

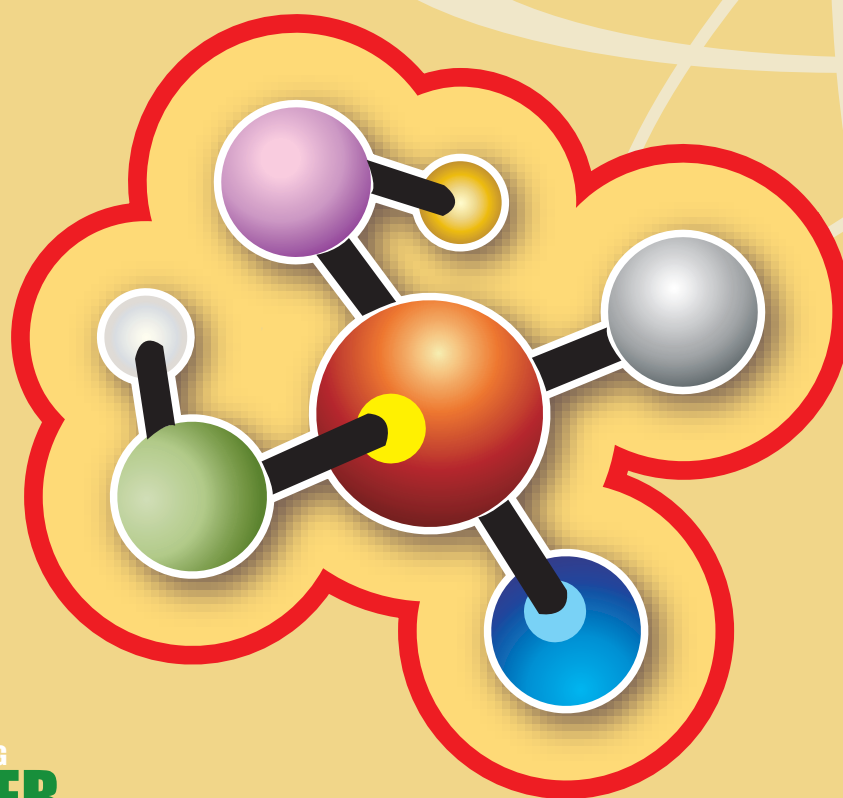


SCIENTIFIC AMERICAN

60-SECOND SCIENCE

Leading science journalists provide a daily minute of commentary on some of the most interesting developments in the world of science. For a full-length, weekly podcast you can subscribe to Science Talk: The Podcast of Scientific American.

60





December 1, 2008

Solar-Powered Sea Slug

A sea slug can carry on photosynthesis for months at a time by eating algae and saving the tiny organelles that the single-celled organism uses to convert sunlight to energy. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

It may look like just another animal. But one kind of lowly sea slug actually has the solar power abilities of a plant. Bizarre but true, the sea slug carries out photosynthesis. This finding was published in the *Proceedings of the National Academy of Sciences*.

Usually, plants perform photosynthesis by way of tiny organelles called plastids. Plastids convert sunlight, water and carbon dioxide into usable nutrients. Then animals eat the plants. But the sea slug goes about it slightly differently.

It has at least one gene necessary for photosynthesis—so far it's the only animal known with this ability. But it needs some help, the gene itself isn't enough. So sea slugs eat algae. They slit open the organisms and suck out the cytoplasm. The slugs digest most of the algae, but those plastids remain whole and undigested. And then the plastids keep on doing what they do, which is convert sunlight to usable energy. Once the sea slug has eaten enough algae, and gained enough plastids, it can live off just sunlight for up to nine months. When it comes to energy, this slug needs no plug.

—Cynthia Graber



December 2, 2008

Robot Clam Achieves Feat with Foot

M.I.T. researchers have invented a robotic clam--which means they've really developed a smart anchor for small vessels. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

M.I.T. scientists have designed a new robot. You'll probably never see it though—it's meant to be hidden. Because it's a robot clam. Engineers wanted to design a lightweight anchor that could be easily set and then picked up. That's not possible with conventional anchors. A more talented anchor would be great for, say, small submarines that move around constantly to test ocean temperatures and currents.

Razor clams presented the ideal biological model. They can burrow a centimeter per second more than two feet down into the soil, where they can anchor themselves tightly to the ocean floor. Scientists set up a glass box with water and beads and stuck a living razor clam inside. They filmed what happened next. The animal's foot wiggled into the beads. The rest of the clam followed by moving quickly up and down and rapidly opening and closing its shell. By carefully analyzing the film, the scientists discovered something surprising. The clam's movements turn the sand around the creature into more of a fluid—basically quicksand. By copying this system, M.I.T. researchers created a tiny RoboClam. It's the size of a cigarette lighter. If they add artificial intelligence, we can find out if the device is happy as a clam.

—Cynthia Graber



December 3, 2008

Using Radar to Monitor Baby Breathing

University of Florida engineers have created a prototype baby monitor that uses Doppler radar to track the movements of a baby's chest, indicating breathing status. Steve Mirsky reports

[The following is an exact transcript of this podcast.]

[Radio sound:] "Northeast 480 you are cleared for landing, Northeast 480 you are cleared for landing."

That same radar technology that guides aircraft and tracks hurricanes could in the future keep track of a baby's breathing. Engineers from the University of Florida have built a prototype radar baby monitor. The crib-mounted monitor detects movement of the infant's chest using Doppler radar. If breathing stops, movement stops and the monitor sounds an alarm. Such a system should be superior to those that just send sound or video to the parents. The research will appear in the February issue of *IEEE Microwave Magazine*. IEEE is the Institute of Electrical and Electronics Engineers.

The radar monitor that the researchers created is about the size of small book. The receiver indicates the baby's breathing, as well as the state of the wireless connection with the monitor and the battery status. Future versions could also detect heartbeat through a higher frequency signal.

[Radio sound:] "Mrs. Watson on Maple Drive, your baby is breathing normally, the baby is breathing normally."

—Steve Mirsky



December 4, 2008

Brahe Burst Brought to Light

Astronomers have collected light bouncing around since a 1572 supernova, witnessed by Tycho Brahe himself, to figure out exactly what kind of explosion it was. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

It's not every day we get a chance to time travel. Other than into the future at the rate of one second per second. But astronomers say they've done a little traveling into the past. In November of 1572, legendary astronomer Tycho Brahe peered up at the night sky. He saw what looked like a strangely bright star in the constellation Cassiopeia. It was brighter even than the nearby planet Venus. He studied that bright new star for five months, until it faded away. But what Brahe saw wasn't a new star. It was actually an old star undergoing the brilliantly bright death of a supernova.

Scientists at the Subaru Telescope in Japan recently analyzed what could be called echoes of this more than 400-year-old event. They published their research in the December 4th issue of the journal *Nature*. Light from the original supernova bounced off dust particles in the interstellar clouds and eventually reached us here on earth more than four centuries later. Scientists used these echoes to determine that Brahe witnessed a type Ia supernova.

—Cynthia Graber



December 5, 2008

Happiness Is Contagious

A happy person within a social circle quickly influences those around him or her to be happy, extending to three degrees of separation. Adam Hinterthuer reports

[The following is an exact transcript of this podcast.]

Want to live a happier life? Try surrounding yourself with happy friends or at least find friends with happy friends. A study published online December 4th in the *British Medical Journal* says happiness can quickly go viral within your social network.

Researchers looked at twenty years' worth of data on more than 5,000 individuals and found that when any one person was happy, their friends became more likely to share that joy. Benefits spread out to three degrees of separation, meaning a better chance at happiness for not only their friends' friends, but also their friends' friends' friends.

But don't go thinking your ten thousand buddies on Facebook will bring you happiness. The researchers found that the strength of the effect dissipates over physical distance, with next-door neighbors and friends living nearby getting the biggest boost. Surprisingly, sadness made very little headway within social networks, paling in comparison to the communal effects of happiness. Just in time for the holiday season, scientific proof that it's not the gift that counts—it's the smile on the face of the friend giving it.

—Adam Hinterthuer



December 8, 2008

Warm Climates Support Longer Limbs

A study with mice finds that those kept in warmer environments develop longer limbs than their chillier cousins, thanks to enhanced cartilage growth. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Animals that live in cold climates tend to have stubby limbs—shorter arms and legs—even smaller ears and tails. Picture a penguin and you'll see what I mean. Biologists have long assumed that these stumpy appendages are an evolutionary adaptation. Shorter extremities minimize heat loss, so animals that are more compact are better suited to the cold.

But scientists from Ohio say that temperature may have a more direct effect on the length of an animal's limbs. Because they find that turning up the heat helps cartilage grow—results that were published in the *Proceedings of the National Academy of Sciences*.

The researchers raised mice at several different temperatures, and they confirmed that those kept at a balmy 80 degrees were longer limbed than those who lived at a more chill 45. But how does a little heat make mice more leggy? The answer, they find, lies in the cartilage. Long bones grow from the cartilage found at either end. And the warmer it is, the more that cartilage grows, even when it's just sitting in a test tube. Which I guess means it's possible that the dog days of summer lead to longer-legged dogs.

—Karen Hopkin



December 9, 2008

Traditional Treatments Show Promise for HIV, Psoriasis

Traditional Chinese medicine's astragalus root shows promise in HIV treatment, and the plant extract, indigo naturalis, may help calm the skin condition psoriasis. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

Chinese medicine has been getting some props lately. A couple of recent studies have demonstrated the medical potential of traditional treatments.

Part of the challenge of AIDS is that immune cells lose their ability to divide and thus their disease fighting power. Partly because the telomeres—a sort of protective cap on the ends of chromosomes—become progressively shorter. Enter the root astragalus. It's used frequently in Chinese herbal remedies. Researchers focused on a chemical called TAT2, which was identified in astragalus. They tested it on cells and blood from HIV infected individuals. The compound slowed the shortening of telomeres and generally improved the ability of cells to fight HIV. (*The Journal of Immunology*)

Another study focused on psoriasis. There's no cure for that chronic skin disease. But in China and Taiwan, people with psoriasis frequently apply a dark blue plant-based powder called indigo naturalis. In a randomized study [in the *Archives of Dermatology*], indigo powder significantly reduced skin scaling, redness and hardness. The Taiwanese scientists say the next step is to determine indigo's pharmacology and perhaps extract the specific chemical compounds that could bring psoriasis sufferers some relief.

—Cynthia Graber



December 10, 2008

Immigrant Elephants Stick Together

When elephants are transported to new habitats, the immigrants tend to stick together, only slowly assimilating into the existing elephant population. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

It's a familiar story. When immigrants arrive in a new place, they tend to stick together, forming segregated enclaves that feel like a home away from home. Then, over time, they become assimilated, and integrate into the local community. It was true of the German and Irish immigrants who came to the U.S. in the 1800s. And it's also true of elephants when they find themselves in unfamiliar territory.

In managing wild elephant populations, rangers will often transport the animals from one place to another, removing them from a familiar habitat and placing them in one that's new. So scientists in California got to wondering how elephants, which are highly social creatures, handle making themselves at home when they get to a new neighborhood.

It turns out they form enclaves that are the elephant equivalent of a ghetto, where the new pachyderms in the park associate with one another and with other immigrant elephants. Then, once the transplants have been around for a year, they get friendly with the locals, findings that were published by the Royal Society on December 10th. The cautious approach seems to be a good one: not knowing whether the natives are friendly, it's probably best not to step on any toes. Especially if you're an elephant.

—Karen Hopkin



December 11, 2008

Cash Rewards Help Dieters

A study in *JAMA The Journal of the American Medical Association* finds that people who were rewarded with a few hundred dollars for losing a few pounds were much more successful than those who just dieted. Steve Mirsky reports

[The following is an exact transcript of this podcast.]

Finally, science has something you can give people that really does help them lose weight: money. Rewarding dieters with a few hundred dollars is effective for promoting at least short-term weight loss. That's according to a study in the December 10th issue of the *Journal of the American Medical Association*.

The researchers tried two approaches. In one, study subjects got paid if they lost 16 pounds in 16 weeks. In the other, participants invested their own money, which they lost if they didn't make that same goal. A control group just tried to lose weight without any economic incentive. And the losers are:

Dieters who got paid for losing—53 percent of them met the target. Followed by those who risked their own money—47 percent of them lost the 16 pounds. And the regular old dieters, for whom losing weight was its own reward? Only 10.5 percent of them got to their goal. And that group averaged just a four-pound loss, compared with 14 pounds for the paid dieters.

So, what do you do with the money you win by losing weight? That's easy: pizza!

—Steve Mirsky



December 12, 2008

Different Exercise Affects Appetite Differently

A study in the *American Journal of Physiology* finds that aerobic exercise affects levels of two different hormones involved in appetite. Weight lifting only affected levels of one of the hormones. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Well, here I am on my exercise bike, anticipating the excesses of the holidays. All those cookies and candies and maybe a glass or two of eggnog. At the very least, I figure maybe a few good turns on the exercycle will keep me from snacking before I hit the buffet table.

But a new study from the U.K. suggests that when it comes to suppressing appetite, not all exercise is created equal. The researchers followed 11 male university students as they jogged for an hour on a treadmill or spent 90 minutes lifting weights. And they found that the treadmill workout altered the production of two different hormones that control appetite. Whereas pumping iron only affected one. Which suggests that aerobic exercise is a better appetite suppressant than muscle building.

And the students' stomachs agreed. Although both workouts curbed the students' appetites, the run left them even less hungry than the weight lifting, results that appear in the online edition of the *American Journal of Physiology*.

Lucky for me, it looks like I'm ok with the exercise bike. But don't worry if dumbbells are your thing. I'm sure lifting weights can also keep you from noshing. As long as you're holding them while you're at the party.

—Karen Hopkin



December 15, 2008

Judge and Jury in the Brain

A study in the journal *Neuron* finds that an area of the brain associated with reasoning comes into play in deciding guilt or innocence, but an emotional region gets involved in sentencing. Karen Hopkin reports. For more info, check out the November 27th, 2007, episode of *Science Talk* at SciAm.com/podcast

[The following is an exact transcript of this podcast.]

[Judge's voice: Members of the jury, do you have a verdict?]

When it comes to making decisions about innocence and guilt, the human brain acts as both judge and jury. Now a study published in the journal *Neuron* shows that, just like in the courtroom, the brain's judge and jury sit in separate places.

When someone's put on trial, two types of decisions have to be made. First, is the person guilty? And second, what punishment, if any, does that person deserve? Scientists at Vanderbilt University got to wondering how the brain actually makes those two different decisions. So they used functional MRI to monitor the brain activity of subjects as they read about various crimes, and decided how severely the perpetrators should be punished, or whether they should be punished at all.

What the researchers found is that a brain region involved in analytical thought was most active when the subject was deciding whether the perpetrator was actually guilty. But a different area, one more in tune with emotion, weighed in on how to make the punishment fit the crime. The study was funded by the MacArthur Foundation Project on Law and Neuroscience, and it suggests that when it comes to crime and punishment, we may be impartial but we're not without passion.

—Karen Hopkin



December 16, 2008

Fruit Flies, Fragile X and Foolery

A study in the journal *Nature Neuroscience* shows that fixing damage to a specific fruit fly gene appears to correct memory problems, which could point to possible treatments for fragile X syndrome in humans (despite Sarah Palin's negative campaign comments about fruit fly research). Cynthia Graber reports. For more McCain-Palin science slipups, check out the Anti Gravity column in the January issue of *Scientific American* magazine at SciAm.com/sciencemag

[The following is an exact transcript of this podcast.]

Sarah Palin on the campaign trail was at times dismissive of science. She attacked fruit fly research, saying that tax dollars were going to “projects having little or nothing to do with the public good, things like fruit fly research in Paris, France. I kid you not.”

Well, as the mother of a special needs baby, maybe Palin should check out a report in the current issue of the journal *Nature Neuroscience*. University of Alberta researcher Francois Bolduc keeps 300,000 fruit flies in a basement laboratory. He discovered that disrupting one gene known as *FMR1* in the flies’ brains can wipe out their long-term memory. What’s interesting for us is that damage to that gene in people is associated with learning and memory problems, epilepsy and autism. That constellation of traits is known as fragile X syndrome. Bolduc then worked on curing his forgetful flies—he found a class of drugs that reduces the activity of the *FMR1* gene. And the insects were able to regain their memory. Which could point to treatments for fragile X syndrome in humans. Thanks to fruit fly research in Alberta, Canada. I kid you not.

—Cynthia Graber



December 17, 2008

Pain on Purpose Hurts More

A study in the journal *Psychological Science* finds that the exact same electrical shock is more painful if the recipient thinks it was done on purpose rather than by accident.

Karen Hopkin reports

[The following is an exact transcript of this podcast.]

When it comes to pain, it's the thought that counts. Because pain hurts more when it's inflicted on purpose. Or so say researchers from Harvard University in the December issue of *Psychological Science*.

Forty-three people were paired off with a partner for what they were told would be a test of psychological perception. Then they were hooked up to some electrodes, and given a quick zap. Sometimes the shock was "intentional." So, the partner would call for a shock to be administered, and zzzt it came. But sometimes the shock was unintentional. That is, the partner called for the subject to hear a pleasant tone, but those zap-happy researchers hit the shock button instead.

They then asked the subjects to rate the pain. The results? On a scale of one to seven, with seven being "extremely uncomfortable," the shocks that were done on purpose rated a respectable 3.6. But the same exact shock when given by accident only rated a 3.

That emotional response to pain makes evolutionary sense, the researchers say. Because an ouch that's just an accident is probably one-time thing. Whereas someone who wants to do you harm will probably do it again. In which case it may be a good idea to pull off your electrodes and just go home.

—Karen Hopkin



December 18, 2008

New Biosensor: DNA-Wrapped Carbon Nanotubes

A study in the journal *Nature Nanotechnology* shows that carbon nanotubes wrapped in DNA can be safely inserted into living cells. The nanotubes emit infrared signals that reveal the cellular conditions affecting the DNA. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

Real-time information about what's happening in our bodies at the cellular level could be crucial for fighting cancer and other life-threatening conditions. It would be incredibly helpful to know whether cancer drugs are reaching their targets or whether toxins are disrupting DNA in healthy cells. Now scientists at M.I.T. have created carbon nanosensors that they say can help answer those questions. The research was published December 14th in the journal *Nature Nanotechnology*.

The researchers wrapped carbon nanotube sensors in DNA, and the coated sensors have been shown to be safe for living cells. The nanotubes emit infrared light. But that signal changes when cancer drugs or molecules that damage DNA bind with the sensor.

By detecting the changes in signals, such as intensity and wavelength, the researchers have shown they can determine just what's happening to cells in real-time. So if the sensor were placed in the body, it could pick up, for example, even a molecule of hydrogen peroxide, which is toxic to DNA. Researchers say these nanotube-DNA sensors could monitor cellular activity over long periods of time. They might also be used in minimally invasive biopsy techniques, because cells would be transmitting information directly to the radiologist.

—Cynthia Graber



December 19, 2008

Dinosaurs Were Dutiful Dads

A study in the journal *Science* looked at bones from dinosaurs found with clutches of eggs, and found that the caretakers appear to be male. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

If you saw the movie *March of the Penguins*, or even the animated film *Happy Feet*, you know that male penguins take their role as parents pretty seriously. Now, a study from Montana State University shows that being a dutiful dad is something even dinosaurs did.

The scientists examined the fossilized remains of three different kinds of two-legged dinosaurs, which are thought to be the ancestors of modern birds. They focused on fossils in which an adult animal was found perched atop a clutch of eggs. And they found that the creatures that died while sitting on a nest did not seem to be female. Lady birds store the minerals they need for building egg shells inside their hollow limb bones. But these dinos did not have that mineral-rich bone tissue, which suggests they were males, results that appear in the December 19th issue of the journal *Science*.

These dino dads were probably polygamous, the scientists say, because their bones were found on top of some pretty big clutches. So it seems they may have wooed multiple mates, and were then left in charge of a veritable dinosaur day care center, filled with their various girlfriends' eggs. Which they somehow apparently kept from getting scrambled.

—Karen Hopkin



December 22, 2008

Fruit Fly Immunity Stronger While Sleeping

A study presented at the meeting of the American Society for Cell Biology found that fruit flies were better able to fight off infections that they got while asleep at night than those received while awake during the day. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

For those of you who've spent many of your waking hours this winter washing your hands and fretting about getting sick, you might be better off just staying in bed. Because scientists from Stanford University have found that the immune system works best after dark.

The scientists were studying fruit flies, which are active at dawn and dusk, and sleep through the night like you and me. The circadian rhythm that tells these critters, and many others, when to snooze and when to cruise, controls lots of bodily functions. So the scientists got to wondering whether it also regulates the immune system and the fly's ability to fight infections. Yes, even fruit flies can catch some pretty nasty bugs. Which the scientists proceeded to demonstrate.

They took a bunch of flies and infected them with some unsavory bacteria. Half the flies were infected while they slept, half while they were awake. Turns out that the flies that were infected at night were better able to battle their bugs than flies who got sick during the day, results presented at the American Society for Cell Biology meeting in San Francisco on December 14th. Whether human immunity is also better during sleep isn't yet known. But Shakespeare might have been onto something when he called sleep "nature's soft nurse."

—Karen Hopkin



December 23, 2008

Crowds Walking Can Make A Bridge Sway

A study in the Proceedings of the Royal Society explains why thousands of tourists were able to make the London Millennium Bridge sway on its opening day in 2000. Karen Hopkin reports.

[The following is an exact transcript of this podcast.]

On its opening day, 90,000 tourists traipsed across the London Millennium Bridge. That pitter patter of pedestrian feet caused the structure to visibly rock, earning it the nickname “the wobbly bridge.” Now, in the December 17th issue of the Proceedings of the Royal Society, civil engineers say they think they know what made the London bridge sway.

It had initially been assumed that the movement was caused by a portion of the pedestrians marching in lock-step. Their synchronized waddle could have caused the bridge to oscillate, leading even more of them to tread in tandem. But the engineers say that the same oscillations can be generated by people who are simply plodding along, just trying to keep their balance—no marching necessary.

Using mathematical modeling, the scientists showed that even walking on level ground people stabilize themselves by controlling where they place their feet side-to-side. So if they’re walking on a bridge that also wiggles side-to-side, in an effort to keep their balance they may shift their weight even more, making the problem worse. So next time you go to walk across the Thames, remember, the London Millennium Bridge is not falling down. But you still might want to watch your step.

—Karen Hopkin



December 24, 2008

Brain Activity Altered during Religious Experience

A study in *Zygon: Journal of Religion & Science* finds that religious experience is associated with decreased activity in the brain's right parietal lobe. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

In America there's a feeling of Christmas. But that's not the only winter holiday going on. Jews are lighting Hanukkah candles, Muslims recently feasted on Eid al-Adha, and pagans celebrated the solstice. So it's a good time for researchers to consider spirituality—from a scientific point of view.

One experience central to major religions around the world is that of transcendence, the idea of almost losing a sense of self to the feeling that there's something bigger out there. Now scientists at the University of Missouri say they've located that experience in our brains. All the people studied, from Buddhist monks in meditation to Franciscan nuns in prayer, experience this transcendence. And they all have decreased activity in the right parietal lobe of the brain. That area has to do with senses such as orienting yourself in the space around you. The study was published in *Zygon: Journal of Religion & Science*.

Interestingly, people with injuries to the right parietal lobe report increased levels of spiritual experiences. The researchers are quick to say that this connection doesn't minimize the role of religion, and that religious or spiritual experiences might decrease activity in that region and thus increase that special feeling of transcendence. Just in time for the holidays.

—Cynthia Graber



December 26, 2008

Fasting May Equal Calorie-Restricted Diets

A study in the journal *Nature* finds that worms that fasted every third day got the same anti-aging benefits offered by severe calorie-restricted diets. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Sometimes it's not what you eat, but when you eat it. At least when it comes to longevity diets. For some time, scientists have known that animals kept on a strict diet live longer than their well-fed peers. But this Methuselah meal plan is no ordinary just-say-no-to-that-second-slice-of-pie kind of diet. To reap the life-extending benefits, some of these animals cut their calorie consumption in half. Such a diet might be do-able for captive mice and monkeys, but it would be a tough sell for people.

Then, five years ago, studies in mice suggested that intermittent fasting would work just as well. These mice abstained from eating every other day, and lived longer than their gluttonous comrades—without really skimping on the total calories they consumed.

Now, scientists at Kyoto University have found the same thing in worms that fasted every third day. And they found a gene that regulates the effect, results reported in the journal *Nature*. Like the mice, these fasting worms did not cut their total calorie intake. But they boosted their lifespan by 50 percent, and showed fewer signs of physical decline than their peers. So go ahead, enjoy that extra slice of pie. Because tomorrow's another day. To not eat.

—Karen Hopkin



December 29, 2008

Men's Chess Superiority Explained

A study published by the Royal Society finds that men's superiority over women at chess at the top levels can be explained by population size. Since many more men play, there's a wider range of abilities, meaning more individuals at the very top. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Women are so much better than men at so many things. But according to a report published by the Royal Society, chess is not one of them. The topic of sex differences when it comes to matters of the mind is, needless to say, a divisive one. Those who wish to argue that women are just not as smart as men often point to chess as their proof. Although girls can obviously play, no woman's ever been world champion. But before looking for cultural or biological explanations for the disparity, scientists say you need to do the math.

Serious chess players are assigned ratings based on their performance against other players. So the scientists compared the ratings of the top hundred male and top hundred female players from Germany. And they found that the men indeed outperformed the women. However that difference can be almost entirely explained by statistics. Because the larger the population, the wider the range of measured scores—the bell curve has a longer tail. And because many more men play than women, the best male players are extreme outliers on that bell curve. As more women play, a few should also reach those extremes, right out there with the men. To which one might be tempted to say: Checkmate.

—Karen Hopkin



December 30, 2008

Brain Smarter Than We Are

A study published in the journal *Neuron* finds that the subconscious brain is excellent at making decisions based on data. Whether we take advantage of that good decision, however, is another matter. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

We humans don't always make the best choices. But now a study in the journal *Neuron* demonstrates that maybe our brains do make the best possible decisions—but only if it's done unconsciously. Alex Pouget at the University of Rochester takes a look at unconscious information gathering. He says a lot of our good decisions—like stopping at a red light—are unconscious ones.

Subjects stared at dots moving around in random patterns on a screen. A controlled number were heading towards either the right or left of the screen. The subjects were asked if the dots were moving left or right. The longer subjects stared at the screen, the more sure they became of the answer.

Pouget analyzed the subjects' neuronal patterns. If a few dots in the group moved to the right, a part of the brain that recognizes right-direction movement lit up. As time went on, it'd light up more and more frequently until the subjects gave a definitive answer. According to Pouget, the subjects were subconsciously gathering information until they finally felt sure of the answer. So the brain usually gets it right. Too bad we still seem to run so many red lights.

—Cynthia Graber