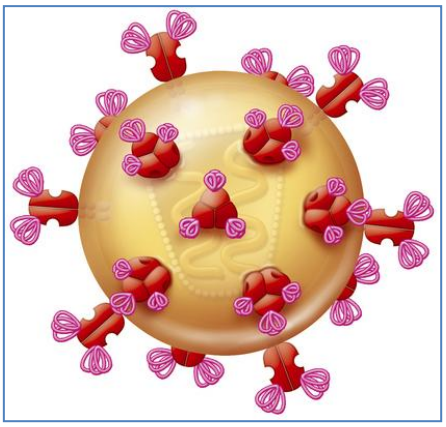
calorie diet for several weeks. Kieffer's team then surgically implanted pancreatic-like cells that had been grown in the laboratory from human stem cells. Mice that received a combination of the cells with one of three diabetes drugs became as "glucose tolerant" as the healthy mice, meaning they were able to keep their blood sugar in check, even after ingesting a sugary meal. In contrast, a group of mice with simulated Type 2 diabetes that received the drugs but not the transplants remained glucose-intolerant. "Being able to reduce spikes in blood sugar levels is important because evidence suggests it's those spikes that do a lot of the damage – increasing risks for blindness, heart attack, and kidney failure," says Kieffer, a member of UBC's Life Sciences Institute. The combination therapy also produced an unexpected but welcome result: the mice returned to a normal weight, the same weight as the healthy control group mice that had been reared on a low-fat diet. "Their weight loss was intriguing, because some of the common diabetes therapies often lead to weight gain," Kieffer said. "We need to do more studies to understand how the cell transplants lead to weight loss." The team is also investigating if higher number of progenitor cells – beyond the five million tested in this study – can achieve the same results without the need for additional drugs.

Atlanta, USA

New HIV Drug Could Thwart Virus' Ability

to Resist

Scientists have announced a new anti-HIV drugthat they say could stop the virus' tendency to become resistant to treatment. The research will be presented at a meeting of the American Chemical Society on Monday. Treatment has been revolutionised by through drug “cocktails” that transformed infection from an almost-certain death sentence into a manageable condition. But the virus' ability to develop resistance to drugs has meant the regimen need constant tweaking to stay effective. “This disease has gone on for over three decades,” says Dennis Liotta, from Emory University. “We’ve got to try to find new solutions. Even with the 30 approved drugs that we have, and even when you completely suppress viral replication, we still see disease progression.” Liotta’s research team at Emory University decided to tackle the resistance problem. To replicate HIV fuses with human immune cells by interacting with key proteins. Its genetic contents subsequently spill inside the immune cells, and the viral proteins then hijack the cellular machinery to make copies of themselves. One drug company (Pfizer) has developed a compound that blocks HIV’s interaction with one of those proteins, a co-receptor called CCR5. But the virus can also use a second co-receptor, CXCR4, to enter cells. If a drug targets just CCR5, a more virulent strain that favors CXCR4 could emerge over time, says Liotta. In theory, drugs targeting CXCR4 would be an effective addition to the arsenal against HIV. But interfering with that protein, which regulates several of the body’s inflammatory responses, could lead to serious side effects. Liotta’s team decided to search for compounds that might be able to bind both CCR5 and CXCR4 at the same time,



while avoiding serious side effects. “Essentially, we took a step back and said instead of creating yet another cocktail of multiple drugs to stop the different mechanisms of HIV, we thought we could design one that hit multiple targets at once,” says Anthony Prosser, a graduate student in Liotta’s lab. If a new drug could block HIV entry by interfering with CCR5 and CXCR4, it could be paired with a traditional cocktail targeting other stages of the virus lifecycle for an even more robust treatment. Prosser came up with a method to synthesize compounds that likely would bind both co-receptors. Lab tests identified the most effective ones, and the group’s partners at pharmaceutical company Bristol-Myers Squibb found that the compounds also blocked HIV reverse transcriptase, an enzyme that’s key to the virus’s ability to copy itself. “The agents were active against CCR5, CXCR4 and HIV reverse transcriptase,” Liotta says. “That was unprecedented. Also, they don’t perturb any of the CXCR4 signaling pathways that lead to inflammation.”
“We’ve got a long way to go, but this is a very exciting finding,” Liotta says.

Washington DC, USA

Mystery of Darwin's strange South American Mammals Solved

To 19th century British naturalist Charles Darwin, they were the strangest animals yet discovered, one looking like a hybrid of a hippo, rhino and rodent and another resembling a humpless camel with an elephant's trunk. Ever since Darwin first collected their fossils about 180 years ago, scientists had been baffled about where these odd South American beasts that went extinct just 10,000 years ago fit on the mammal family tree. The mystery has now been solved. Researchers said on Wednesday a sophisticated biochemical analysis of bone collagen extracted from fossils of the two mammals, Toxodon and Macrauchenia, demonstrated that they were related to the group that includes horses, tapirs and rhinos. Some scientists previously thought the two herbivorous mammals, the last of a successful group called South American ungulates, were related to mammals of African origin like elephants and aardvarks or other South American mammals like armadillos and sloths. "We have resolved one of the last unresolved major problems in mammalian evolution: the origins of the South American native ungulates," said molecular evolutionary biologist Ian Barnes of London's Natural History Museum, whose research appears in the journal Nature. Toxodon, about 9 feet long (2.75 meters), possessed a body like a rhinoceros, head like a hippopotamus and ever-growing molars like a rodent. Macrauchenia, just as long but more lightly built, had long legs, an extended neck and apparently a small trunk. "Some of Darwin's earliest thoughts about evolution by means of natural selection were engendered by contemplating the remains of Toxodon and Macrauchenia, which resembled so confusingly the features of a number of other groups, but had died out so

recently," said paleo-mammalogist Ross MacPhee of New York's American Museum of Natural History. The researchers tried but failed to get DNA from the fossils, but were able to coax the longer-lasting collagen from the remains. Collagen is the main structural protein in various types of tissues, including bone and skin. The scientists compared the collagen to a wide range of living and a few extinct mammals to properly place the creatures on the mammal family tree. MacPhee said this group most likely entered South America from North America at about the time the dinosaurs were wiped out 65 million years ago in a calamity that enabled mammals to become Earth's dominant land animals. An eclectic array of mammals including elephant-sized ground sloths and saber-toothed marsupials arose in South America. By Will Dunham; Editing by Sandra Maler. The original article from Reuters.

Chapel Hill, USA

Crocodile Ancestor Was Top Predator Before Dinosaurs

Roamed North America

A newly discovered crocodilian ancestor may have filled one of North America's top predator roles before dinosaurs arrived on the continent. Carnufex carolinensis, or the "Carolina Butcher," was a 9-foot long, land-dwelling crocodylomorph that walked on its hind legs and likely preyed upon smaller inhabitants of North Carolina ecosystems such as armored reptiles and early mammal relatives. Paleontologists from North Carolina State University and the North Carolina Museum of Natural Sciences recovered parts of Carnufex's skull, spine and upper forelimb from the Pekin Formation in Chatham County, North Carolina. Because the skull of Carnufexwas preserved in pieces, it was difficult to visualize what the complete skull would have looked like in life. To get a fuller picture ofCarnufex's skull the researchers scanned the individual bones with the latest imaging technology - a high-resolution surface scanner. Then they created a three-dimensional model of the reconstructed skull, using the more complete skulls of close relatives to fill in the missing pieces. The Pekin Formation contains sediments deposited 231 million years ago in the beginning of the Late Triassic (the Carnian), when what is now North Carolina was a wet, warm equatorial region beginning to break apart from the supercontinent Pangea. "Fossils from this time period are extremely important to scientists because they record the earliest appearance of crocodylomorphs and theropod dinosaurs, two groups that first evolved in the Triassic period, yet managed to survive to the present day in the form of crocodiles and birds," says Lindsay Zanno, assistant research professor at NC State, director of the Paleontology and Geology lab at the museum, and lead author of a paper describing the find. "The discovery of Carnufex, one of the world's earliest and largest crocodylomorphs, adds new information to the push and pull of top terrestrial predators across Pangea." Typical predators roaming Pangea included large-bodied rauisuchids and poposauroids, fearsome cousins of ancient crocodiles that went extinct in the Triassic Period. In the Southern Hemisphere, "these animals hunted alongside the earliest theropod dinosaurs, creating a predator pile-up," says Zanno. However, the discovery of Carnufex indicates that in the north, large-bodied crocodylomorphs, not dinosaurs, were adding to the diversity of top predator niches. "We knew

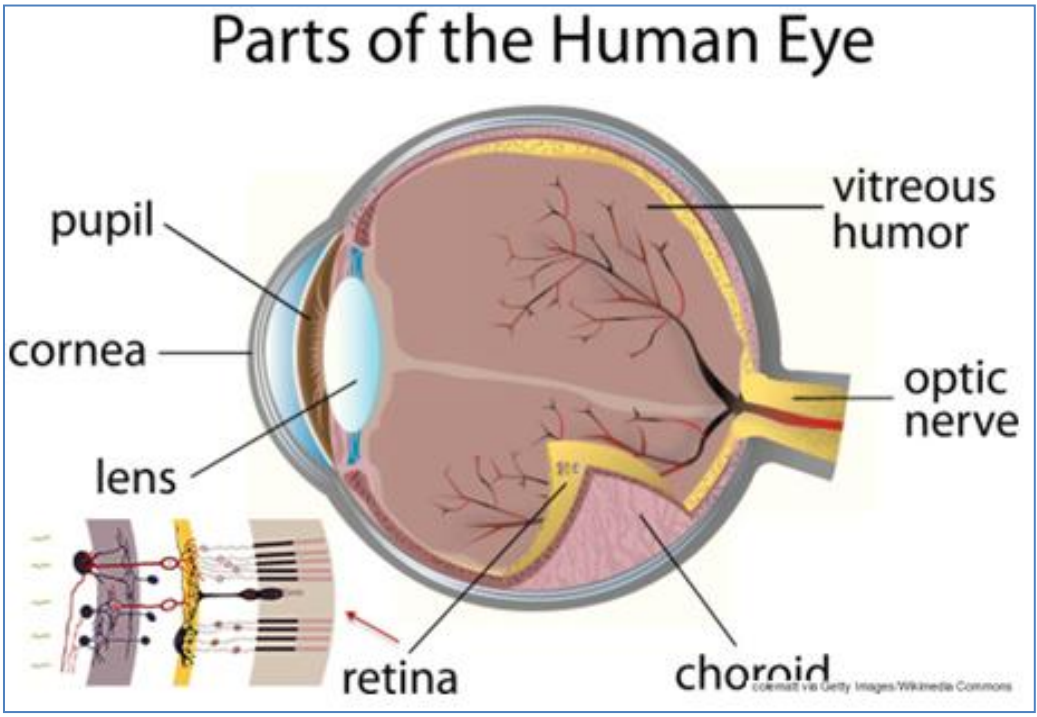
that there were too many top performers on the proverbial stage in the Late Triassic," Zanno adds. "Yet, until we deciphered the story behind Carnufex, it wasn't clear that early crocodile ancestors were among those vying for top predator roles prior to the reign of dinosaurs in North America."

San Antonio, USA

The Human Eye Is Wired 'Backwards,' And These Scientists Think They Know Why

Scientists have long known that our eyes seem to be "wired backwards." But as to *why* our eyes evolved this way, that's long been a mystery. See, as light passes through your retinas -- the light-sensitive layer of tissue at the backs of the eyes -- it has to travel through a layer of cells before reaching the all-important rods and cones that process it. (Just have a look at the diagram below.) Theoretically, this should cause the light to scatter in a way that yields blurry vision -- but it doesn't.

Now the researchers behind a new study think they've figured out what's going on. For the study, researchers at Technion–Israel Institute of Technology in Haifa built a computer model of a human retina and then compared how light behaves in the model with the way it behaves in the retinas of guinea pigs. "Instead of using hard-to-get cadaver eyes, we opted for another diurnal animal, the guinea pig, whose model we could run in the computer for comparison with the measurement results. We used multiple patches in five eyes to ascertain that what we found is not an occasional result," study co-author Dr. Erez Ribak, a researcher in physics at the



institute, told The Huffington Post in an email. The comparison showed that when light travels through cell layers before reaching the rods and cones (photoreceptors), it's actually being sorted into red, green, and blue light -- presumably prepping it before it gets to the back of the retina.

"Indeed we were surprised, since retinas are being studied daily by thousands of ophthalmologists, and no one has seen before the uneven distribution of light crossing the retina," Ribak said in the email. What's doing the sorting? Tiny structures known as Muller glia cells, according to the researchers. While the finding is intriguing, not all scientists are convinced that the light-filtering phenomenon explains why our eyes are wired backward, BBC News reported. "We should also remember that several animal classes do not have a 'backward-pointing' eye, and also have Muller cells," Mark Hankins, a professor of visual neuroscience at the University of Oxford in England, told the BBC. "So Muller cells do plenty of important things other than perhaps functioning as light guides." The study was presented at a meeting of the American Physical Society on March 5, 2015 in San Antonio, Texas. By Jacqueline Howard. The original article from *The Huffington Post*.

Boulder, USA

Beetles Mostly Immune to Mass Extinction Events

Why are there so many kinds of beetles today? Scientists say it's likely because the insect group is especially resistant to extinction. Most of the research into the diversity of beetle species has focused on finding mechanisms of speciation -- the biological pressures that spur adaption, variation and ultimately new species. But new research suggests avoiding obliteration might be equally as important. "By looking at the fossil history of the group, we can see that extinction, or rather lack of extinction may be just as important, if not more important, than origination," lead study author Dena Smith, a paleontologist and curator at the University of Colorado Museum of Natural History, explained in a press release. "Perhaps we

should be focusing more on why beetles are so resistant to extinction." To examine the hypothesis that a resistance to extinction might enable biodiversity, Smith and her co-author Jonathan Marcot, a biologist at the University of Illinois, did a comprehensive scan of the fossil record -- from modern discoveries to as far back as 19th-century digs. They identified a total of 5,553 beetle species, unearthed from 221 unique locations. In analyzing the evolutionary record, the scientists were able to show that the majority of modern beetle families extend back through the fossil record. The discovery isn't so much a rejection of attempts to locate speciation or origination, but a complement. The same adaptable qualities that have allowed family lines to avoid collapse, likely also inspire biological differentiation. "There are several things about beetles that make them extremely flexible and able to adapt to changing situations," Smith said, citing the specifically the process of metamorphosis. "This means that they can take advantage of very different types of habitats as a larva and then as an adult," she explained. "Adult beetles can be highly mobile and research that has focused on glacial-interglacial cycles has shown that they can move quickly in response to any climate fluctuations." Smith said she hopes the work of her and her research partner inspire other entomologists to use the fossil record as a resource and inspiration for new scientific investigations. "I think people have been hesitant to jump into studying insect fossils because there has been the misperception that they are so fragile and rarely fossilize," Smith added. "I am hoping that this study demonstrates that the fossil record is quite good and can be used in many ways to study the evolution of this diverse and important group." The new study was published this week in the journal Proceedings B.

By Brooks Hays.

BASE

THE BONOI ACADEMY OF SCIENCE & EDUCATION

Call for Subcommittee Members

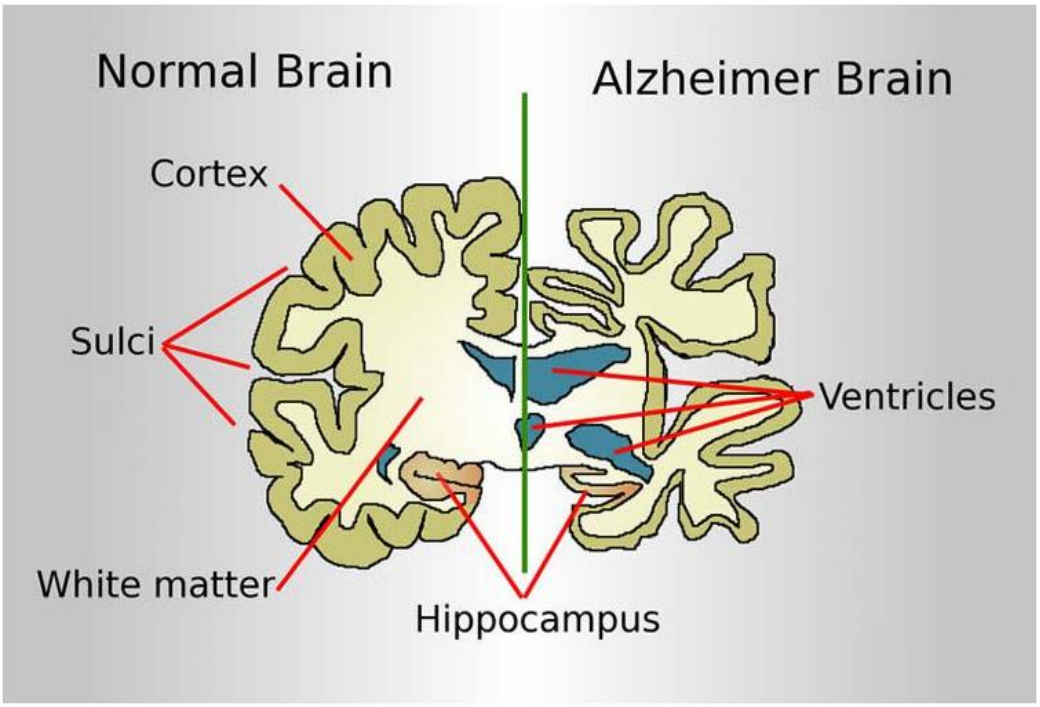
The Bonoi Academy of Science & Education (BASE) is composed of 20 different scientific and educational divisions. All these divisions are consisted of Director, Co-Director, Standing Committee, and Office Members. Some of the divisions are enrolling above positions. If you are interested in science or education work and if you think that is of great value for your career development, please send us your application asap. Given the BASE is a non-profitable organization, these positions then are also non-profitable, the BASE is not responsible for the salary or any other benefits. If you are approved as a member of one of the subcommittees, you automatically become a member of the BASE, which means you do not need to pay for the membership fees during the term. Of course, you are also eligible for applying for the BASE awards and funding, and also suitable for the member benefits. Come on with us to spread science knowledge to the far corner of the world by education.

The BASE
Subcommittee Application System


Love the Wave
Love the Earth

NEUROSCIENCE, USA

Early Diagnosis Opportunities for Alzheimer's through Simple Blood Test



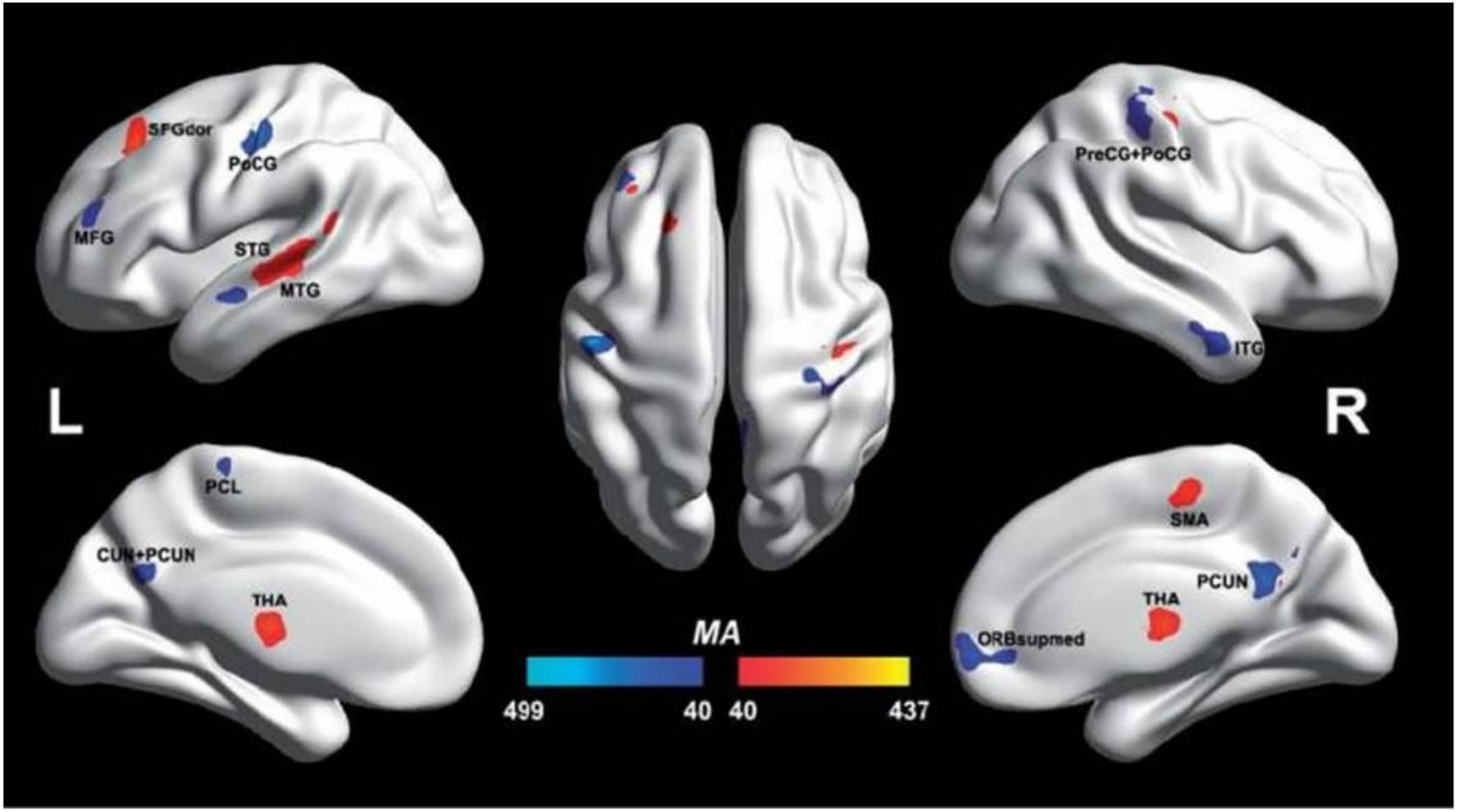
"People have been looking for a long time for markers for Alzheimer's disease," says Sidney Strickland, head of the Patricia and John Rosenwald Laboratory of Neurobiology and Genetics. But current diagnostic tests for pre-symptomatic Alzheimer's leave much to be desired. Evaluating the level of amyloid-β in the cerebral spinal fluid, for instance, requires an invasive spinal tap procedure. "Finding a blood biomarker that would let us know through a simple test whether someone is on their way to developing the disease would be a significant advance," says first author Daria Zamolodchikov, a postdoctoral associate in the Strickland lab. The new study grew from the lab's ongoing work that looks at how the vascular system is involved in Alzheimer's disease. It has been shown that amyloid-β can activate a protein in plasma called factor XII, the first step in a pathway known as the contact system. When activated, this system leads to the release of a small peptide called bradykinin, a molecule known to promote potentially damaging inflammation. Although some studies have found these molecules in the cerebral spinal fluid and brain tissue of Alzheimer's patients, no one had studied them in Alzheimer's patient plasma. Using plasma from people with and without diagnosed Alzheimer's disease, the researchers measured the activation levels of the contact system. They found increased activation of this system in the plasma of Alzheimer's patients, potentially implicating it in the inflammatory pathology of the disease. Moreover, in a subset of patients whose amyloid-β levels in the cerebral spinal fluid were known, the researchers demonstrated a positive correlation between activation of the contact system and changes in cerebral spinal fluid amyloid-β levels, which as mentioned above are correlated with the development of Alzheimer's. The researchers found similar activation of the contact system in mouse models of Alzheimer's, which are genetically modified to overproduce amyloid-β. They then conducted a follow-up experiment with healthy mice. "We went one step further and took completely normal wild-type mice and injected them with amyloid-β. We found that on its own, injection with amyloid-β can activate this system. It's a proof of principle in a complex environment," says Zamolodchikov. These findings will need to be supported by studies in larger patient populations and longitudinal studies, but they could eventually open the door to diagnosis of pre-symptomatic Alzheimer's based on blood levels of these molecules. The contact system may also offer a new approach to therapies for Alzheimer's disease, since inhibition of the pathway could blunt some of the inflammatory aspects of the disease. One concern is that the contact system is also involved in blood clotting and inhibition might carry a risk of bleeding. However, people with a defect in this system do not have hemophilia. Thus, inhibition of this pathway might slow progression of the disease without increasing the risk of hemorrhage.

PNAS 2015; Doi: 10.1073/pnas.1423764112

NEUROSCIENCE, UK

Autistic and Non-Autistic Brain Differences Isolated for First Time

Developed by researchers at the University of Warwick, the methodology, called Brain-Wide Association Analysis (BWAS), is the first capable of creating panoramic views of the whole brain and provides scientists with an accurate 3D model to study. The researchers used BWAS to identify regions of the brain that may make a major contribution to the



symptoms of autism. BWAS does so by analysing 1,134,570,430 individual pieces of data; covering the 47,636 different areas of the brain, called voxels, which comprise a functional MRI (fMRI) scan and the connections between them. Previous methodologies were process this level of data and were restricted to modelling only limited areas. The ability to analyse the entire data set from an fMRI scan provided the Warwick researchers the opportunity to compile, compare and contrast accurate computer models for both autistic and non-autistic brains. Led by BWAS developer Professor Jianfeng Feng, from the University of Warwick's Department of Computer Science, the researchers collected the data from hundreds of fMRI scans of autistic and non-autistic brains. By comparing the two subsequent models the researchers isolated twenty examples of difference, where the connections between voxels of the autistic brain were stronger or weaker than the non-autistic. The identified differences include key systems involved with brain functions relating to autism.

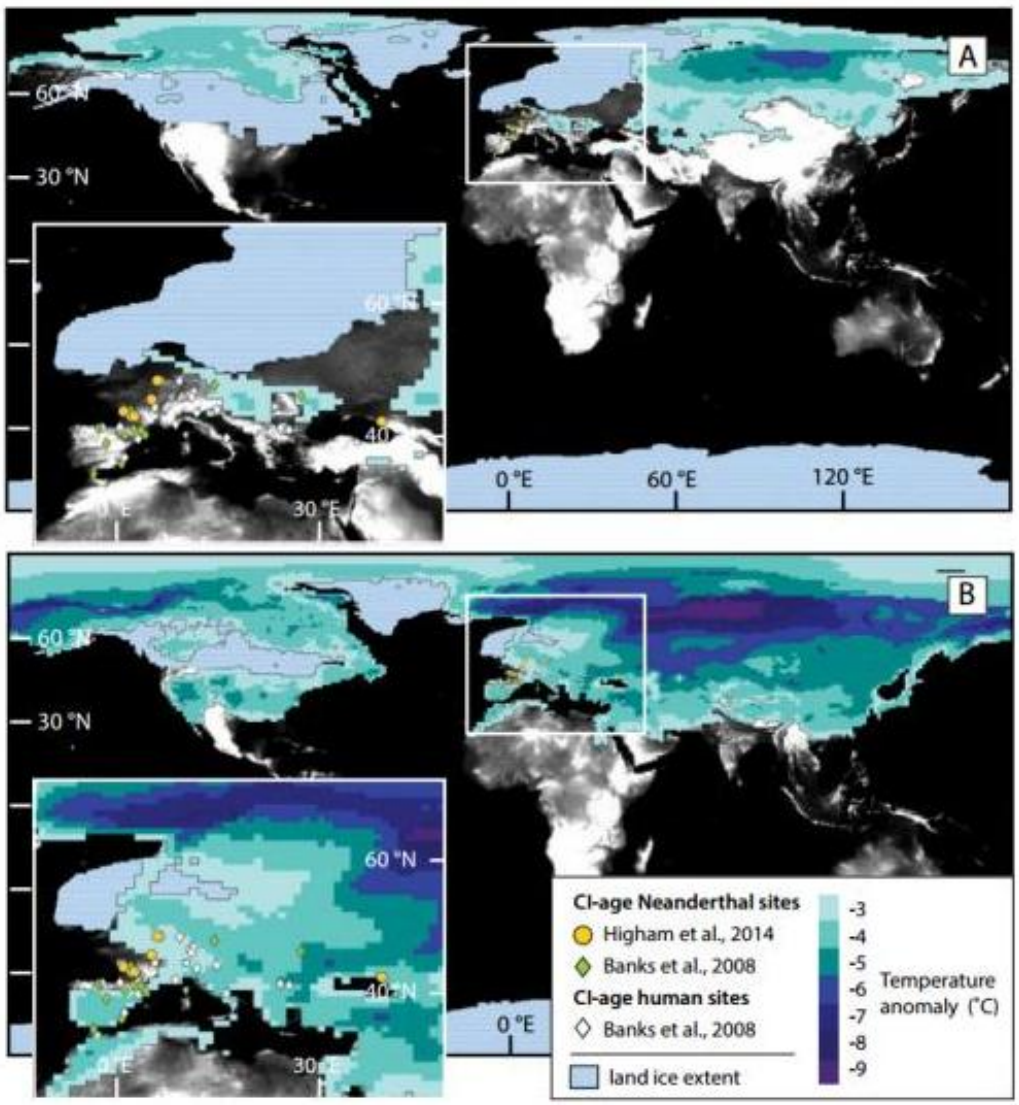
Professor Feng explained the findings: "We identified in the autistic model a key system in the temporal lobe visual cortex with reduced cortical functional connectivity. This region is involved with the face expression processing involved in social behaviour. This key system has reduced functional connectivity with the ventromedial prefrontal cortex, which is implicated in emotion and social communication". The researchers also identified in autism a second key system relating to reduced cortical functional connectivity, a part of the parietal lobe implicated in spatial functions. They propose that these two types of functionality, face expression-related, and of one's self and the environment, are important components of the computations involved in theory of mind, whether of oneself or of others, and that reduced connectivity within and between these regions may make a major contribution to the symptoms of autism. The researchers argue that the methodology can potentially isolate the areas of the brain involved with other cognitive problems, including Obsessive Compulsive Disorder, ADHD and schizophrenia. By using meta-analysis and a rigorous statistics approach the Warwick researchers were able to collect and use a big data set to obtain significant results, the likes of which have not been seen in autistic literature before. Professor Feng explains: "We used BWAS to analyse resting state fMRI data collected from 523 autistic people and 452 controls. The amount of data analysed helped to achieve the sufficient statistical power necessary for this first voxel-based, comparison of whole autistic and non-autistic brains. Until the development of BWAS this had not been possible. "BWAS tests for differences between patients and controls in the connectivity of every pair of voxels at a whole brain level. Unlike previous seed-based or independent components-based approaches, this method has the great advantage of being fully unbiased in that the connectivity of all brain voxels can be compared, not just selected brain regions."

Brain 2015; Doi: 10.1093/brain/awv051

HUMAN, USA

Did Volcanic Cataclysm 40,000 Years Ago Trigger Final Demise of Neanderthals?

The Campanian Ignimbrite (CI) eruption in Italy 40,000 years ago was one of the largest volcanic cataclysms in Europe and injected a significant amount of sulfur-dioxide (SO2) into the stratosphere. Scientists have long debated whether this eruption contributed to the final extinction of the Neanderthals. This new study by Benjamin A. Black and colleagues tests this hypothesis with a sophisticated climate model. Black and colleagues write that the CI eruption approximately coincided with the final decline of Neanderthals as well as with dramatic territorial and cultural advances among anatomically modern humans. Because of this, the roles of climate, hominin competition, and volcanic sulfur cooling and acid deposition have been vigorously debated as causes of Neanderthal extinction. They point out, however, that the decline of Neanderthals in Europe began well before the CI eruption: "Radiocarbon dating has shown that at the time of the CI eruption, anatomically modern humans had already arrived in Europe, and the range of Neanderthals had steadily diminished. Work at five sites in the Mediterranean indicates that anatomically modern humans were established in these locations by then as well." "While the precise implications of the CI eruption for cultures and livelihoods are best understood in the context of archaeological data sets," write Black and colleagues, the results of their study quantitatively describe the magnitude and distribution of the volcanic cooling and acid deposition that ancient

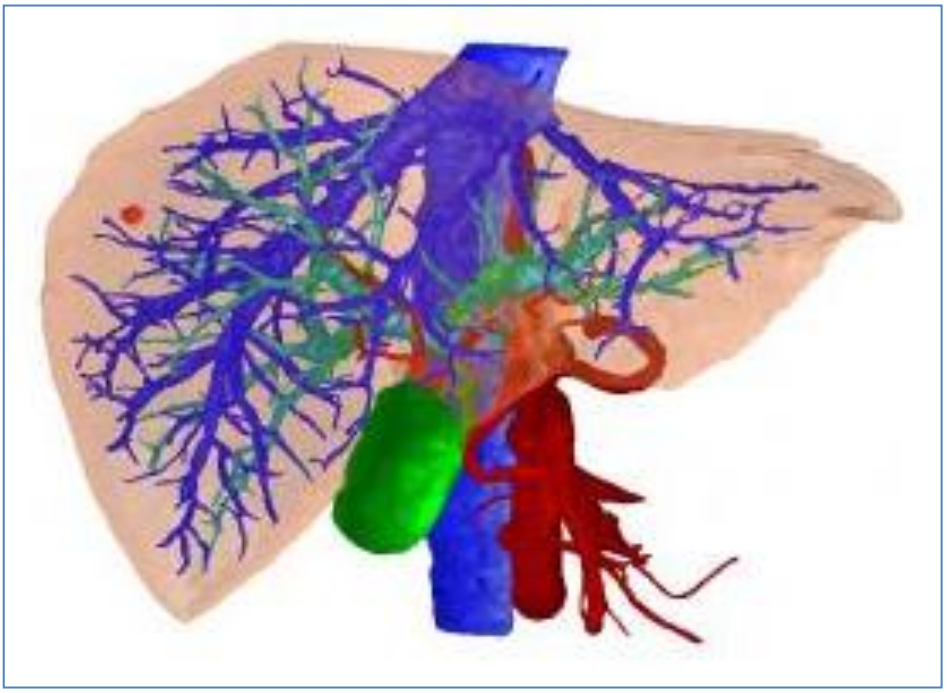


hominin communities experienced coincident with the final decline of the Neanderthals. In their climate simulations, Black and colleagues found that the largest temperature decreases after the eruption occurred in Eastern Europe and Asia and sidestepped the areas where the final Neanderthal populations were living (Western Europe). Therefore, the authors conclude that the eruption was probably insufficient to trigger Neanderthal extinction. However, the abrupt cold spell that followed the eruption would still have significantly impacted day-to-day life for Neanderthals and early humans in Europe. Black and colleagues point out that temperatures in Western Europe would have decreased by an average of 2 to 4 degrees Celsius during the year following the eruption. These unusual conditions, they write, may have directly influenced survival and day-to-day life for Neanderthals and anatomically modern humans alike, and emphasize the resilience of anatomically modern humans in the face of abrupt and adverse changes in the environment.

Geology 2015; Doi: 10.1130/G36514.1

BIOLOGY, USA

Research Team Discovers Backup System That Helps Sustain Liver during Crisis



Scientists from Montana State University and Sweden have discovered an antioxidant system that helps sustain the liver when other systems are missing or compromised. Like a generator kicking in when the power fails or an understudy taking the stage when a lead actor is sick, the newly found system steps up during a crisis. It's fueled by methionine, an amino acid that can't be manufactured in the body and doesn't come from herbal teas or supplements. People get it only by eating protein. "This is an important finding," said Edward Schmidt, a professor in MSU's Department of Microbiology and Immunology and co-author of a newly published study in *Nature Communications*. "It tells us about humans and all living things. It's an alternative way to maintain the balance you need in your cells to be alive." Schmidt and his collaborators at the Karolinska Institute published their findings March 20 in *Nature Communications*. Some vitamins and supplements act as antioxidants, Schmidt said. They help protect cells from the damage that can lead to aging, cancers and inflammatory diseases. However, vitamins and supplements can't replace two known natural systems in liver cells: the thioredoxin and glutathione systems. To investigate further, Schmidt's lab generated mice whose livers lacked key components of both systems. The mice were not robust. They were on the brink of failure, Schmidt said. And yet they survived. Pursuing the mystery, the researchers found the third antioxidant system and said it has broad implications for health issues in humans. They said methionine was a surprising source of its power.

"Methionine, a sulfur-containing amino acid that is required in our diet so our cells can make proteins, is also a potent, but previously unrecognized antioxidant that, unlike any other antioxidant tested to date, can sustain the liver when the two other systems are absent or compromised," Schmidt said. "It was well-known, hiding in the shadows," Schmidt continued. "It wasn't until we removed the two powerful universal systems and found that the liver would survive that we recognized the role of this third system." Methionine is found in high levels in eggs, meat, fish, Brazil nuts, sesame seeds and cereal grains. "There is plenty of it in a normal balanced diet," Schmidt said. "It's only in extreme cases where people are deprived of dietary protein, or possibly when they are exposed to some toxins, that this could be a problem."

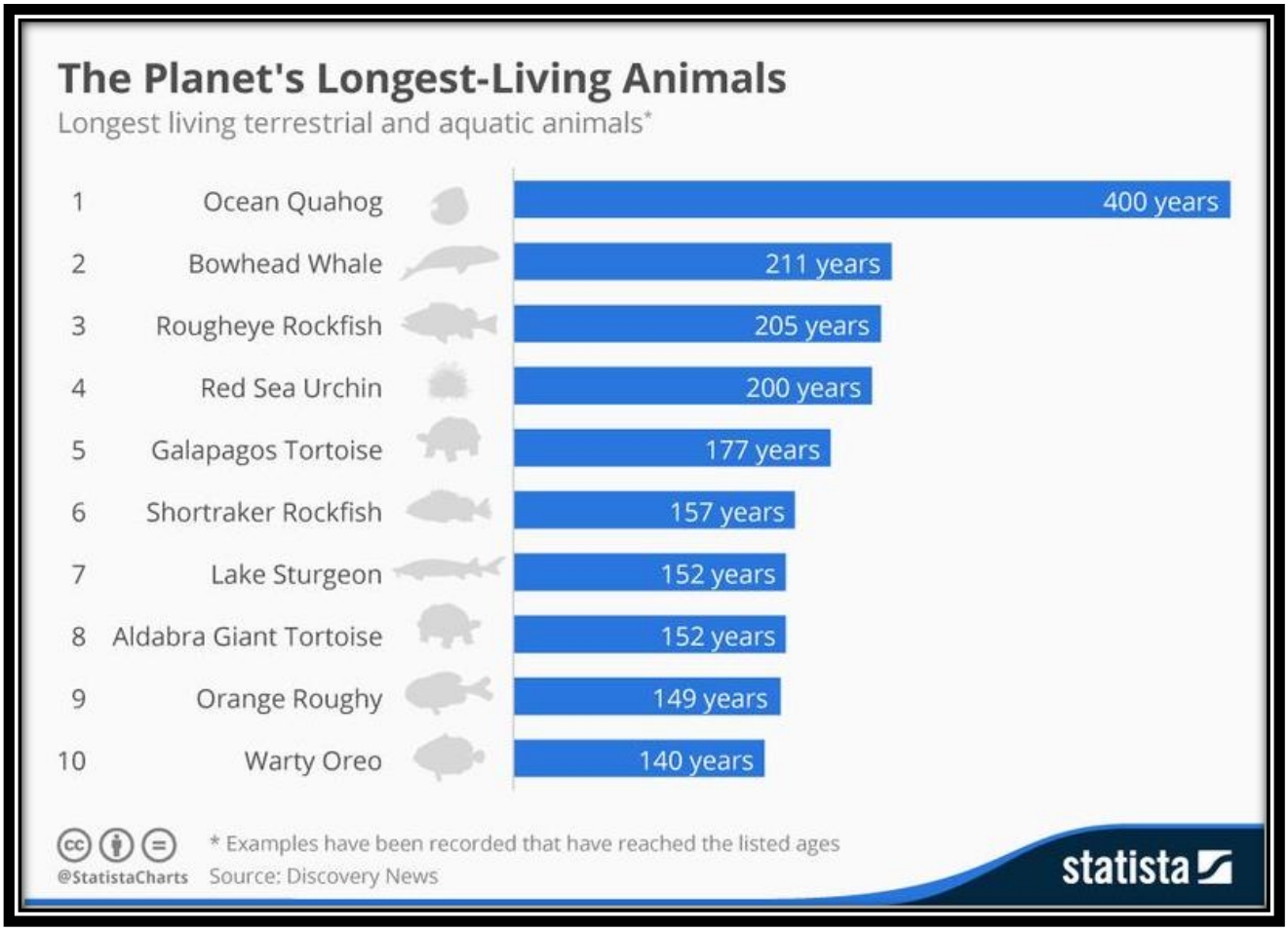
Nat Commun 2015; Doi: 10.1038/ncomms7479

Stop wasting foods


Help those in need…

The Longest-Lived Animals on Earth

By Joseph Stromberg



When you think of animals that can live a really long time, you probably think of tortoises and parrots. The ocean quahog — a species of clam that lives in the North Atlantic — likely doesn't come to mind. But this chart by Niall McCarthy, based off data collected by Discovery News, shows an interesting point: almost all of the longest-lived animals on Earth are in the ocean. And several of them can survive for two centuries or more. Why are these species capable of living for so incredibly long? One commonality is that in many cases, either their size (as with the bowhead whale) or some sort of external protection (the quahog or red sea urchin) makes them virtually immune to predators. When an animal can survive for longer, there's a selection for genes that provide longevity, because they can provide a real advantage," Jay Olshanksy, a public health researcher who studies aging, told me last year for an article about the naked mole rat, a rodent that can live for up to 30 years. When predation isn't a threat, there's a big evolutionary advantage in developing physiological systems that allow an animal to live longer — since it can mean producing more offspring — and all that investment won't get wiped out if a random predator were to come by for a meal. When predation is a constant threat, though (as is the case for the vast majority of animals), there's no selective pressure that leads to animals evolving to live for centuries. A good analogy is a car: if you bought a junker you knew would break down in 10,000 miles, it wouldn't make sense to invest in a high-end stereo.


Who feeds us?

Should the Psychological Regimens Be Introduced into Clinical Pain Control in the Context of Postoperation?

Johnson S. Leonard,[*,1] Wei Wang,[†,1] Aili Sunny,[‡] Haibo Wu,[†] Mary K. Pathak,[‡] Liming Lei,[†] Nan Wang,[†] Maria L. Bolick,[‡] Yusheng Liu,[†] Shiqin Xu,[†] Fuzhou Wang,[†,‡,Δ] Xiaofeng Shen[†,Δ]

SUMMARY **Patients haunted by pain, acute or chronic, always bear tremendous pressure from spiritual and psychological respects. While the analgesic techniques available currently to certain extent are effective in alleviating pain, which is mainly to acute pathologic condition, it is challenged for its role in many sensitive patients with relatively lower threshold of pain manifesting limited effects treated with analgesic drugs especially when the pain develop into chronicity. Psychological maneuver designed with strategic procedures displayed interesting effect in managing pain. Although different types of psychological interventions have been found producing distinct results in pain relief under various clinical environments, the clinical value of psychological interventions in the postoperative condition is still not clear. Some suggestion and recommendation have been presented by researchers on this topic, but how to optimize these means through balancing the pros and cons of these methods needs to be weighed carefully upon clinical situations. In this review, we discussed the development of psychological pain therapy and raised our concerns about its administration in the clinical environments on the bases of the currently psychological models.■**

*: Division of Medicine and Public Health, The Bonoi Academy of Science and Education, Winston-Salem, NC 27103, USA

†: Department of Anesthesiology, Nanjing Maternity and Child Health Care Hospital, Nanjing Medical University, Nanjing 210004, China

‡: Division of Neuroscience, The Bonoi Academy of Science and Education, Winston-Salem, NC 27103, USA

1: These authors contributed equally to this work.

Δ: Correspondence to: Dr. Xiaofeng Shen, Tel: +86-25-5222 6115, Email: sxf0418@126.com Or Dr. Fuzhou Wang, Tel: +1-336-734-3249, Email: fred.wang@basehq.org

Received: 08 March, 2015
Revised: 21 April, 2015
Accepted: 29 April, 2015

Doi: 10.15354/si.15.re021

SCIENCE INSIGHTS 2015; 12(2):406-410.

How to Cite This Paper: Leonard JS, Wang W, Sunny A, Wu H, Pathak MK, Lei L, Wang N, Bolick ML, Liu Y, Xu S, Wang F, Shen X. Should the psychological regimens be introduced into clinical pain control in the context of postoperation? Science Insights 2015; 12(2):406-410 DOI: http://dx.doi.org/10.15354/si.15.re021.

Keywords: Psychology – Surgery – Pain therapy – Eligibility – Outcomes

PSYCHOLOGY REFERS to the study on "mind" and "behavior", so it is strongly mingled with psychiatry and neurology because some common bases exist among them (1). Although great progress has been made in understanding the general psychology, it is not that easy to apply the newly appeared psychological theories into specific condition. Many medical situations are closely associated with psychological states including autism, attention deficit hyperactivity disorder (ADHD), depression, and post traumatic stress disease (PTSD) et al. (2). This makes medical psychological interventions focus on these special medical problems, but does that mean psychological factor exists only in these conditions? The answer is almost ascertained: no. The *de facto* situation is that psychological impact performs function anywhere in the medical practice.

Surgery itself is a strong stress evoker, and many other factors including post-surgical pain, worry about prognosis, complications, future living quality, and financial burden etc. all together stressed up patients to a highly stressful state (3). What is the underlying contributor to this? It is psychology. Pain, as the must-be consequence of different surgical procedures, is unavoidable even though it can be treated. It is still obliged to be treated even though pain itself possesses protective role in keeping patients from further injury. As one of the important parts of sensory system, pain is closely connected with spiritual and psychological feelings, which often results in analgesic failure when traditional pharmacological means are used, and also raises questions on how to alleviate pain through psychotherapeutics (4). Considering the difference in methods of psychological interventions and the association with the changing therapeutic context, the analgesic efficacy of psychosocial support fluctuates.

Potential Mechanisms of Psychological Analgesia

Psychological analgesia is a broad concept that includes all aspects referring to the psychological intervention. Hypnosis, music therapy, preoperative education, and linguistic suggestion all belong to psychological approaches in pain control (5-7). Common neural mechanisms exist no matter what kinds of psychological methods used in analgesia.

Functional magnetic resonance imaging (fMRI) verified an increase in neural activity during placebo associated psychological stimulation that is related to two major pain modulation mechanisms (8): 1) affective regulation which includes activation of the rostral anterior cingulate cortex, bilateral amygdala, and medial prefrontal cortex; and 2) higher cognitive regulation during which the posterior cingulate, pre-cuneus, rostral anterior cingulate cortex, perihippocampal gyrus, and the temporal lobes are activated. As the "gate theory" described that afferent inhibition blocks ascending signals from the periphery, psychological stimuli at the early period produce analgesic effect through a self-reinforcing feedback mechanism.

Several models give an in-depth understanding of the psychological stimulation associated analgesia. Conditioning, expectancy, motivation, and emotion are four psychological mediators involving in the process of analgesia. Conditioning model says that the interventional effect presented when the individual without knowing the stimulation would be and this process would not produce cognition (9). In this model, the perception of pain after psychological treatment largely depends on the learning history of the individual which determines the response variability under different context. The psychological conditioning as well as the verbal suggestion can turn tactile stimuli into pain and low-intensity pain into high-intensity pain. For this, the direct evidence was the conditioned pain reduction could be absolutely removed when the psychological stimuli were explained. Originally, conditioning is the primary response to psychological analgesia. Following conditioning, expectancy of the psychological stimuli to produce an effective analgesia takes place. Once the patients expect to have an improvement in pain management, the effect of psychological analgesia would play its role. Due to anxiety and fear to pain, patients generally want to have rapid and effective methods that can relieve their pain (10), which consequently leads to an expectancy of their pain therapies. Under this condition, physicians' attitude and enthusiasm take an important part in whether or not the psychological analgesia comes into play (11). Give patients the hope to conquer pain accompanying with a warmth care, the expected effect of psychological analgesia would be maximized. After expectancy, motivation of analgesia is another aspect in determining the effect of psychological interventions. If the patient desires for a relief of pain, the real analgesic role of psychological stimuli would be magnitude (12). The motivation itself whether or not could predict the psychological effect on one type of pain needs to be explored in detail, and it could be effective for different types of pain is also yet to be guaranteed. A body of literature has confirmed the role of emotions in pain perception and alleviation. Anxiety and stress are two main factors of emotion-associated psychological mediator. It is believed that anxiety is the cause of increased levels of pain, and reduction in anxiety produces analgesia. Stress sometimes is related with increased levels of pain, but in some contexts, stress can produce analgesia (13). Therefore, the purpose of psychological suggestion in pain control is to alleviate patients' anxiety and stress, which in turn produces a feedback analgesia effect.

Three consecutive stages exist when psychological treatment was given: the induction, psychophysiological mediation, and actualization. In the induction stage, three aspects compose the major contents including the introduction or initiation (therapeutic message; method of administration; follow-up and booster sessions;

assessment of side effects), idiosyncratic variables (beliefs and values; personal history; innate predisposition) and therapeutic context (treatment objectives; therapeutic alliance; sociocultural factors). In the second stage, psychophysiological mediation composes of psychological and biological mechanisms. Psychological mechanisms include above-mentioned conditioning, expectancy, motivation, and emotion, and the biological mechanisms include neurochemical mediators (endorphins, dopamine, and other neurotransmitters/neuromodulators) and neurophysiology (activation of central modulatory mechanisms including descending inhibitory circuits). In the actualization stage, three main aspects exist including subjective experience (pain, emotions, quality of life, satisfaction, and related relief), behavioral markers (amount of analgesics consumed and overt pain behaviors), and physiological markers (physiological nociceptive activity, objective clinical indicators). As thus, when a psychological intervention is given, these three stages would be experienced. However, in consideration of the multiple phases of these stages, the actual effect of psychological analgesia may be variable in different individuals under different circumstances.

Psychological Analgesia: Whether It Is An Effective One in Clinical Practice?

The effect of psychological analgesic approaches largely depends on types of pain, individual status, caregivers' attitude and contextual frame, which finally determines the efficacy of psychological analgesia. For postoperative pain, preoperative hypnosis could accelerate wound healing and alleviate pain intensity after mammoplasty, and reduce post-surgical pain and distress in patients undergone excisional breast biopsy (14). However, in other surgical contexts like in military trauma pain control, psychological interventions did not produce detectable difference compared with the control: relaxation training for spinal surgeries could not reduce postoperative pain (15), and intraoperative music therapy also could not produce analgesia in Cesarean patients; Contrary to this, postoperative music can alleviate the pain and reduce the need for analgesics in patients who undergone Cesarean section (16). Besides, in cardiac surgeries, music therapy produced effective role in alleviating anxiety and pain (17). These different even controversial results raise questions on the real analgesia efficacy of psychological interventions. In fact, difference in interventional methods, types of surgeries, and professionals of investigators may all contribute to the changeable results of psychological analgesia. An attractive study performed to observe the influence of linguistic suggestion on postoperative pain management after abdominal surgeries, and found that negative words from nursing professionals results in therapeutic failure of patient-controlled analgesia, and suggested that a trusting psychological relationship between medical caregivers and patients should be established (7). Therefore, it is necessary to seek a standardized effective psychological method that can be employed at any time to alleviate pain and pain-associated psychological contributors.

Chronic pain, due to its multi-original property and hypo-responsiveness to traditional analgesics, is a complex pathological condition that needs to be cared with specific concentration. How to predict psychological problems in patients with chronic pain and then to take steps to overcome them plays pivotal role in alleviating this kind of pain. Modified Somatic Perception, Zung Questionnaires and Catastrophizing Scale are major means in predicting possible psychological factors in patients with chronic pain. These tools can help to identify psychological problems at early period that is crucial for understanding the development of acute pain into chronic and also possibly preventing its chronicity. Controversial views exist on the effect of psychological factors on the chronicity of pain (see review 18). Various results in different studies questioned the real analgesic effect of psychological approaches in chronic pain management. Also, seek an optimized psychological procedure in chronic pain management is necessary for pain physicians.

Is the Psychological Procedure Useful for Analgesia?

Difference in methods of psychological interventions makes it difficult to reach a uniform procedure that could be used for each individual at different pathological conditions. Irrespective of what kind of methods employed, four basic factors below are consistent and also can be regarded as the interventional focuses: 1) types of pain; 2) individual expectation; 3) medical context; and 4) professional ability.

Pain Category

It is hard to find proper and standard methods to treat pain for all due to its property of multiple originalities plus difference in its duration, intensity and responsiveness to pharmacological analgesics. To have a clear description and avoid an extra complexity of the standardization of the psychological procedure in the types of pain, here two major types of pain, acute and chronic, are discussed. Acute pain is relatively easier to treat and generally resulted from traceable causes. However, chronic pain is refractory to pharmacological treatments and without assured causes. Although acute pain and chronic pain have different transduction pathways, they finally reach brain and then the perception is occur.

Individual Expectation

Individual expectation is the second factor that needs to be standardized. Everyone expects to have an effective method that can conquer the pain because of the unpleasant experience. Once a patient has such a hope, the psychological analgesia would play its role. However the psychological com-

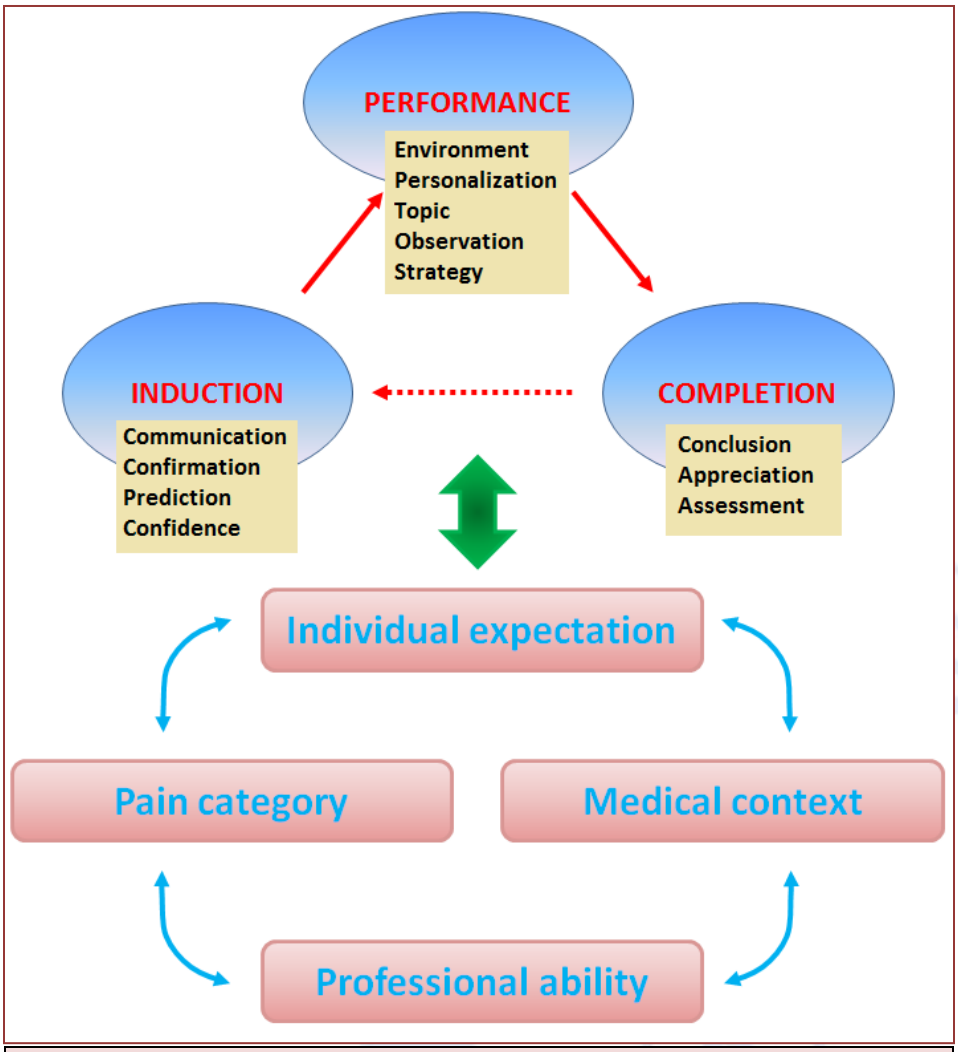


Figure 1. Schematic of Psychological Intervention of Pain. Even though the currently available psychological regimens are not verified for their effectiveness in alleviating pain, it is still imperative to discuss its potential role in the management of pain by relying on cumulating data of this field. This recommended flowchart of psychological intervention is a derivative of the most current knowledge of psychological analgesia. Different clinical results might get from this regimen, and further verification and in-depth studies are necessary in evaluating its practical value when various presentations presented in individual patient.■

plexity makes people doubt the real efficacy of the analgesia. Therefore, give a timely psychological intervention along with patients' expectancy is the best way for analgesia through matching their different time windows. Under this condition, careful assessment of patients' psychological status with proper means would give physicians more information on what, how and when a psychological stimulation could be employed. In fact, psychological intervention if given appropriately at this moment exactly fills patients' psychological gap. If want take effective steps to control the pain, time communication with patients is the guarantee. So, the following flow is recommended: talk to confirm the expectancy → predisposition for psychological intervention → psychological preparation → increase confidence of conquering. During this process, the psychological support seems play a more important role than any other factors.

Medical Context

Medical context is the environment where the patients go and seek for pain management. Whether clinics could provide proper and humanistic care or not determines the final conclusion of psychological analgesia. Due to big difference in the contextual background, it is hard to standardize the consulting environment. Here just give a proposal that should at least be followed when administering psychological interventions for pain control: 1) avoiding negative stimuli; 2) establishing a comfortable setting; 3) patient-centered communication; 4) one-stop services. A trusting relationship between medical environment and patients could pave the way to a successful analgesia with psychological approaches.

Professional Ability

Professional ability works like the "software" that needs to be updated and improved gradually with practice. Personal morality is another crucial part that can give patients the taken-to-be-seriously feeling. Further, if the physician trained in psychological treatment, such professional knowledge in psychology would make the psychological analgesia more effective, and would produce the best efficacy in alleviating pain. This section, in fact, is the easiest one that can be improved after training and practice. Following is the suggestion on how to get better results in psychological analgesia: 1) take patients' claim into heart; 2) build friend relationship with patients; 3) serve with the best professional knowledge; 4) psycho-language communication; 5) unchangeable attitude; 6) performance in honesty.

The window of psychological alteration is very wide, which make it easy to be changed when each above-mentioned part cannot satisfy the expectancy. Besides, the prone-to-be-broken psychological state would be shattered by improper intervention. Therefore, patients with different types of pain have various expectancy of analgesia that needs to be treated

with optimal psychological procedures even at different clinics.

Therefore, following three-step procedures should be referred to when performing psychological analgesia:

First, induction:
(1) Communicate without hint of psychological intervention;
(2) Confirm patient's psychological state;
(3) Predict patient's expectancy;
(4) Increase confidence that is bound to succeed.

Second, performance:
(1) Select a relatively quiet environment;
(2) Build a kind talking ambient;
(3) Give personalized linguistic intervention;
(4) Choose an interesting topic;
(5) Talk without constraint;
(6) Observe psychological change during talking;
(7) Fine regulation in communication strategies.

Third, completion:
(1) Conclude what have been talked;
(2) Thank patient's patience;
(3) Assess pain intensity with appropriate tools.

Application of psychological linguistic suggestion should not be similar for one person at different visits, and the communicating environment should be changed time after time (Figure 1).

Concluding Remarks

Psychological activity is a complex emotional response that can be influenced by many aspects. Psychological analgesia itself also is a complex process that its efficacy is uncertain for different types of pain under different conditions. Therefore, individualized therapeutic regimen requires selecting personalized interventional methods and performing individualized procedures in patients with various psychological states. While we herein provided some procedures as recommendations for psychological analgesia, it should be bear in mind that the procedures need to be changed for different patients under different medical contexts.■

Acknowledgement

This work is supported by the BASE Foundation from The Bonoi Academy of Science and Education (BASE2013002B), National Natural Scientific Foundation of China (81271242, 81371248), and Nanjing Outstanding Young Scientists Grant (JQX12009).

Conflict of Interests

None

References

1. Eccles JA, Owens AP, Mathias CJ, Umeda S, Critchley HD. Neurovisceral phenotypes in the expression of psychiatric symptoms. Front Neurosci 2015; 9: 4.
2. Bystad M, Bystad C, Wynn R. How can placebo effects best be applied in clinical practice? A narrative review. Psychol Res Behav Manag 2015; 8: 41-45.
3. Nanavati AJ, Prabhakar S. Fast-track surgery: Toward comprehensive peri-operative care. Anesth Essays Res 2014; 8:127-133.
4. Howe CQ, Robinson JP, Sullivan MD. Psychiatric and psychological perspectives on chronic pain. Phys Med Rehabil Clin N Am 2015; 26: 283-300.
5. Silva AG, Lã FM, Afreixo V. Pain prevalence in instrumental musicians: A systematic review. Med Probl Perform Art 2015; 30: 8-19.
6. Kim KH. Safe Sedation and Hypnosis using Dexmedetomidine for Minimally Invasive Spine Surgery in a Prone Position. Korean J Pain 2014; 27: 313-320.
7. Wang F, Shen X, Xu S, Liu Y, Ma L, Zhao Q, Fu D, Pan Q, Feng S, Li X. Negative words on surgical wards result in therapeutic failure of patient-controlled analgesia and further releaseof cortisol after abdominal surgeries. Minerva Anestesiol 2008; 74: 353-365.
8. Wilcox CE, Mayer AR, Teshiba TM, Ling J, Smith BW, Wilcox GL, Mullins PG. The subjective experience of pain: An fMRI study of percept-related models and functional connectivity. Pain Med 2015; doi: 10.1111/pme.12785. In press.
9. Williams AE, Rhudy JL. The influence of conditioned fear on human pain thresholds: does preparedness play a role? J Pain 2007; 8: 598-606.
10. Lovich-Sapola J, Smith CE, Brandt CP. Postoperative pain control. Surg Clin North Am 2015; 95: 301-318.
11. Bruns D, Disorbio JM. The psychological evaluation of patients with chronic pain: A review of BHI 2 clinical and forensic interpretive considerations. Psychol Inj Law 2014; 7: 335-361.
12. Horing B, Weimer K, Muth ER, Enck P. Prediction of placebo responses: a systematic review of the literature. Front Psychol 2014; 5: 1079.
13. Woo KY. Chronic wound-associated pain, psychological stress, and wound healing. Surg Technol Int 2012; 22: 57-65.
14. Lozano-Ondoua AN, Symons-Liguori AM, Vanderah TW. Cancer-induced bone pain: Mechanisms and models. Neurosci Lett 2013; 557: 52-59.
15. Litwack K. Pain management in military trauma. Crit Care Nurs Clin North Am 2015; 27: 235-246.
16. Laopaiboon M1, Lumbiganon P, Martis R, Vatanasapt P, Somjaivong B. Music during caesarean section under regional anaesthesia for improving maternal and infant outcomes. Cochrane Database Syst Rev 2009; 2: CD006914.
17. Bradt J, Dileo C. Music interventions for mechanically ventilated patients. Cochrane Database Syst Rev 2014;12: CD006902.
18. Newton BJ, Southall JL, Raphael JH, Ashford RL, LeMarchand K. A narrative review of the impact of disbelief in chronic pain. Pain Manag Nurs 2013; 14: 161-171.

** This is an update upon the book chapter by Dr. Wang: Wang F. Psychological strategies in pain management: optimizing procedures in clinics. *Pain Management - Current Issues and Opinions*, Gabor B. Racz and Carl E. Noe (Ed.), ISBN: 978-953-307-813-7, by InTech, 2012: pp459-466.

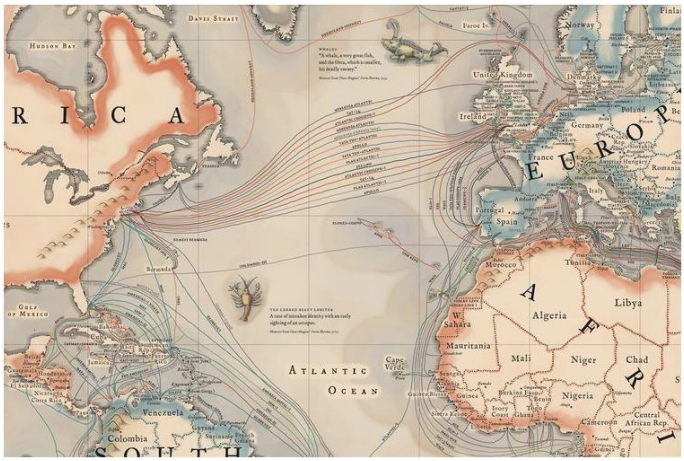

When you face the eruption
Do you feel the ending of the world?


Working like a worker bee?
Relax yourself.....

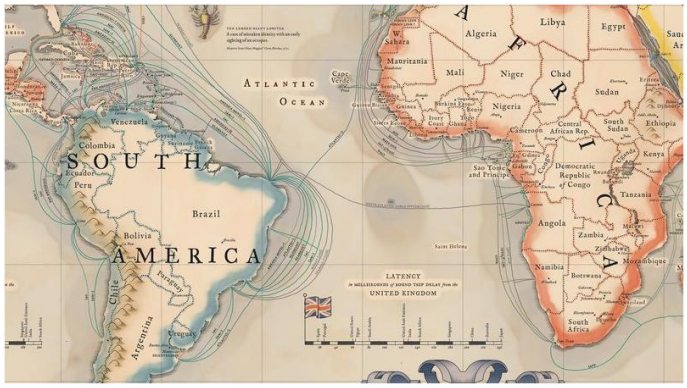
A Map of All the Underwater Cables That Connect the Internet

By Phil Edwards (USA)

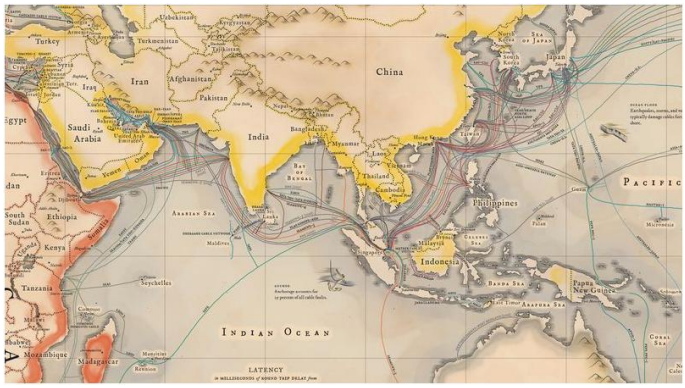
They transmit 99 percent of international data, make transoceanic communication possible in an instant, and serve as a loose proxy for the international trade that connects advanced economies. Their importance and proliferation inspired Telegeography to make this vintage-inspired map of the cables that connect the internet. It depicts the 299 cables that are active, under construction, or will be funded by the end of this year. In addition to seeing the cables, you'll find information about "latency" at the bottom of the map (how long it takes for information to transmit) and "lit capacity" in the corners (which shows how much traffic a system can send, usually measured in terabytes). The ca

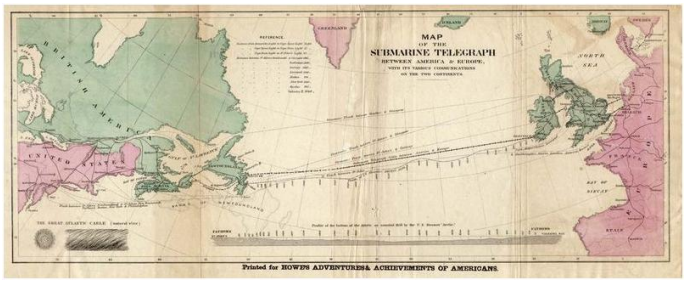


bles are so widely used, as opposed to satellite transmission, because they're so reliable and fast: with high speeds and backup routes available, they rarely fail. And that means they've become a key part of the global economy and the way the world connects. Take, for example, the below map, which lets you slide between a 1912 map of trade routesand Telegeography's map of submarine cables today. The economic interdependence has remained, but the methods and meaning have changed: The submarine cable map shows economic connections in less-

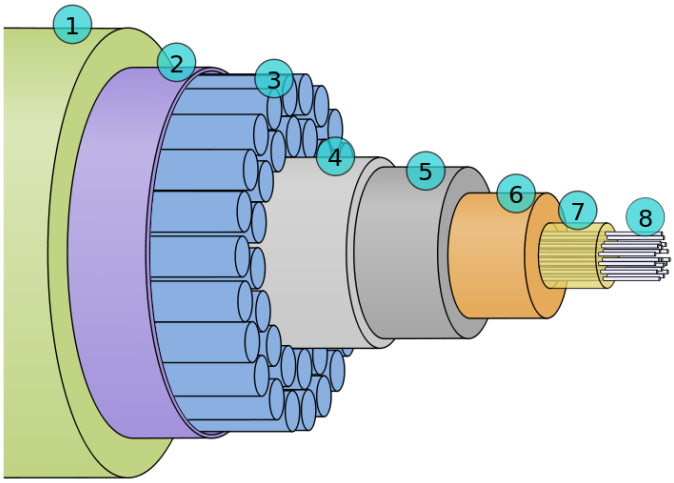


developed countries as well. Cables between South America and Africa, for example, are much more scarce than trans-Atlantic and trans-Pacific routes:Though cables to developing countries are expanding, they have a lot of work to do before they catch up. And Antarctica is left out completely. The analogy between submarine cables and historic trade routes has a lot of caveats: trade routes were determined by geography as well as economic interests, and economic incentives were a lot different than they are today. It would also be a mistake to overlook physical goods in favor of the internet. But both then and now, paths across the ocean require investment, trading partners on both sides, and a willingness to take risks. Sailors took the gamble in the past, and tech companies are taking it now. These cables carry information for the entire internet, including both corporate and consumer





interests. That's why Google invested $300 million in a trans-Pacific cable system consortium to move data, Facebook put money into an Asian cable system consortium, and the finance industry invests just as much to shave a few milliseconds off trade times. Other consortia regularly lay cables to transmit the consumer internet. Each group's control of a submarine cable is an advantage in the information exchange between countries. The process for laying submarine cables hasn't changed much in 150 years — a ship traverses the ocean, slowly unspooling cable that sinks to the ocean floor. The SS Great Eastern laid the first continually successful trans-Atlantic cable in 1866, which was used to transmit telegraphs. Later cables (starting in 1956) carried telephone signals. Modern cables are surprisingly thin, considering how long they are and how deep they sink. Each is usually about 3 inches across. They're actually thicker in more shallow areas, where they're often buried to protect against contact with fishing boats, marine beds, or other objects. At the deepest point in the Japan Trench, cables are submerged under water 8,000 meters deep — which means submarine cables can go as deep as Mount Everest is high. The optical fibers that actually carry the information are bundled within the larger shell of the cable: The components include:



1. Polyethylene
2. Mylar tape
3. Stranded metal (steel) wires
4. Aluminum water barrier
5. Polycarbonate
6. Copper or aluminum tube
7. Petroleum jelly (this helps protect the cables from the water)
8. Optical fibers

These cables move the videos, trades, gifs, and articles that bring the internet around the world in a matter of milliseconds. And that's the type of advantage any trader — digital or analog — could appreciate.

Science INSIGHTS®

The Official Journal of The Bonoi Academy of Science & Education (BASE)

Science INSIGHTS®
Submission System


FREEDOM


RIOT
TODAY'S WORLD
who should pay for this…

AUTHOR GUIDE

About The Journal

Science INSIGHTS® is the official journal of The Bonoi Academy of Science and Education (BASE). *Science INSIGHTS*® focuses on general science that includes all the aspects of the field related to science (see full list of publication fields below). *Science INSIGHTS*® has a three-stage review system on which the manuscript will be reviewed first by the executive Editor-in-Chief, and then it will be forwarded to the in-house professional editors for screening, and finally it will be sent out for peer review. During the second stage, the manuscript may be encountered rejection or even be accepted for publication without further peer review depending on the critical checking by our in-house editors. The peer review process for the Journal is generally two weeks, so any submissions to *Science INSIGHTS*® can get the final decision within one month. The basic criteria for considering submissions are whether the manuscript is clearly written in English, and whether the idea is presented concisely, and whether it is readable to non-professionals. Special criteria exist for different types of papers.

List of Publication Fields

Following is the full list of the fields *Science INSIGHTS*® accepting submissions for publication.
http://www.bonoi.org/node/69

Publication Categories

Based on the BASE's goal of "*let science reach the far corner by education*", *Science INSIGHTS*® publishes all categories of papers if only they are related with science or education. We encourage authors and readers to take advantage of these merits of the Journal and establish their own idea or theoretical system. Let *Science INSIGHTS*® endorse your thoughts and become the stronghold of your future. Please refer to the special requirements for each type of paper below:

News: As the weekly journal, we accept news from all over the world that occurred in the past two weeks before it is to be published. News will be checked for the authenticity and will be published immediately without further peer review and also without any publication charges. The words are limited for News to 100-200 each with no more than three authors (reporters). No references are allowed. Photos or pictures are welcomed and encouraged.

Editorial: This belongs to the editors with specific comments or thoughts when they reviewed the manuscript and it will be published accompanying to the original paper. No peer review is required. The words limitation for Editorial is at least 500 with no more than five authors. It should include a plain summary with 50-100 words. No limitation on the number of references, figures and tables.

Essay: Essay is an important part of the literatures. If you have some special thoughts and considerations on the science and education, you can write them down. This is a different format that differs to the Opinion below; Essay generally belongs to the author's personal point of view on the general science and education, but not for a specific professional question. Tell us your point of view with this kind of Essay, and we will present your point to the world. We required the Essay be written with at least 300 words including a plain summary with 50-100 words. No limitation on the number of references, figures and tables.

Poem: *Science INSIGHTS*® is not only for the regular publications of science and education, but also for the aesthetics and rhythm of our surroundings. If you are interested in this form of literary art, write it and publish it. Let science and education show more enjoyable elements. No limitation on the count of words for Poem with maximum of 3 authors. No peer review is needed for Poem.

Journal Club: Journal Club means a group of individuals who meet regularly to critically evaluate recent articles in scientific literatures. In general, Journal Club is written by students including undergraduates and postgraduates, and postdoctoral fellows. *Science INSIGHTS*® welcomes Journal Club that criticizes any kinds of papers published in any internationally-circulated English-edited journals in the past three months before it is to be published. Do not forget citing the article you criticized in your Journal Club submission. In-house review will be given, but the send-out peer review is not required. A maximum of 10 authors can be listed. A plain summary with 50-100 words is required. The words limitation on the text is at least 500. No limitation on the number of references, figures and tables.

Letters: A huge number of papers are published every day. If you have some different ideas or personal points on one paper, you can write us with a letter and describe your thoughts clearly. We will take into consideration of it for publication without peer-review process. No matter the paper comes from which journal, you can letter us only if it was published in the past three months before it is to be accepted for publication. The Letters will be forwarded to the original authors for responses. Please remember citing the original paper in your Letters. A total of 7 authors are the maximum for the Letters. The words limitation on the text is at least 200. No limitation on the number of references, figures and tables. No publication fee is required.

Comments: Comments on others' publication means you have different or similar thoughts on the same topic. You need give an in-depth analysis with robust evidence upon your points. An in-house assessment will be given. Please citing the paper you are commenting on. You can write a comment on any papers published in any internationally-circulated English-edited journals in the past three months. A plain summary with 50-100 words is required. The text should be at least 1,000 words with a minimum of 10 references. Figures and tables are welcomed.

Perspectives: This is a specific type of paper written with foreseeing style. It gives readers an overall impression with impressive in-depth presentation. It generally inspires new ideas or even novel thoughts. Sometimes it raises new questions with the potential to change the world. Even if you think it is strange for others, but it may be just the thing, the very thing we wanted. Merely the in-house review will be given for this type of paper. A plain summary with 100-200 words is required. No limitation on the count of words in the text, and on the number of references, figures and tables.

Opinion: This is not the same as the Perspectives, Opinion means you speak out your thoughts on the bases of currently available evidence. But sometimes, you do not need provide solid evidence, but just show you opinion to everything – science, education, society, politics, economy and future etc. if you have some special opinions, please write us Opinion with at least 300 words accompanied with a round 50-100 words plain summary. It will be reviewed by our in-house editors. No limitation on the references, figures and tables.

Picture Station: *Science INSIGHTS*® publishes pictures considered as the important snapshots of the science or education. If you are a drawing-lover, you can draw pencil sketches and cartoons for the Journal to reflect the contents of science or education. A descriptive caption and a detailed legend with a minimum of 100 words are required. Author information should be provided in detail with a short-paragraph introduction.

Feature of Life: We every day have different life experience, and also have different stories. If you think yours are associated with science or education, you can tell us, and we will tell them to the world. Feature of Life is special column for *Science INSIGHTS*®, from which we highlight our everyday life with marks of science and education. Also, if you are a story-lover, you can write us yours and even others you think it is interesting enough for the world. A total of 3,000 words you can use, and 5 authors can be listed. Photos and pictures are welcomed.

Abstract or Meeting Abstracts: To reach the goal of spreading science to the far corner of the world, we encourage authors report their findings via presenting them in a short format - abstract. Meanwhile, *Science INSIGHTS*® accepts meeting abstracts submission. A total of 400 words are allowed for each abstract, and a maximal of 5 graphics and tables, and 10 references can be accompanied. No limitation there on the author number. All submitted abstracts should be structured as Background, Objective, Methods, Results, and Conclusion.

Scientist On-Spot: *Science INSIGHTS*® reports and introduces scientists to the world. Please tell us the stories of scientists you think is worthy being known by the world. This is also a means for better understanding and communication among scientists. Please provide a picture of the scientist you introduced. No limitation there on the word count.

Educator On-Spot: As the goal of the BASE: let science reach the far corner by education. We also tell the world your stories if you are an educator. Write us no matter you are working for kids, or youths, or college students, or adult students. Please provide a picture of the educator you introduced. No limitation there on the word count.

Hypothesis: If you have new idea, but you cannot test it due to the limitations of time, efforts and finances, so you can write us Hypothesis. Tell us the background, why you think it is essential, the hypothesis, how to test it, and what methods you think are needed when testing it. One hypothesis should be focused on just one topic. A paragraph summary with 100-200 words is required. The Hypothesis will be reviewed by the in-house editors only. No limitation on the count of words in the text, and on the number of references, figures and tables.

Review: In this so-called information times, we face billions of information every second. We need try our best to figure out the useful but rule out the useless. Yes, Review can help us save time in this process. If you are expertise in your field or you are familiar with what you are doing, you can collect corresponding information and write us Review. Review paper can be mini, comprehensive and systematic. Meta-analysis is also included in this type of paper. The three-stage review will work on this type of paper. A paragraph summary with 150-350 words is required. No limitation on the count of words in the text, and on the number of references, figures and tables.

Mini-Reports: This is the novel type of our publication introduced to provide a rapid and efficient communication among researchers or educators. You don't need write too many words for this kind of manuscript. The minimal requirement for the text words is 300 usually composed of three paragraphs - one for introduction, one for methods and results, and one for discussion. Two figures and two tables are permitted for mini-reports. No limitation on the references. Oops, do not forget the summary with at least 100 words.

Reports: You can report your findings without subtitles; just describe it with one kind of formation from the beginning to the end. This is the good thing for some people, but not yet for others. If you are good at writing descriptive papers, you can use this formation as your data presenter. It will be assessed by our three-stage review system. A paragraph summary with 100-200 words is required. No limitation on the count of words in the text, and on the number of references, figures and tables.

Short Communication: If you do not have too much data, you can write us the Short Communication, in which the paper is divided into five major parts: introduction, materials and methods, results, discussion and references. This type of paper will be assessed by our three-stage review system. The abstract should be structured into: objective, methods, results and conclusions. The words limitation for the abstract is no more than 250. A total of 5,000 words for the text is the maximum (not including the references). The total number of the figures and tables for Short Communication is 10. No limitation on the number of references.

Article: Unlike the Short Communication, Article is defined with over 5,000 words for the text (not including the references). The body of the Article is composed of five parts: introduction, materials and methods, results, discussion and references. Article will be assessed by the three-stage review system. The abstract should be structured into: background, objective, methods, results and conclusions. The words limitation for the abstract is 200-350. No limitation on the number of references, figures and tables.

Book Review: We publish Book Review for authors or publisher to spread the contents of the book contains. A minimum of 100 words are needed for the overall introduction of the book. Authors' information, publisher, publication year and prices if have.

Cover – SI: In general, *Science INSIGHTS*® chooses her cover for each issue from the would-be publications, but we also accept submissions for the Cover-SI. If you are interested in, please submit us the cover arts with some 50 words legend. Your name, affiliation and email will be shown accompanying to the Cover-SI. No publication fee is required.

Erratum: We try the best to reduce the errors when publishing papers, but it is still unavoidable. So the Erratum is set for the purpose of correction. If your publications in *Science INSIGHTS*® were found any errors, please contact the editorial office with email. It is our responsibility for publishing your work with the most precise manner. No publication fee is required.

Structure and Preparation of the Manuscript

Science INSIGHTS® has her special format for manuscript preparation. Please refer to following guidelines before submitting your manuscript to the Journal. *Cover Letter*: All manuscripts need include a Cover Letter to speak their findings in one sentence and declare it is merely submitted to the Journal, and describe the conflict of interest, and all authors have approved for the submission. It also should include the information of the corresponding author(s). At last, the cover letter needs to be signed by the corresponding author(s). *Science INSIGHTS*® accepts the scanned signature.

Title Page: The Title Page should include all the general information about the manuscript as follows:

Title: With no more than 20 words, concisely reflects the core contents of the manuscript.

Authors: Different categories of manuscript have different requirement for the number of authors, please refer to the above description. *Science INSIGHTS*® allows a maximum of 4 authors having equal contribution to the work. Authors should be marked with "*, †, ‡, ¶, §, ||, ¦|, **, ††, ‡‡, ¶¶, §§" in sequence. Corresponding author(s) should be labeled with "Δ".

Author Affiliations: List all affiliations of the authors in sequence as they are appeared with the corresponding marks above.

Correspondence to: Provide contact information of the corresponding authors including email address, telephone number and fax number. *Science INSIGHTS*® allows 4 corresponding authors from different institutes, but only 2 corresponding authors from the same institute.

Running Head: Please provide a short title with no more than 6 words.

Funding: If the work was supported by any kinds of financial sources, please provide detailed information on these providers with the reference IDs.

Conflict of Interests: A declaration on the conflict of interests is required on the title page. Besides, you need sign the Conflict of Interests form and submitted it accompanying to your submission.

Acknowledgements: Type your acknowledgements on the Title Page if you have. Do not follow it at the end of the discussion.

Author Contributions: Give a detailed description on each author's contribution to the work.

Abbreviations: Please list all the abbreviations appeared in the paper like "CNS: central nervous system" with only one each line.

Keywords: *Science INSIGHTS*® requires 3-8 keywords for each paper. Only the Hypothesis, Review, Reports, Short Communication, and Article are required to provide keywords.

Metadata: You need provide the words count of the abstract or summary, body text; and the number of references, figures, color figures, and tables.

Abstract or Summary: *Science INSIGHTS*® has different requirements on the summary of different types of papers, so please refer to above-mentioned publication categories for the type-specific information on this section.

Introduction: This is specifically for the Hypothesis, Review, Reports, Short Communication, and Article. All these types of paper are needed start with an introduction with less than 1,000 words. In this section, generally an overall background of the work, and reasons why you did that work, and questions you tested should be presented. Please follow the special format for each type of paper.

Materials and Methods: For the Short Communication and Article, you need provide repeatable methods you performed and available tools or materials you used in your work. No limitation on the words count in this part, but you still need consider the total limitation of the words for the Short Communication (less than 5,000).

Results: This is also the specific feature for the Short Communication and Article. Keep in mind do not repeat your results with description that will be depicted in the figures or tables. Describe you data concisely with readable manner.

Discussion: Especially for the Short Communication and Article too, please discuss you work on each point only if you think it is necessary. Discussion is not always the longer the better. *Science INSIGHTS*® requires the authors present their work with readable format.

References: *Science INSIGHTS*® has her special requirements on the references. Taking into consideration of the copyright and efforts the authors made, the Journal requires list all the authors of the reference. The references should be appeared in sequence in Arabic number in parentheses like "(1)" in the text. Please format your references as following examples:

Published journal article:
Samaan Z, Mbuagbaw L, Kosa D, Debono VB, Dillenburg R, Zhang S, Fruci V, Dennis B, Bawor M, Thabane L. A systematic scoping review of adherence to reporting guidelines in health care literature. J Multidiscip Healthc 2013; 6:169-88.

Journal online ahead publication:
Stevenson JR, Villoria N, Byerlee D, Kelley T, Maredia M. Green Revolution research saved an estimated 18 to 27 million hectares from being brought into agricultural production. Proc Natl Acad Sci USA 2013; In press.

Web reference:
Shine on: photos of dazzling mineral specimens. Last accessible date: May 15, 2013. Available from: http://www.livescience.com/31960-photos-dazzling-minerals.html

Book chapter:
Daniel N. Miller and Raymond A. de Callafon. Identification of linear, discrete-time filters via realization. Linear Algebra - Theorems and Applications. Yasser H (Ed.), ISBN: 978-953-51-0669-2, InTech. 2012; pp1-26.

Meeting abstract:
Toro L, Singh H, Stefani E, Bopassa JC. NS1619-induced cardioprotection against ischemia reperfusion injury is lost after kcnma1 gene ablation (Abstract). A154, ASA 2012 Annual Meeting, Washington DC.

Figure Legend: Please provide a detailed Figure Legend on each figure. It should include a brief methods introduction from which you got your data, and statistical P values. In each figure, the symbols should be used as follows in sequence as it is needed: *, †, ‡, ¶, §, ||, ¦|, **, ††, ‡‡, ¶¶, §§. In addition, the abbreviations appeared in the figure should be spelt out at the end of the legend.

Graphics

All figures must be high enough in definition. To maintain high quality of the publication, *Science INSIGHTS*® will ask the authors for providing the data for redrawing the figures as the Journal's uniform style. We encourage color figures in the papers. No additional payment is required for the color figures. Some specific graphics will be redrawn by our professional illustrators, and the drawn-works will be signed by the illustrators for the copyright purpose.

Statistics

Except for it is a special study category, statistical analyses should be reported if applicable. Which software you used with what versions, and what kinds of methods you consulted, and what a P value you set. Our expert statisticians will review the statistical analyses before the paper is considered for publication.

Submission

***Science INSIGHTS*® accepts submissions through following means:**

Submission System: To simplify the submission processes, *Science INSIGHTS*® designed her own submission system that makes the manuscript submission so fun and so easy. We have only two steps for all submission. No registration is needed. Fill out the form using our submission system and then upload you manuscript(s) and/or graphic files. All these will be done on one screen, and then review the information followed by submit click. OK, now, click the button below and enjoy the submission. **Please note, this system is only for original submission or re-submission that was rejected after the 1st round peer review.**

Revision Submission System: For revised manuscript, we designed a more easier-to-be-understood system. Please press the button below and submit your revision to us. If it is not a revision, please use the Submission System above.

Email: We suggest you to use our online submission system, but If you cannot access to the system from technological issues, please submit you manuscript(s) to the Journal via the email Editor-in-Chief@bonoi.org as the attachment.

Publication Charges

As the official journal of the BASE, *Science INSIGHTS*® requires the authors pay for the publication in part (30-50%) for the circulation and processing maintenance once the manuscript accepted for publication. Based on this charge, the paper published in the Journal will be available freely (open access) once it was published. Also the payment would be different for the authors from different countries, please refer to the full list of the Country Rate below.

Notes: The values are the United States Dollars ($, USD)

Country Rate

Science INSIGHTS® charges the authors based on the latest reports by The World Bank. Its main criterion for classifying economies is the gross national income (GNI) per capita which is similar to but not the same as the gross domestic product (GDP). Based on its GNI per capita, every economy is classified as low income, lower-middle income, upper-middle income, or high income.

Low income: $1,025 or less; (1st-type countries)
Lower-middle income: $1,026 - $4,035; (2nd-type countries)
Upper-middle income: $4,036 - $12,475; (3rd-type countries)
High income: $12,476 or more. (4th-type countries)
http://www.bonoi.org/node/75

Conflict of Interests

All manuscript submissions are required to submit the signed *Conflict of Interests* (.doc, .pdf) form during submission, or using online system:
http://basehq.org/machform/view.php?id=16631.

Copyright

The authors of *Science INSIGHTS*® have two choices for the copyright of their published paper. The first is they can transfer the copyright to *Science INSIGHTS*®, so the *Permission* from the Journal is needed if the paper or some parts of the paper is needed to be spread, advertized, propagated, republished, reprinted, or changed. The illegal or business use of the paper will sue claims. Once transferred, the paper will be marked with "**PC**", i.e. publisher copyright. The second choice for the authors is that they can keep the copyright of the paper, but under this situation, they need pay $2,000 (USD) for the copyright keeping, and once kept, all rights will be belong to the authors. Therefore, NO permission from the Journal is needed. Once kept, the paper will be marked with "**AC**", i.e. author copyright. No matter which choice the authors finally decided, the *Copyright Transfer or Keeping Agreement* (.doc, .pdf) should be signed before publication. Once the transfer agreement is signed, the authors need pay $3,000 (USD) if they want to redeem the copyright. If the Journal did not get the signed copyright form before the assigned publication date, the Journal will keep all rights and the authors cannot redeem the copyright any more. We recommend you use online system:
http://basehq.org/machform/view.php?id=17072.

Permission

If a PC-marked paper or some contents of a PC-marked paper was needed to be reprinted or for some other non-illegal and non-business purposes, the permission for use application is needed for the users. As thus the *Permission Form* (.doc, .pdf) should be filled, scanned and emailed to the editorial office. After reviewed and signed by the Journal, the form will be returned to the applicants. No payment is required for the permission application and other-place use. Online system is recommended for permission request:
http://basehq.org/machform/view.php?id=17937

WHO CARES OUR EARTH?