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May - October 2010

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Los Angeles Times

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New way to 'talk' for severely disabled

THOMAS H. MAUGH II

The severely disabled, including those "locked in" to their bodies as a result of accidents or disease, may soon have a new way to communicate and move around, Israeli scientists said Monday.

By sniffing, more than a dozen quadriplegics were able to control computers that allowed them to write and to guide a wheelchair, the team reported in the Proceedings of the National Academy of Sciences.

The technology relies on the fact that quadriplegics and others retain control of their soft palates, which regulate breathing through the nose. Even people who are not able to breathe on their own can control the new device by blocking and releasing the flow of air forced through their noses by a pump.

The technology "may provide a host of viable solutions for the growing population of individuals who are severely disabled," the team wrote.

The device "is pretty ingenious in giving people who can't control their environment another way to do that," said Dr. Adam Stein, chairman of physical medicine and rehabilitation at North Shore-Long Island Jewish Health System in Great Neck, N.Y.

It would be particularly valuable for people who have locked-in syndrome, in which they can do little more than flutter an eyelid, he said. For many other patients, however, alternatives exist, including controlling devices through a breathing tube or with the tongue.

The mechanism is relatively simple. Small tubes in the nose monitor sniffs and exhalations, enabling the user to control a computer. To control a wheelchair, for example, two short sniffs signal a forward move, and two short exhalations signal backward. An exhale followed by a sniff signals left, and a sniff followed by an exhale signals right. Similar protocols can move a cursor on a computer screen for writing.

Neurobiologist Noam Sobel of the Weizmann Institute of Science in Tel Aviv and his colleagues initially studied the device in 96 healthy people, demonstrating that they could control the movement of a cursor with it as easily as they could with a joystick or mouse. About 1 in 4 could not work the device properly, however.

The researchers then tested the device with a 51-year-old woman who had suffered a stroke seven months earlier; she could not move her limbs and was unable to control her blinking, the most common means of communication in such patients.

After training her to control her breaths, they presented her with a writing device that she began using immediately, "initially answering questions, and after a few days [she] generated her first post-stroke meaningful self-initiated communication that entailed a profound personal message to her family."

They next tested the device with a 42-year-old man who had been locked in for 18 years after a car accident. He had attempted to use an eye-tracker to communicate, but stopped because he "did not like it." The new device, he said, was "more comfortable and more easy to use."

The device did not work on the third patient, however, a 64-year-old man who had suffered a stroke four years earlier. The man was severely depressed, and the researchers could not determine "whether this failure reflected a genuine inability or rather disinterest."

The team installed the device on a wheelchair and demonstrated, first with healthy people, then with disabled, that it could be used to navigate a 150-foot obstacle course including sharp turns.

Overall, the device has now been tested successfully in 15 severely disabled patients. The Weizmann Institute has filed for a patent on the technology used in the device and hopes to find a marketing partner.

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THE JERUSALEM POST
FRONT 22/06/2010
12033 - בית ויצמן - עקרון

Prof. Ruth Arnon is named first woman to lead Israel Academy of Sciences

Prof. Binyamin Ze'ev Kedar appointed to serve as academy's vice president

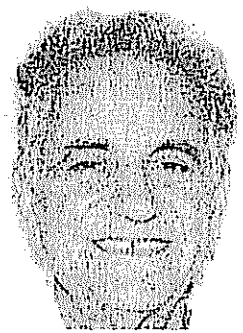
• By JUDY SIEGEL

World-renowned immunologist Prof. Ruth Arnon of the Weizmann Institute has been named the new – and first woman – president of the Israel Academy of Sciences and the Humanities, since 1961 the government's official adviser on science and planning of civilian research. She replaces Prof. Menahem Ya'ari, who held the position for two three-year terms.

The academy also announced on Monday that Arnon's vice president will be Prof. Binyamin Ze'ev Kedar. Both were elected at a general assembly of 100 academy members, and they will take office around Rosh Hashana. The social sciences and humanities are represented in the academy along with the exact sciences.

Arnon, whom *The Jerusalem Post* chose a few weeks ago as one of the "50 most influential Jews in the world," is the co-developer of the Teva drug Copaxone for reducing the frequency and severity of multiple sclerosis attacks. This was the first original Israeli drug, and it is now taken by many MS patients around the world.

PROF. RUTH ARNON



PROF. BINYAMIN ZE'EV KEDAR

She is also a member of the European Molecular Biology Organization and was president of the European Federation of Immunological Societies, as well as the recipient of numerous prestigious awards, including the Robert Koch Prize, Israel Prize, Rothschild Prize, Hadassah Women's Zionist Organization of American's Women of Achievement Prize and honorary doctorates.

Prof. Kedar is a Hebrew University historian and an expert in the Crusader period. He is chairman of the council of the Israel Antiquities Authority, a member of the Medieval Academy of America and founding editor of the journal *Crusades*.

nature

TURNING POINT

Jacob Hanna

In April 2011, Jacob Hanna, currently a Genzyme postdoctoral fellow at the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts, will start his own lab at the Weizmann Institute of Science in Rehovot, Israel. As one of the few Palestinian researchers at the Weizmann, he is eager to build scientific bridges in the region.

Why did you choose to return to Israel to start your independent lab?
There were two major factors. The Weizmann is a great multidisciplinary centre that offers strong financial and organizational support. And on a personal level, as a Palestinian who grew up in Israel, it is meaningful to do science there.

Do you plan to encourage more scientific exchange between regions?
I am a scientist, and research is my priority. But building a diverse group of students and collaborators at the Weizmann is one way to have a positive impact. Palestinians are underrepresented in academia, in part because there is little academic infrastructure in the area outside Israel, and if I can encourage Israeli and Palestinian scientists to join my lab and work in an integrative environment, I will be happy.

You have focused on stem-cell research projects with a high risk of failure. Why?
The Whitehead has a risk-taking culture. My mentor, Rudolf Jaenisch, encourages us to take on high-risk ideas and not to be constrained by technical limitations. That support taught me to work hard and be adventurous. He also tells us not to lower standards by overlooking complexity. In this field, there is a tendency to rely on concepts that are not yet well defined. I'm realizing how important it is to do quantitative experiments to get conclusive answers.

Is media attention affecting stem-cell research?
It is a double-edged sword. I'm happy that the importance of stem cells has been recognized. But I'm concerned that media attention may be directing the science by encouraging scientists to publish too early. I worry that this rush lowers standards.

What was your best career decision?
I did an MD–PhD at the Hebrew University of Jerusalem. Towards the end of my studies, I realized that I enjoyed medicine and research, but would be better at research. So I focused on that instead of doing a residency. I'm glad I have my medical degree. It gives me a different view of research. For example, as a physician, I'm interested in type I autoimmune diabetes and genetic susceptibilities. With stem cells, we can ask questions about how to humanize mouse models of this disease to understand its genesis.

Any missed opportunities you regret?
No. In fact, I'm glad I passed on an early opportunity to start my own lab after one year of my postdoc. I was fortunate that my research went well in that first year, but I realized I would be rushing. I know it is time now, because I have a much better grasp of the important questions and I feel confident that I have gained enough experience and maturity to handle any scientific situation.

What questions will you ask at the Weizmann?
I want to understand the continuum of reprogramming cells to pluripotency. But I also want to develop a new avenue of research — disease-specific stem-cell research. I want to use technology to ask basic immunology questions and develop human models. My first challenge will be to forge collaborations throughout Israel, to lay the foundation for my future research.

What inspires your work?
Mostly it is the work of others. When I read somebody else's great paper, even in another field, I want to do something similar — come up with a new idea that will make a contribution. What drives me is good scientific work.

What is your career philosophy?
Work hard and never admire your own science. It can always be better. ■

INTERVIEW BY VIRGINIA GEWIN

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Technology

The Power of Sniff

A new device lets the disabled move and communicate with their noses

The key to restoring movement and communication for the severely disabled may lie on the roofs of our mouths. Researchers have invented a device that allows the paralyzed to write, surf the Web and steer an electric wheelchair—all by sniffing. Initial tests, described recently in *Proceedings of the National Academy of Sciences USA*, suggest that patients with severe paralysis may soon have a new way of doing everyday tasks.

Sniffing is controlled in part by cranial nerves in the soft palate, the tissue lining the back of the roof of the mouth. Because these nerves emerge directly from the brain, as opposed to the spinal cord, they remain intact for many severely paralyzed people. They also control the ability to blink, sip and puff.

The sniff controller, which was developed by Anton Plotkin and his colleagues at the Weizmann Institute of Science in Rehovot, Israel, uses a small plastic tube that fits into the nose. It measures pressure, translating variations in intensity and frequency of sniffing in and out into commands for a computer or wheelchair.

The nose knows: Plotkin and his sniff controller, which operates laptops and wheelchairs.

In the study, the researchers tested the controller on 15 disabled patients; 13 used the technology to write messages or surf the Web and one to maneuver his wheelchair. (The 15th volunteer made no progress.) Further testing is required, but Plotkin is optimistic: "We figured out that sniffing can control just about anything." —*Ferris Jabr*

THE JERUSALEM POST INT 23/04/2010

Scientists identify 'smoking gun' of stress-related diseases

Changes in the activity of a single gene in the brain can lead to metabolic changes that cause mice to develop symptoms associated with type 2 diabetes, as well as trigger anxious behavior.

These findings, discovered by Weizmann Institute of Science researchers, were published online this week in the *Proceedings of the National Academy of Sciences*.

The constant stress many are exposed to in our modern society may thus be taking a heavy toll: Anxiety disorders and depression, as well as metabolic disorders such as obesity, type 2 diabetes and arteriosclerosis, have all been linked to stress.

These problems are reaching epidemic proportions. Type 2 diabetes alone is expected to affect some 360 million people around the world in 20 years.

The connection between stress, changes in appetite and anxiety-related behavior was recently proven scientifically, but the exact reasons for this were not clear until Dr. Alon Chen of the Rehovot institute's neurobiology department and colleagues made their gene discovery.

They found that all the body's systems are involved in the stress response, which evolved to deal with threats and danger. Behavioral changes tied to stress include heightened anxiety and concentration, while other changes in the body include heat-generation, changes in the metabolism of various substances and even changes in food preferences.

The Weizmann team suspected that a protein known as Urocortin-3 (Ucn3) was involved in tying all of these together. Produced in certain brain cells – especially in times of stress – it is known to play a role in regulating the body's stress response.

These nerve cells have extensions that act as "highways" to speed Ucn3 on to two other sites in the brain: One, in the hypothalamus – the brain's center for hormonal regulation of basic bodily functions – oversees, among other things, substance exchange and feelings of hunger and satiety; the other is involved in regulating behavior, including anxiety levels.

Nerve cells in both these areas have special receptors for Ucn3 on their surfaces, and the protein binds to these receptors to initiate the stress response.

The researchers developed a new, finely tuned method for influencing the activity of a single gene in one area in the brain, using it to increase the amounts of Ucn3 produced in just that location.

They found that heightened levels of the protein produced two different effects: The mice's anxiety-related behavior increased, and their bodies also underwent metabolic changes. With excess Ucn3, their bodies burned more sugar and fewer fatty acids, and their metabolic rate sped up.

These mice began to show signs of the first stages of type 2 diabetes: A drop in muscle sensitivity to insulin delayed sugar uptake by the cells, resulting in raised sugar levels in the blood. The pancreas then produced extra insulin to make up for the perceived "deficit."

"We showed that the actions of a single gene in just one part of the brain can have profound effects on the metabolism of the whole body," says Chen.

This mechanism, which appears to be a "smoking gun" tying stress levels to metabolic disease, might, in the future, point the way toward the treatment or prevention of a number of stress-related diseases.

– Judy Siegel

THE JERUSALEM POST - FRONT 28/07/2010

Weizmann invention allows quadriplegics to communicate, maneuver with their breath

• By JUDY SIEGEL

Quadriplegics like England's Prof. Stephen Hawking who have difficulty even pressing buttons or moving a joystick will be able to navigate their wheelchairs and communicate with others more easily by inhaling or exhaling through the nose at a sniffing device invented at the Weizmann Institute of Science.

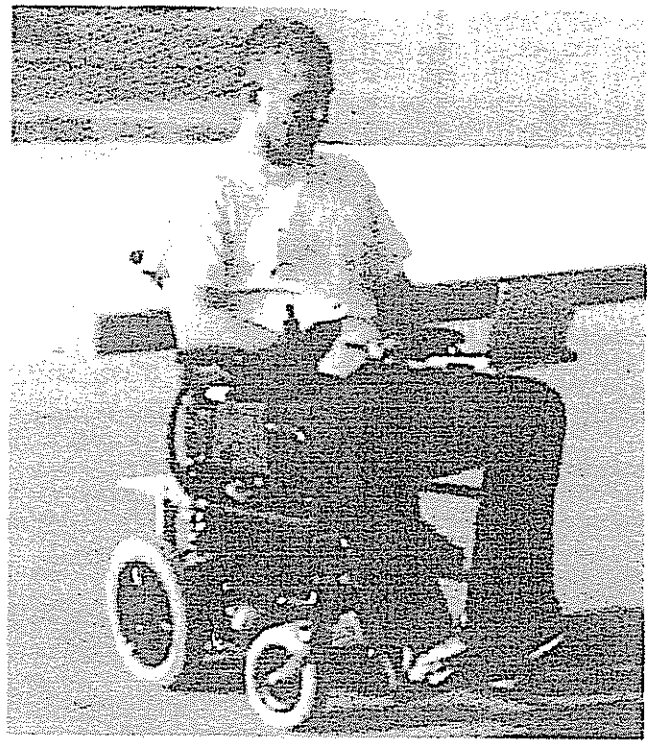
Prof. Noam Sobel, electronics engineers Dr. Anton Plotkin and Aharon Weissbrod, and research student Lee Sela developed the technology in the Rehovot institute's neurobiology department, which announced the achievement on Tuesday.

The unique device could replace the more tedious technology of blinking one's eyelids to choose letters and piece together words, use a computer or steer an electric wheelchair.

Sniffing technology, said the developers, might even be used in the future to create a sort of "third hand," to assist healthy surgeons or pilots.

The new system identifies changes in air pressure inside the nostrils and translates these into electrical signals. After the device was tested on both healthy volunteers and quadriplegics, the results showed that the method is easily mastered. Users were able to navigate a wheelchair around a complex path or play a computer game with nearly the speed and accuracy of a mouse or joystick.

"The most stirring tests were those we did with locked-in syndrome patients," said Sobel. "These are people with unimpaired cognitive function who are completely paralyzed – 'locked into' – their bodies. With the new system, they were able to communicate with family members,and even initiate



A VOLUNTEER in a wheelchair is seen attached to a nasal tube as he tries out the new breath-controlled device. (Weizmann Institute)

side world. Some wrote poignant messages to their loved ones, sharing with them – for the first time in a very long time – their thoughts and feelings."

Four of those who participated in the experiments are already using the new writing system, and the Weizmann Institute's technology transfer arm, Yeda Research and Development Company, Ltd., is investigating the possibilities for developing and distributing the technology.

Sniffing is a precise motor skill that is controlled, in part, by the soft palate – the flexible divider that moves to direct air in or out through the mouth or nose. The soft palate is controlled by several nerves that connect to it directly through

Sobel and his scientific team to theorize that the ability to sniff – that is, to control soft palate movement – might be preserved even in the most acute cases of paralysis.

Functional magnetic resonance imaging (fMRI) provided evidence behind the idea, showing that a number of brain areas contribute to soft-palate control. This imaging revealed a significant overlap between soft palate control and the language areas of the brain, hinting to the scientists that the use of sniffing to communicate might be learned intuitively.

To test their theory, the researchers created a device with a sensor that fits on the nostril's opening and measures changes in air pressure. For

developed a different version of the device, which diverts airflow to the patient's nostrils. About three-quarters of the subjects on respirators were able to control their soft-palate movement to operate the device.

Initial tests, carried out with healthy volunteers, demonstrated that the device compared favorably with a mouse or joystick for playing computer games. In the next stage, carried out in collaboration with Prof. Nachum Soroker of Loewenstein Hospital Rehabilitation Center in Ra'anana, quadriplegics and locked-in patients tested the device.

One patient who had been locked in for seven months following a stroke learned to use the device over a period of several days, writing her first message to her family. Another, who had been locked in since a traffic accident 18 years earlier, wrote that the new device was much easier to use than one based on blinking. Another 10 quadriplegics succeeded in operating a computer and writing messages via sniffing.

The device can also function as a sort of steering mechanism for wheelchairs: Two successive sniffs in tell it to go forward, two out mean reverse, out and then in turn it left, and in and out turn it right. After 15 minutes of practice, a subject who is paralyzed from the neck down managed to navigate a wheelchair through a complex route – sharp turns and all.

Sniffs can be in or out, strong or shallow, long or short; and this gives the device's developers the opportunity to create a complex "language" with multiple signals. The new system is relatively inexpensive to produce, Sobel suggests, and simple and quick to learn to operate in comparison with other brain-

THE JERUSALEM POST - FRONT 15/08/2010

Brave brains: Neural mechanisms of courage

The Cowardly Lion in *The Wizard of Oz* made the long trek to the Emerald City to get courage. Now a fascinating new study combines snakes with brain imaging to uncover neural mechanisms associated with that trait. The research, recently published in *Neuron*, provides insight into what happens when an individual voluntarily performs an action opposite to that promoted by fear. and may even lead to new treatment strategies for those who exhibit a failure to overcome fear.

Although there is a substantial body of research examining brain mechanisms associated with fear, far less is known about those associated with courage, defined here as action in the face of fear. "By gauging properly defined actions of either overcoming fear or succumbing to it in an acute controllable fearful situation, one can render certain neural substrates of courage amenable to investigation," explains senior study author, Dr. Yadin Dudai from the Weizmann Institute of Science in Rehovot.

To study the neural mechanisms associated with moments of real-life courage, Dudai, Uri Nilli and their colleagues devised an experimental paradigm in which participants had to choose whether to advance an object closer or farther away from them while their brain was scanned with functional magnetic resonance imaging (fMRI). The objects used in the study were either a toy bear or a live corn snake.

Before the study, participants were categorized as "fearful" or "fearless" depending on how they responded to a validated snake-fear questionnaire.

As might be expected, the researchers observed that both high subjective fear and high somatic arousal were associated with succumbing to fear and moving the snake farther away. However, somewhat surprisingly, bringing the snake closer was associated with either high somatic arousal (assessed by skin conductance response) accompanied by low subjective fear (assessed by fear self-ratings) or high subjective fear accompanied by low somatic arousal. Brain imaging during the task revealed that activity in a brain region called the subgenual anterior cingulate cortex (sgACC) correlated positively with the level of subjective fear when choosing to act courageously but not when choosing to succumb to fear. Further, activity in a series of temporal lobe structures was decreased when the level of fear increased and the individual chose to overcome their fear.

"Our results propose an account for brain processes and mechanisms supporting an intriguing aspect of human behavior, the ability to carry out a voluntary action opposite to that promoted by ongoing fear," concludes Dudai. "Specifically, our findings delineate the importance of maintaining high sgACC activity in successful efforts to overcome ongoing fear and point to the possibility of manipulating sgACC activity in therapeutic intervention in disorders involving a failure to overcome fear."

HEALTH SCAN

• By JUDY SIEGEL-ITZKOVICH

THE JERUSALEM POST - FRONT 24/05/2010

Weizmann's supernova find may shed light on some universal mysteries

• By JUDY SIEGEL

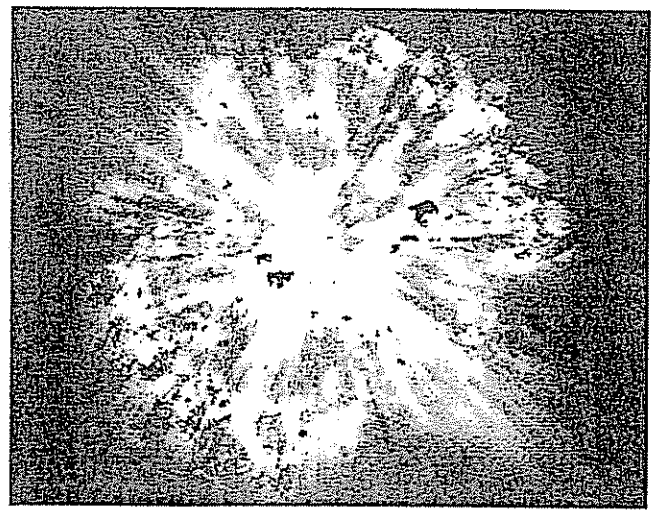
Until now, scientists have been able to identify only two basic types of exploding stars known as supernovae. Now Weizmann Institute of Science astrophysicists and colleagues abroad have observed a third.

It is believed that the discovery of this new type could shed light on some universal mysteries in the heavens and even the human body.

The findings were reported last week in a four-page-long "letter" published in the journal *Nature*, with a commentary by a University of Oklahoma astronomer in the same issue.

The supernova types that have long been known are hot, young giants that go out in a violent display as they collapse under their own weight, and old, dense white dwarves that blow up in a thermonuclear explosion.

However, the new type that began to appear in telescope images five years ago and about which data has been collected, measured and assessed for the supernovae's chemical makeup and type of material they threw off in the explosion is different. Dr. Avishay Gal-Yam, Hagai Perets, (now at the Harvard-Smithsonian Center for Astrophysics), Iair Arcavi and Michael Kiewe of the Rehovot institute's physics faculty found quickly that the new type did not belong to either of the known patterns. Seeing that it had recently begun the process of exploding, the Israelis obtained the help of by Paolo Mazzali of the Max-Planck Institute for Astrophysics in Germany and the Scuola Normale Superiore at the INAF/Padova Observatory Pisa, Italy; Prof. David Arnett from the University of Arizona; and researchers from across the USA, Canada, Chile and the UK, who began to collect and combine data at different telescope sites around the world. They team found that the new supernova did not fit either of the known patterns.



A PAIR of white dwarves were involved in creating the new type of supernova.

The amount of material hurled out from the supernova was too small for it to have come from an exploding giant. Its location – distant from the busy hubs where new stars form – implied it was an older star that had had time to wander off from its original location. Yet the supernova's chemical composition didn't match that commonly seen in the second type. "It was clear," said the paper's lead author Perets, "that we were seeing a new type of supernova." The scientists turned to computer simulations to see what kind of process could have produced such a result.

The common type of exploding white dwarf (a type Ia supernova) is mainly made up of carbon and oxygen, and the chemical composition of the ejected material reflects this. The newly discovered supernova had unusually high levels of the elements calcium and titanium; these are the products of a nuclear reaction involving helium, rather than carbon and oxygen.

"We've never before seen a spectrum like this one," said Mazzali. "It was clear that the unique chemical composition of this explosion held an important key to understanding it."

The simulations suggested that a pair of white dwarves were involved; one of them stealing helium from the other. When the thief star's helium load rises past a certain point, the explosion occurs. "The donor star is probably completely destroyed in the process, but we're not quite sure about the fate of the thief star," said Gal-Yam.

The scientists believe that several other previously observed supernovae may fit this pattern. In fact, these relatively dim explosions might not be all that rare; if so, their occurrence could explain some puzzling phenomena in the universe. For example, almost all the elements heavier than hydrogen and helium have been created in and dispersed by supernovae; the new type could help explain the prevalence of calcium in both the universe and in our bodies. It might also account for observed concentrations of particles called positrons – identical to electrons, but with an opposite charge – in the center of our galaxy. Some scientists have hypothesized that the decay of yet unseen "dark matter" particles may be responsible for the positrons' presence.

But one of the products of the new supernova is a radioactive form of titanium that, as it decays, emits positrons. "Dark matter may or may not exist," said Gal-Yam, "but these positrons are perhaps just as easily accounted for by the third type of supernova."

THE JERUSALEM POST - FRONT 16/05/2010

NEW WORLDS

• By JUDY SIEGEL-ITZKOVICH

EXOTIC TOMATOES

Far Eastern diners are partial to a variety of sweet, pink-skinned tomato. Dr. Asaph Aharoni of the Weizmann Institute of Science's plant sciences department recently revealed the gene responsible for producing these pink tomatoes. Aharoni's research focuses on plants' thin, protective outer layers, called cuticles, which are mainly composed of fatty, wax-like substances. In the familiar red tomato, this layer also contains large amounts of antioxidants called flavonoids that are the tomatoes' first line of defense. Some of these flavonoids also give the tomato cuticles a bright yellow cast – the color component that is missing in the translucent pink skins of the mutants.

Using a lab system that's unique in Israel – and one of only a few in the world – Aharoni and his team are able to rapidly identify hundreds of active plant substances called metabolites. A multidisciplinary approach developed over the past decade, known as metabolomics, enables them to create a comprehensive profile of all these substances in mutant plants.

The research, carried out in Aharoni's lab by Dr. Avital Adato, Dr. Ilana Rogachev and research student Tali Mendel, showed that the differences between pink and red tomatoes go much deeper than skin color: The scientists identified about 400 genes whose activity levels are quite a bit higher or lower in the mutants. The largest changes, appearing in both the plant cuticle and the fruit covering, were in the production of substances in the flavonoid family. The pink tomato also has less lycopene, a red pigment known to be a strong antioxidant associated with reduced risk of cancer, heart disease and diabetes. In addition, alterations in the fatty composition of the pink tomato's outer layer caused its cuticle to be both thinner and less flexible that a regular tomato skin.

The researchers found that all these changes can be traced to a mutation on a single gene known as SlMYB12. This gene acts as a "master switch" that regulates the activities of a whole network of other genes, controlling the amounts of yellow pigments as well as a host of other substances in the tomato. Aharoni: "Since identifying the gene, we found we could use it as a marker to predict the color of the fruit even before the plant has flowered. This ability could accelerate efforts to develop new, exotic tomato varieties."

HAARETZ - FRONT | 13/10/2010

BiondVax universal flu shot starts next test stage

By Lior Zeno

BiondVax Pharmaceuticals has begun Phase IIa testing of its universal influenza vaccination, it said this week.

The company is conducting the tests on human volunteers. It hopes the vaccine will be proven to provide multi-year protection against existing and future strains of flu virus. Influenza has a habit of mutating rapidly, hence the drive to find a universal preventative.

The company said it expects to release the results of the tests by the middle of 2011.

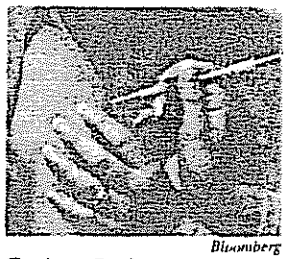
The study, being conducted on 200 healthy male and female subjects aged 18-49, will evaluate the safety of the vaccine, as well as its effectiveness in inducing immune responses to various strains of flu, both seasonal and pandemic.

The trials are being led by Yoseph Caraco, director of the Hadassah Clinical Research Center, and Jacob Atsmon, director of the Clinical Research Center at the Tel Aviv Sourasky Medical Center.

BiondVax performs research and development on a universal vaccine against most flu strains, including avian and swine flu. The vaccine is based on research conducted by Ruth Arnon of the Weizmann Institute of Science.

The current study, Phase IIa of the clinical trials, follows success in the two previous Phase I/II trials. In April the company announced the successful completion of the second Phase I/II testing on 60 people aged 55-75, and said it found the vaccine to be safe at all levels of dosage tested.

Last December Biondvax completed its first tests, showing safe and positive results, on 63 subjects aged 18-49.



Bloomberg

Getting a flu shot.

BIBLICAL ARCHAEOLOGY REVIEW

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$4 Million for "Reconstructing Ancient Israel"

With a grant of more than $4 million, the project described at the end of Israel Finkelstein's interview will be a unique scientific effort to reconstruct the history of ancient Israel. Never before has a project of this complexity been undertaken with such substantial funding and such an array of scientific researchers.

The grant proposal notes that we have "very few real-time historical records" relating to the history of ancient Israel. Moreover, the proposal notes, "the biblical testimony [was] written a long time after the events described (if not mythical) took place." The proposal also recognizes "the strong theological agenda of both the original authors [of the Biblical text] and many modern scholars."

While Biblical archaeology has "provided critical evidence for the material culture of Ancient Israel ... until recently it has been dominated by a conservative interpretation of the biblical text and was not given a true independent role in constructing Ancient Israel's history," the grant proposal explains.

In contrast, "The exact and life sciences are not restricted by these preconceptions ... Archaeological science," the proposal asserts, "is the wave of the future."

The 15-page, single-spaced grant proposal describes this enormously complex project using scientific methodologies that most of us have never heard of, like morphometry, palynology and the examination of polished thin sections illuminated with polarizers. The project will apply "algorithms from the domain of artificial intelligence to the study of epigraphy." The project will study food deposits left in pottery, using "gas chromatography with either flame ionization or mass spectrometer detectors." The project will thus "deploy an arsenal of disciplines from the exact and life sciences."

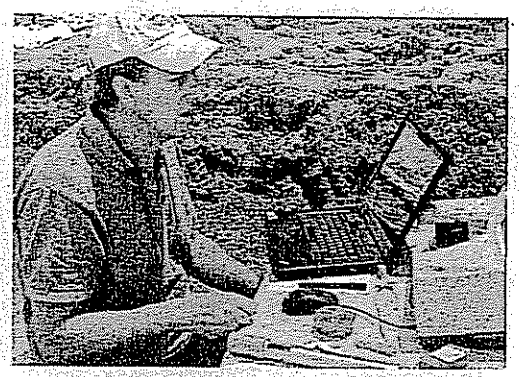
The researchers will "concentrate on the micro-archaeology of Ancient Israel diachronically and synchronically."

It is not clear from the proposal to what extent purely Biblical scholars will be part of the project. They are not mentioned. Presumably they will be consulted at various junctures. Certainly this will be required when the project explores "a possible connection between the Hebrew Bible and Homeric literature," one of the subjects to be studied.

Unlike so many past efforts, this project, we are told, aims to provide a "bias-free history of Ancient Israel" that is expected to "revolutionize the study of Ancient Israel."

This prodigious project of course represents a marvelous opportunity. It is not without its dangers, however. A major question is whether the plan is simply too complex to be accomplished. Four million dollars sounds like a lot of money until you begin to apply it to the vastness of this project as envisioned in the proposal.

I do have one recommendation—the inclusion of an experienced, high-level management consultant with sufficient authority who will strictly supervise budgets and time schedules of each subproject and review their interconnections. He must have constant access to the principal investigators (Israel Finkelstein and Stephen Weiner) and enjoy their confidence. Of one thing I am sure: Undreamt-of complexities and problems will tax the abilities of even the greatest scholars.—H.S.



STEPHEN WEINER, the Dr. Walter and Dr. Trude Borchardt Professorial Chair in Structural Biology at the Weizmann Institute of Science, will codirect with Israel Finkelstein a multifaceted $4-million research project titled "Reconstructing Ancient Israel, The Exact Life Science Perspective."

THE SCIENTIST

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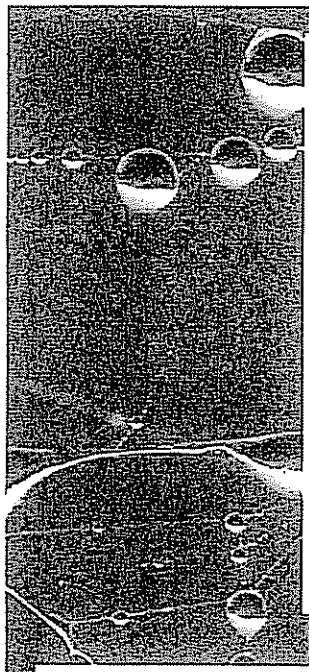
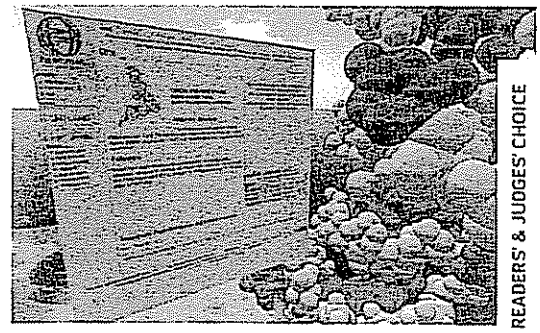


PROTEOPEDIA >

"Proteopedia," is a wiki resource that allows people to contribute to and edit the more than 68,000 pages containing information and three-dimensional structures of biomolecules. It was the creation of Joel Sussman, Jaime Prilusky, Eran Hodis, and colleagues at the Weizmann Institute of Science in Israel as well as two US institutions, who all thought "it would be wonderful if there were a way to make structures somehow understandable to a really wide community of scientists," Sussman says.



READERS' & JUDGES' CHOICE

Submitted by Jaime Prilusky, Eran Hodis, and Joel L. Sussman from The Weizmann Institute, as well as the Proteopedia User Community

HOLMES: **Very absorbing. Kept me looking and playing (and learning) with it for a long time.**

KIRBY: **Very informative and a good resource.**

JUDGES' BIOS

JEFFREY SEGALL is a professor of anatomy and structural biology at the Albert Einstein College of Medicine in New York, where he studies the proteins responsible for cell motility, chemotaxis, and metastasis in the hopes of isolating potential drug targets.

KIRSTEN "KIKI" SANFORD is a taekwondo-black-belt-wielding neurophysiologist with a passion for communicating science. She is a correspondent for the Science Channel, the host of the radio show *This Week in Science*, and author of the blog *The Bird's Brain*, among several other projects.

DAVID KIRBY is a lecturer in Science Communication Studies at the University of Manchester. He earned his PhD from the University of Maryland studying the population genetics of Drosophila and is currently finishing a book about science consultants in Hollywood.

NIGEL HOLMES is a legendary graphic designer and founder of Explanation Graphics, a graphic design firm in New York that boasts a high-profile clientele such as *The New Yorker*, *Sports Illustrated*, Apple, and MasterCard. He has a master's degree in illustration from the Royal College of Art in London.

This Week in Science. "I would not have been able to do what I do without the Internet," she says. And she is not alone.

"All of science is terribly dependent on the Web," says Joel Sussman, a structural biologist at the Weizmann Institute of Science in Israel. His most recent Web creation, Proteopedia, is a scientific wiki that allows virtually anyone to add or edit Web pages on the three-dimensional structures of biological molecules, as well as contribute information about their function and biological importance. Since the Web site's launch in 2008, it has amassed more than 68,000 different molecular structures contributed and edited by hundreds of people, from top-notch structural biologists to high school teachers and students. A team of judges selected by *The Scientist*, including Sanford, as well as thousands of online readers, have chosen Proteopedia as this year's Labby Award winner for Best Web site.

This Web resource harkens to the broader scientific revolution in the age of Web 2.0. "The world is now incredibly smaller," Sussman says. Research being carried out in remote places can quickly find its way to an incredibly diverse audience. Rapidly advancing Web-based technologies have made science a truly global effort, making it much easier for scientists to share their work with each other—and the rest of the world.

THE WONDER OF THE WEB

This year marks the 20th anniversary of the first successful demonstration of the World Wide Web—an idea conceived in 1989 at the international physics research facility, CERN, in Geneva, Switzerland. It was borne out of the pressing scientific need to share

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The Brain by Carl Zimmer

Smell is a powerful and evocative sense yet also a deeply enigmatic one. So scientists have invented an odor yardstick to figure out what goes on between your nose and your brain.

Our brains can learn to revalue the same odor for different conditions. The smell of bacon is alluring if you're hungry, but not after the fourth helping.

Your nose is a paradox. In some ways the human sense of smell is astonishingly precise. For example, natural gas companies add a smelly molecule called n-butyl mercaptan to natural gas, which is odorless by itself, so that people can sniff gas leaks. All it takes is one n-butyl mercaptan molecule for every 10 billion molecules of methane to do the trick. To put this precision in perspective, imagine you are standing in front of two Olympic-size swimming pools. One of them contains a grand total of three drops of n-butyl mercaptan, and the other has none. Your nose could tell the difference.

But don't get too smug, because in other ways your sense of smell is practically useless. To judge for yourself, find someone to help you run a simple experiment. Close your eyes while your partner raids your refrigerator and then holds different foods under your nose. Try to name each scent. If you're like most people, you'll bomb. In a number of studies, scientists have found that people tested on items in their own kitchens and garages give the wrong answer at least half the time. And as bad as we normally are at identifying smells, we can easily be fooled into doing worse. If orange food coloring is added to cherry-flavored soda, for example, people are more likely to say that it smells like oranges.

Noam Sobel of the Weizmann Institute of Science in Israel and his colleagues have been puzzling over this paradox for the past several years. What has been missing in the science of smell, they argue, is a meaningful way to measure it—an olfactory yardstick. Now they have built one.

That it has taken so long for someone to come up with a yardstick for smell is something of a scandal. Scientists who study vision, for example, know that light with a wavelength of 620 nanometers will appear a particular shade of orange. They know with perfect certainty that orange is closer in wavelength (and perceived color) to yellow than it is to green. And they have used such objective measures about light and vision to learn a great deal about the biology that allows us to see. Scientists who study smell have had no equivalently objective way to judge, for example, whether the smell of roses is closer to spearmint or vanilla.

Part of the reason for this lack of an odor yardstick may have been the common belief that the human sense of smell is crude. Dogs and other mammals have a better sense of smell than we do, but their prowess doesn't mean our noses are useless. In fact, as Sobel and his colleagues demonstrated in a 2007 experiment, humans can do a pretty good impression of a bloodhound.

Sobel and company went into an open field and set down 30 yards of twine scented with chocolate. Then they brought together 32 people and gave them a mission: Follow the trail using nothing but your nose. The scientists put blindfolds on their subjects so they could not see the twine. Earmuffs blocked out sounds. Elbow pads, knee pads, and work gloves shielded them from tactile clues. Only their noses could provide them with information.

The subjects got down on all fours about 10 feet from the start of the scent trail. Then they started to sniff.

Remarkably, most of the volunteers were able to find the twine. Even more remarkably, 21 of them were able to follow its scent from start to finish. Whenever they veered off course, they sniffed their way back. Not only did they track the scent impressively well, but they also improved with practice. The scientists arranged for some of the subjects to run the course for 45 minutes a day for three days; they cut their times and improved their accuracy.

When Sobel's human bloodhounds put their noses to the ground, they drew in a gaseous cocktail of many different kinds of molecules—from the dirt, the grass, and anything else riding along in the air. Those molecules then latched onto olfactory receptors located on nerve endings in their nostrils. Only certain molecules, one theory holds, have the right shape to latch onto certain receptors. A given receptor can snag a number of different odor molecules, and a given odor molecule can latch onto several different receptors. Each nerve in a person's nose builds all its receptors using just a single gene.

The olfactory neurons are the only ones in the central nervous system that are directly exposed to the air. When a receptor grabs a molecule, it causes an electric signal to travel the length of the neuron from the nasal lining to the smell-processing regions of the brain. There, the neuron converges with thousands of other neurons delivering their own signals. The brain does not just passively accept all these signals. If we learn how to tell two odors apart through one nostril, for example, we are able to tell them apart with the other nostril as well. The learning happens in the brain, not in the nose.

All this complex signal processing means that we can distinguish among thousands of different odor molecules. Sobel and his

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colleagues recently set out to pin down how that process works by determining the relationship between the structure of a molecule and the way it smells. The scientists began by building a database of 1,500 odor-producing molecules, cataloging 1,664 different traits—their size, the strength of the chemical bonds between their atoms, and so on.

Next, Sobel and his team looked for patterns in this dizzying cloud of data using a statistical technique known as principal component analysis, a method commonly employed to analyze large sets of data and tease out patterns. They searched for traits that consistently varied in lockstep with one another from molecule to molecule. A few key traits account for a lot of the variation in structure from one molecule to the next. For instance, the size of a molecule varies along with how tightly its atoms are packed.

Sobel used these patterns to give each molecule in his database a single, simple score, like notches on a yardstick.

This yardstick, Sobel soon determined, is not just a statistical abstraction. It has a deep connection to how we smell the world. The researchers selected molecules from different intervals along the yardstick and had people sniff them. The farther apart the molecules were on the yardstick, the easier it was for people to tell them apart by their odor.

Sobel also got a striking result when he asked people to report how pleasant or unpleasant they judged various smells to be. Molecules ranked at one end of the yardstick stank to high heaven. At the other end, they were delightfully fragrant. The yardstick did such a good job of measuring the quality of odors that the scientists could use it to predict just how pleasant (or unpleasant) people would rate a new molecule.

To see whether this yardstick is universal, neurobiologist Nathalie Mandairon and her colleagues at the University of Lyon in France decided in 2008 to test Sobel's odor-ranking system on mice. The researchers picked a set of odors and observed how long the animals sniffed them. The closer an odor was to the pleasant end of Sobel's yardstick, the longer the mice spent smelling it. Sobel's odor yardstick seems to have uncovered a fundamental truth about the nature of smell. When the noses of our distant ancestors evolved into sophisticated molecular detectors, he suggests, they started to process key traits to come up with a simple measurement—an internal yardstick. Our ancestors felt pleasure when they sensed smells that signified desirable things (a mother's teat, a ripe piece of fruit) and moved toward them. They felt disgust or fear at odors that signified danger (rotting corpses or a predator's feces) and moved away.

Our sense of smell is not a purely automatic system, however. An odor, Sobel argues, is more than the physical properties of a molecule; it is also the emotions these properties summon up. This is where learning comes in. We can learn to fear certain smells that signal danger, just as we learn to make associations with dangerous sights or sounds. At a deeper level, our brains can revalue the same smell for different conditions. The smell of bacon may be alluring if you are hungry, but after a fourth helping, the same smell can start to get sickening. Scientists can see this revaluing take place within the brain as emotion-regulating regions change their activity. As a result, we can use pleasure and disgust as a guide not just for finding the right kinds of food but also for eating the right amount. These links to emotion and learning also help explain why a single whiff can summon up powerful memories.

Using Sobel's yardstick, scientists may be able to start untangling the paradox of smell: why we are so good at distinguishing odors and so bad at naming them. Our brains appear to have evolved an elegant way to reduce the dizzying variety of molecules in our environment into a simple scale based on what matters most about scents—whether they smell good or bad. By giving different odor molecules a place on the yardstick, we can distinguish fine gradations among them. Although this method may be helpful and efficient, it doesn't give us much information that we can use in putting a name to different smells. Imagine that someone showed you pictures of different types of fruit and had you name each one. Now imagine that the pictures zoom in on a single patch of color on each piece of fruit. You might be easily able to tell the difference between two shades of red without being able to say which belonged to a strawberry and which to a raspberry.

This analogy, Sobel argues, actually understates the difficulty we have in naming smells. He draws a distinction between odor molecules and "odor objects." There is a visual object we call "banana" that encompasses our experience of seeing a banana. There is also an odor object version of "banana," a combination of the inherent pleasantness of the molecules released by the fruit (as measured by Sobel's yardstick) and our subjective mental state when we encounter them. Emotions are notoriously hard to put into words, and the emotions wrapped up in odors make the problem of identification even harder.

Supreme Court judge Potter Stewart famously wrote in 1964 that pornography was hard to define but that he knew it when he saw it. In the same way, we may not be able to put a name to an odor, but we sure know when something stinks. ◘

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Disabled control wheelchair by sniffing

THE severely disabled, including those "locked in" to their bodies as a result of accidents or disease, may soon have a new way to communicate and move around, Israeli scientists have announced.

By sniffing in and out, more than a dozen quadriplegics were able to control computers that allowed them to write and to guide a wheelchair, the team reported in the *Proceedings of the National Academy of Sciences* on Monday.

The technology relies on the fact that quadriplegics and others retain control of their soft palates, which regulate breathing through the nose. Even people who are not able to breathe on their own can control the device by blocking and releasing the flow of air forced through their noses by a pump.

The technology "may provide a host of viable solutions for the growing population of individuals who are severely disabled", the team wrote.

The device "is pretty ingenious in giving people who can't control their environment another way to do that", said Adam Stein, the chairman of physical medicine and rehabilitation at North Shore-Long Island Jewish Health System in New York.

It would be particularly valuable for people who have locked-in syndrome, in which they can do little more than flutter an eye, he said.

The mechanism is relatively simple. Small tubes inserted in the nose monitor sniffs and exhalations, allowing the user to control a computer. To control a wheelchair, two short sniffs signal "forward" while two short exhalations signal "back". Similar protocols move a cursor on a computer screen for writing.

Noam Sobel, a neurobiologist at the Weizmann Institute of Science in Tel Aviv, and his colleagues initially studied the device in 96 healthy people, demonstrating they could control the movement of a cursor with it as easily as they could with a joystick or mouse.

About one in four could not work the device properly. After training patients to control their breaths, they had more success.

The team then installed the device on a wheelchair and demonstrated, first with healthy people, then with disabled, that it could be used to navigate a 45-metre obstacle course with sharp turns and other impediments.

The device has now been tested successfully in 15 severely disabled patients.

Los Angeles Times

Quadriplegics and others retain control of their soft palates.

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Size: 198.59 sq.cms.
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Scientists use noses to help disabled

WASHINGTON

Severely disabled people may soon be able to use their noses to write, drive a wheelchair or surf the internet, thanks to a device developed by doctors in Israel.

The device harnesses sniffing, which involves the soft palate on the roof of the mouth.

The soft palate was controlled by cranial nerves which were always very well conserved after severe injury, Noam Sobel, a professor of neurobiology at the Weizmann Institute in Rehovot, said.

"That's why eye blinks can be used to communicate with severely injured people — because eye blinks are also controlled by cranial nerves," Professor Sobel, one of the lead authors of a study published on Monday, said.

Professor Sobel worked with other scientists from the Weizmann Institute and the Sackler faculty of medicine at Tel Aviv University to develop a way to convert sniffs into electrical signals. The team's findings were published in the Proceedings of the National Academy of Sciences of the United States.

Able-bodied individuals tested the device, which consists of a small canula like the tube used to deliver oxygen to patients in hospitals, but which is connected to a pressure sensor. They quickly learnt to play computer games and write sentences by sniffing.

Researchers then tested their device on quadriplegics and "locked-in" individuals — people who are paralysed but whose mental faculties remain intact.

One, a woman who was locked-in after a stroke seven months earlier, had to be retaught how to sniff. But within three weeks, she was able to use the sniff-controller to write.

She "started writing with this device at once, initially answering questions and after a few days generated her first post-stroke meaningful self-initiated communication that entailed a profound, personal message to her family", the study says.

A man who had been able to communicate only by blinking one eye was able to write his name by sniffing within 20 minutes of being fitted with the device.

And a quadriplegic woman with severe multiple sclerosis was able to write for the first time in 10 years. She also learnt how to move a cursor on a computer screen by sniffing and now uses the device to surf the internet and write emails, the study says.

Encouraged by their success, the researchers devised a code to allow an electric wheelchair to be driven by sniffs.

Ten healthy people easily mastered sniff-driving a wheelchair through a maze and a 30-year-old man who had been paralysed from the neck down for six years was as good a sniff-driver as the healthy participants by his second attempt, the study says.

Sniff-controlled technology is still in the developmental stage and the Weizmann Institute has applied for a patent on the device. Professor Sobel said it should cost no more than $US20 ($22) to mass-produce.

MX (Melbourne)
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Brief: WEIZMANN

Writing again is nothing to sniff at

Severely disabled people may soon be able to sniff to write, drive a wheelchair or surf the internet with a device developed and tested by doctors in Israel.

The gadget consists of a small cannula – like the tubes used to deliver oxygen to patients – which sits at the opening of the nostrils and is connected to a small pressure sensor.

The sensor converts the nasal pressure into electrical signals.

The device was created by Noam Sobel, a professor of neurobiology at the Weizmann Institute in Rehovot, and scientists at Tel Aviv University.

Able-bodied people quickly learned to play computer games and write sentences by sniffing.

Encouraged by the results, researchers tested the device on quadriplegics and people who are paralysed but whose mental faculties remain intact.

A woman who had been paralysed for seven months after a stroke was within three weeks using the sniff controller to write.

She "started writing with this device at once, initially answering questions and after a few days generated her first post-stroke meaningful self-initiated communication that entailed a profound, personal message to her family", the study said.

A man who had been paralysed for 18 years and could communicate only by blinking one eye was able to write his name by sniffing within 20 minutes of being fitted with the device.

A man, 30, paralysed from the neck down for six years was able to master sniff-driving a wheelchair through a maze.

The technology is still in the development stage and the Weizmann Institute has applied for a patent on the device.

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Disabled could write, surf web by sniffing

WASHINGTON: Severely disabled people may soon be able to use their noses to write, drive a wheelchair or surf the internet, thanks to a device developed and tested by doctors in Israel.

The device harnesses sniffing, which involves the soft palate, according to a study published yesterday in the *Proceedings of the National Academy of Sciences of the United States*. The soft palate is controlled by cranial nerves that are "always very well conserved following severe injury", said Noam Sobel, one of the lead authors and a professor of neurobiology at the Weizmann Institute in Rehovot, Israel. Professor Sobel and colleagues have developed a way to convert sniffs into electrical signals.

The device consists of a small cannula, like the tubes used in hospitals to deliver oxygen to patients, that sits at the opening of the nostrils and is connected to a small pressure sensor.

Able-bodied individuals who tested the device quickly learned to play computer games and write sentences by sniffing.

The researchers then tested their device on quadriplegics and "locked-in" individuals — people who are paralysed but whose mental faculties remain intact.

A woman who became locked in, following a stroke about seven months earlier, had to be retaught how to sniff. But within three weeks, she was using the sniff-controller to write.

She "started writing with this device at once, initially answering questions and after a few days generated her first post-stroke meaningful self-initiated communication that entailed a profound, personal message to her family", the study says.

"We had one patient who couldn't blink at all and she sends us emails now by sniffing. That's pretty moving," Professor Sobel said.

AFP

The Toronto Sun (Toronto, ON)

Date 27.07.2010 Circ. 195683

Sniff device would help disabled communicate

WASHINGTON — A device that detects the subtle movements needed to sniff air through the nose or mouth can steer a wheelchair or allow completely paralyzed people to type messages, Israeli researchers reported Monday.

One patient wrote letters to her family for the first time since she had a stroke, while others used the device to surf the Internet or steer a wheelchair.

While no replacement for a true brain implant that would allow users to control devices with thoughts alone, the "sniff controller" works better for many patients than eyeblinks or other methods of communicating, the researchers reported in the *Proceedings of the National Academy of Sciences*.

"Indeed, sniffing allowed completely paralyzed, locked-in participants to write text and quadriplegic participants to write text and drive an electric wheelchair," they wrote.

"The most stirring tests were those we did with locked-in syndrome patients. These are people with unimpaired cognitive function who are completely paralyzed — 'locked into' their bodies," Noam Sobel of The Weizmann Institute of Science in Rehovot, Israel, said.

This syndrome can be caused by stroke, injuries or disease, such as amyotrophic lateral sclerosis, known as Lou Gehrig's disease.

"Some wrote poignant messages to their loved ones, sharing with them, for the first time in a very long time, their thoughts and feelings."

The device looks something like the nose tubes that deliver oxygen to patients.

— Reuters

BUSINESS DAILY
Wednesday, 28 July 2010, p. 29

Bottom Line

Researchers say sniff controller can steer wheelchair or help patients write letters

A device that detects the subtle movements needed to sniff air through the nose or mouth can steer a wheelchair or allow completely paralysed people to type messages, Israeli researchers reported on Monday.

One patient wrote letters to her family for the first time since she had a stroke, while others used the device to surf the Internet or steer a wheelchair.

While no replacement for a true brain implant that would allow users to control devices with thoughts alone, the "sniff controller" works better for many patients than eyeblinks or other methods of communicating, the researchers reported in the Proceedings of the National Academy of Sciences.

"Indeed, sniffing allowed completely paralysed locked-in participants to write text and quadriplegic participants to write text and drive an electric wheelchair," they wrote.

"The most stirring tests were those we did with locked-in syndrome patients. These are people with unimpaired cognitive function who are completely paralysed—'locked into' their bodies," Noam Sobel of The Weizmann Institute of Science in Rehovot, Israel, said in a statement.

This syndrome can be caused by stroke, injuries or disease such as amyotrophic lateral sclerosis, also known as ALS or Lou Gehrig's disease.

"Some wrote poignant messages to their loved ones, sharing with them, for the first time in a very long time, their thoughts and feelings."Sobel and colleagues developed the device after noticing that the soft palate, which controls how air is breathed in and out, has many nerves connecting to the brain. Some of this function must be preserved even after severe illness or injury, they reasoned.

The device, which looks something like the nose tubes that deliver oxygen to patients, measures nasal pressure and generates electrical signals.

Functional magnetic resonance imaging, which can show brain function in real time, showed many nerves were being used, including brain regions involved with language.They tested their "sniff controller" in 36 healthy volunteers, who used it instead of a computer mouse or joystick to play computer games, with equal accuracy and speed.

Then they approached a woman who had been completely "locked in" since a stroke seven months before.

The 51-year-old woman could not control her eyeblinks to communicate, yet "started writing with this device at once, initially answering questions, and after a few days generated her first poststroke meaningful self-initiated communication that entailed a profound personal message to her family," the researchers wrote.

A 63-year-old quadriplegic woman wrote her first letter in 10 years and uses the device to send e-mail and surf the Internet, they said, and a 30-year-old man paralysed from the neck down used it to guide a wheelchair.

"A quadriplegic person could use the sniff controller to drive an electric wheelchair with high precision following a total of only 15 minutes of practice," Sobel's team wrote.

-Reuters

STAR
Monday, 10 May 2010, p. 8

Piling on fat? Blame 'comfort eating gene'

Relaxing holds key to losing weight

FIONA MACRAE
London

FORGET that punishing exercise regime or elaborate diet. The key to losing weight could be as simple as putting your feet up and relaxing.

Scientists have found a gene that makes us crave sweet and fatty foods and pile on the kilos when under stress.

The "comfort eating gene" has also been linked to type 2 diabetes – the form of the disease that usually occurs in middle-age and is related to obesity.

It is hoped that studying the gene will lead to new diabetes drugs as well as weight loss pills.

But it seems that finding time to relax could also do us the power of good.

Researcher Dr Alón Chen, of the Weizmann Institute in Israel, set out to find out why so many people reach for the biscuit tin when under pressure at home or at work.

In studies on mice, he pinpointed a gene that pumps out a protein called Ucn3 at times of stress. Produced in the brain, the protein has profound effects throughout the body, affecting organs including the heart, muscles, liver and pancreas.

It increases appetite and affects how full we feel as well as the way the body uses insulin, a hormone crucial in the processing of sugar into energy.

Mice that were made to make more Ucn3 than usual began to show signs of diabetes, the journal Proceedings of the National Academy of Sciences reports.

Ucn3 also seems to trigger a taste for sugary and fatty foods – providing the body and brain with extra fuel when under extreme stress.

But when the system is constantly activated by everyday stresses and strains, we can become fat and ill.

Chen said: "Stress is good when you have to cope with an event, like when you meet a lion. Your metabolism is changing, you consume more sugars and more glucose goes to the muscles to help you escape the lion.

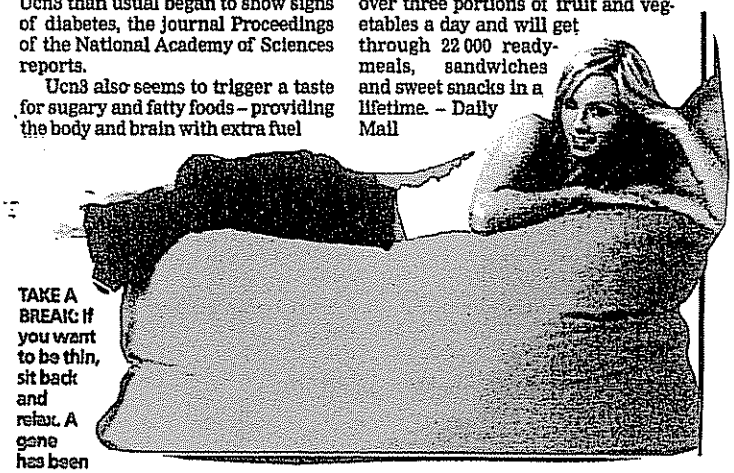
"But the stress response needs to be a tightly regulated system. The genes need to kick in at the right time. If they are not working properly, it can lead to psychiatric and metabolic disorders."

Drugs that target the "comfort eating gene" or the Ucn3 protein could help prevent diabetes and keep weight down.

Previous work by British researchers has shown that almost two-thirds of people in the UK carry other "junk food genes" that cause them to crave fatty and sugary foods.

Those with the genetic flaw eat 100 calories more at each meal – the equivalent of a Kit Kat. Over the course of a week, that amounts to an extra 2 100 calories – or an extra day's food. The findings, by researchers at Dundee University, help explain why some people find it hard to resist fast food – and why some diets are doomed to fail.

Britons are also the world's worst junk food addicts, beating even the Americans in their appetite for fat- and sugar-laden snacks. Figures show the average British adult eats just over three portions of fruit and vegetables a day and will get through 22 000 ready-meals, sandwiches and sweet snacks in a lifetime. – Daily Mail



TAKE A BREAK: If you want to be thin, sit back and relax. A gene has been recognised as the key to gaining weight.

PICTURE: PRNEWSFOTO / SUMO LOUNGE

SCIENTIFIC AMERICAN

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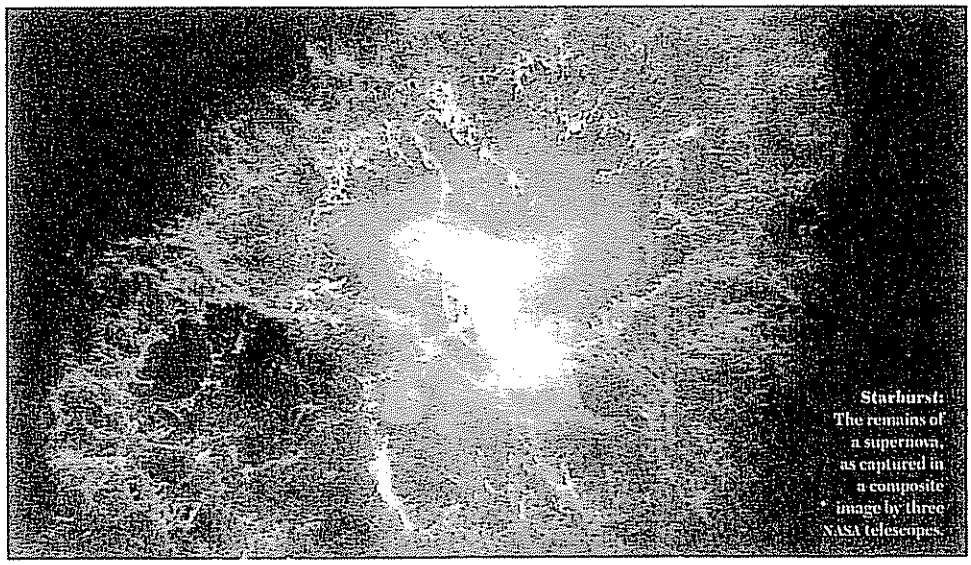
Advances

Top developments in science, technology and medicine



Starburst: The remains of a supernova, as captured in a composite image by three NASA telescopes

Astronomy

The Biggest Bang Theory

A new type of supernova is forcing astronomers to rethink the lives of the biggest stars

When our sun comes to its ending in five billion years or so, it will fade into a quiescent white dwarf. Bigger stars go out with a bang—those with more than 10 times the mass of our sun collapse with enough vigor to spark a supernova, one of the most energetic events in the universe. For decades astronomers have suspected the existence of a type of stellar explosion that is bigger still—a "pair-instability" supernova, with 100 times more energy than an ordinary supernova. In the past year two teams of astronomers have finally found it, redrawing in a stroke the limit of how big things can be in this universe of ours.

All stars balance gravity with pressure. As light elements such as hydrogen fuse in a star's core, the reactions generate photons that press outward, counteracting the pull of gravity. In larger stars, pressure at the core is high enough to fuse heavier elements such as oxygen and carbon, creating more photons. But in stars bigger than 100 solar masses or so, there's a hitch. When oxygen ions begin to fuse with one another, the reaction releases photons that are so energetic, they spontaneously transmute into electron-positron pairs. With no photons, there's no outward pressure—and the star begins to collapse.

One of two things can happen next. The collapse can create even more pressure, reigniting enough oxygen to create a burst of energy. This burst is enough to toss off the outer layers of the star but not enough to create a full supernova. The cycle can repeat itself in pulses—astronomers call this case a "pulsational" pair-instability supernova—until the star loses enough mass to end its life in an ordinary supernova. A team led by the California Institute of Technology's Robert M. Quimby announced it had identified one of these and has submitted a paper for publication.

If the star is really big—and here we're talking more than 130 solar masses—the collapse happens so fast and gathers so much inertia that even fusing oxygen can't stop it. So much energy develops in such a little space that eventually the whole thing blows up, leaving no remnant behind. This is "the real deal, the big stuff," says Avishay Gal-Yam, an astronomer at the Weizmann Institute of Science in Rehovot, Israel, whose team claims in a recent paper in *Nature* to have discovered the first full-fledged pair-instability supernova (*Scientific American* is part of Nature Publishing Group).

Before the findings, most astronomers had argued that gigantic stars in nearby galaxies slough off much of their mass before dying out, precluding a pair-instability supernova. These ideas are being reconsidered, now that these biggest of explosions have announced themselves in spectacular fashion. —*Michael Moyer*

DATA POINTS

EXPLOSIVE EVIDENCE

3,767

The number of supernovae discovered since 2000, more than twice as many as had been discovered before then.

Astronomy

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And then there were three

Ambling black hole

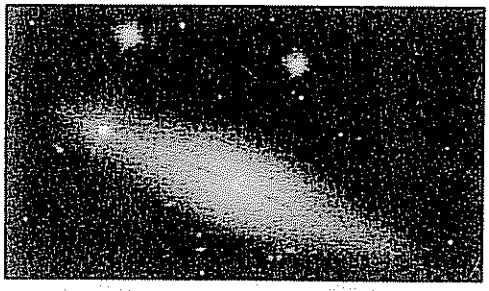
A team of scientists at the May 25 meeting of the American Astronomical Society in Miami announced that the supermassive black hole in nearby galaxy M87 isn't centered, suggesting it migrated from its original location.

How many ways can a star blow up? For decades, astronomers thought nature had found two paths to creating supernovae, the stellar explosions that can shine as bright as entire galaxies. In one, a massive star's core collapses at the end of its life, creating a shock wave that expels all of the star's outer layers. In the other, a white dwarf star accretes matter from a binary companion until it reaches 1.4 solar masses. The white dwarf can't support any more weight and detonates in a titanic thermonuclear explosion.

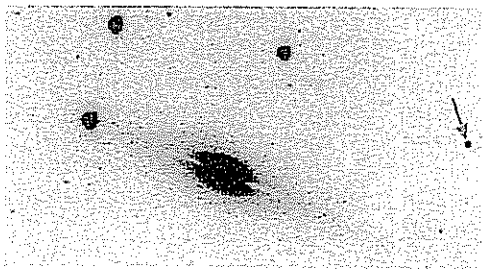
But a team of astronomers now argues that SN 2005E — a supernova that lit up the spiral galaxy NGC 1032 in 2005 — represents a third way. The team's analysis shows that the explosion occurred in a region devoid of massive stars, ejected a paltry amount of material (0.3 solar mass), and created abnormally high levels of calcium and radioactive titanium.

The team concludes that the supernova took place in a low-mass white dwarf that stole helium from a companion star. "We know that SN 2005E came from the explosion of an old, low-mass star because of its location in the outskirts of a galaxy devoid of recent star formation," says team member Alex Filippenko of the University of California, Berkeley. "And the presence of so much calcium in the ejected gases tells us that helium must have exploded in a thermonuclear runaway."

The researchers, who were led by Hagai Perets of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, and Avishay Gal-Yam of the Weizmann Institute of Science in Rehovot, Israel, calculate that calcium made up about half of the ejected mass. A galaxy would need only a couple of such supernovae per century to produce the amount of calcium observed in the Milky Way and incorporated into life on Earth. The team reported its findings in the May 20 issue of *Nature*. — R. T.



Spiral showcase. The edge-on spiral NGC 1032 hosted the calcium-rich supernova SN 2005E. SDSS/Lick Observatory



Strange blast. Supernova 2005E (arrow) occurred in NGC 1032's halo, a region far from any star formation. Astronomers think the blast originated from a low-mass white dwarf that was accreting helium. SDSS/Lick Observatory

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NewScientist

Scans point to the source of courage

WHY put snakes and people who are afraid of them into a brain scanner? Uri Nili and Yadin Dudai, at the Weizmann Institute in Rehovot, Israel, did it to work out what's going on in people's brains when they overcome fear.

Their conclusion is that courage does not come by banishing fear completely, but through overcoming it enough to act. "A firefighter having to go into a burning building should display courage, but that firefighter is not fearless," Dudai says.

The researchers examined the brain activity of 39 people with an abnormally strong fear of snakes as they lay in a functional MRI (fMRI) brain scanner. They were given the option either to move a venomless 1.5-metre-long corn snake further away from their heads along a conveyer belt, or to bring it closer.

The scans showed that the subgenual anterior cingulate cortex (sgACC), an area linked to emotion, became particularly active when participants brought the snakes closer, but not when they gave in to their fears (*Neuron*, DOI: 10.1016/j.neuron.2010.06.009). "If you manage to maintain activity in this area at a high level, you will be able to overcome your fear," says Nili.

If, as he suggests, the sgACC blocks natural responses to fear, t could one day be a target in therapies to rid people of phobias.

nature

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NEUROSCIENCE

Snakes on the brain

Neuron 66, 949–962 (2010)

A hair-raising study has revealed a brain signal for acts of courage performed in the face of fear.

Yadin Dudai at the Weizmann Institute of Science in Rehovot, Israel, and his team used functional magnetic resonance imaging to scan the brains of volunteers as they decided whether to slide a live snake towards their heads.

In people fearful of snakes, a region called the subgenual anterior cingulate cortex (sgACC) was activated (pictured) if they mustered up the courage to move the snake closer. Skin conductance — an indication of bodily arousal — dropped as activity in the sgACC rose, even though the volunteers said that they still felt frightened.

The researchers propose that sgACC activation promotes courageous action and that manipulating its activity could help in treating fear disorders. A.A.

Daily Mail

Daily Mail, Friday, May 7, 2010

Comfort eating gene that makes us peckish when times are tough

By **Fiona MacRae**
Science Reporter

Duvet dining: Bridget Jones consoles herself with a snack

'SOS? No, I've just ordered a pizza'

IF you've ever wondered why you raid the biscuit tin when you're under pressure, here's the answer.

It's not the lure of the chocolate digestives or custard creams that makes you fancy something sweet. It's your genes.

Scientists have found a gene that makes us crave sweet and fatty foods – and pile on the pounds when under stress.

The 'comfort eating gene' has also been linked to type 2 diabetes – the form of the disease that usually occurs in middle-age and is related to obesity.

It is hoped that studying the gene will lead to new diabetes drugs as well as weight loss pills.

But it seems finding time to relax – and so avoiding that stress trigger in the first place – could also do us the power of good.

Researcher Dr Alon Chen set out to unravel why so many people reach for the biscuit tin when under pressure at home or at work.

In studies on mice, he pinpointed a gene that pumps out a protein called Ucn3 at times of stress.

Produced in the brain, the protein has a profound impact throughout the body, affecting organs including the heart, muscles, liver and pancreas.

It increases appetite and affects how full we feel as well as the way the body uses insulin, a hormone crucial in the processing of sugar into energy.

Mice that were made to make more Ucn3 than usual began to show the first signs of diabetes, the journal Proceedings of the National Academy of Sciences reports.

Ucn3 also seems to trigger a taste for sugary and fatty foods – providing the body and brain with extra fuel when under extreme stress.

But when the system is constantly activated by everyday stresses and strains, we can become fat and ill.

Dr Chen, of the Weizmann Institute in Israel, said: 'Stress is good when you have to cope with an event, like when you meet a lion.

'Your metabolism is changing, you consume more sugars and more glucose goes to the muscles to help you escape the lion.

'But the stress response needs to be a tightly-regulated system.

'The genes need to kick in at the right time. If they are not working properly it can lead to psychiatric and metabolic disorders.'

Drugs that target the 'comfort eating gene' or the Ucn3 protein could help prevent diabetes and help to keep weight down.

Previous work by British researchers has shown that almost two-thirds of people in Britain carry other 'junk food genes' that cause them to crave fatty and sugary foods.

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Daily Mail

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Will a pill be able to give us courage?

A PILL that gives cowards courage could be in the pipeline.

Scientists have pinpointed an area of the brain that is vital in overcoming fear.

A drug that activates these brain cells could help people face their phobias, from spiders to heights to public speaking.

Researchers looked at how the brain reacts to ophidiophobia - fear of snakes. Volunteers with and without a fear of snakes had their brains

Caught the eye of the military

scanned as they watched either a cuddly toy bear or a live snake move past them on a conveyer belt.

A touch of a button brought the bear or snake closer – or moved them away.

A region called the subgenual anterior cingulate cortex, which helps us process emotions, lit up when those who were scared of snakes exhibited bravery by moving the snake closer to them.

And the bigger their fear of snakes, the greater the activity in the region, the journal Neuron reports.

Researcher Dr Yadin Dudai, of the Weizmann Institute of Science in Rehovot, Israel, said the results had shone a light on the basis of courage.

They also 'point to the possibility of manipulating subgenual anterior cingulate cortex activity in therapeutic intervention in disorders involving a failure to overcome fear'.

Previous research has shown that the stress hormone cortisol can make the difference between being a hero or a coward.

Those who rise to the challenge do not experience the cortisol rush of those who fall to pieces when the going gets tough.

When U.S. psychiatrists subjected soldiers to concentration camp simulations and other extremely stressful situations they found that those who remained calm made less cortisol.

They also made more neuropeptide Y, a compound that counteracts the effects of cortisol.

The Israeli study has caught the eye of the U.S. military, who believe it could be used to create the perfect soldier.

Using the right cocktail of supplements, steroids and mind exercises, it might be possible to turn run-of-the-mill recruits into heroes.

An estimated 16million Britons suffer from phobias.

By **Fiona MacRae**
Science Reporter

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Scientists find key to courage in the brain

Scientists have found the key to overcoming fear.

The discovery means it might one day be possible to give people back their courage. Snakes were used to test people's bravery in a brain scanning study.

Scientists at the Weizmann Institute of Science in Rehovot, Israel, pinpointed a brain region called the subgenual anterior cingulate cortex (sgACC) which was activated when people displayed courage.

Volunteers were divided into those who had a fear of snakes, and those who did not.

They were then tested with either a toy bear or a live corn snake, a non-poisonous American species often kept as pets.

Participants could choose whether to have the toy or snake moved closer or further away from them while their brains underwent a functional magnetic resonance imaging scan.

The scans showed up different patterns of brain activity when volunteers succumbed to fear and when they displayed courage by deliberately overcoming it.

Activity in the sgACC increased with the degree of fear felt by snake-hating volunteers who showed bravery by having the corn snake brought closer to them.

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From coward to hero, just take one brain-changing pill

A PILL that could have helped the Lion in the Wizard of Oz and will give cowards courage could be in the pipeline.

Scientists have pinpointed the region in the brain which is key in overcoming fear.

A drug that activates these brain cells could help people face their phobias, from spiders to heights and public speaking.

The researchers, at the Weizmann Institute of Science in Rehovot, Israel, looked at how the brain reacts to ophidiophobia – or fear of snakes.

A report in the American journal Neuron explains that volunteers, with and without a fear of snakes, had their brains scanned as they watched either a cuddly toy bear or a live snake move past them on a conveyor belt.

The scans showed up different patterns of brain activity when volunteers succumbed to fear or when they displayed courage by deliberately overcoming their phobia.

The bigger the volunteer's fear of snakes, the greater the activity in the region of the brain called the subgenual anterior cingulate cortex.

Up to 20 per cent of people suffer from phobias including fear of spiders or flying or the number 13 which is known as triskaidekaphobia.

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Scientists discover 'key to beating fear'

IN RESEARCH echoing The Wizard of Oz, scientists yesterday announced they had found the key to overcoming fear.

Snakes were used to test the bravery of participants in the unusual study.

Volunteers were divided into those who had a fear of reptiles and those who did not.

They were then tested with either a toy bear or a live corn snake, a non-poisonous American species.

Participants could choose whether to have the toy or snake moved closer or further away from them, and their brains were scanned while the choice was made.

The tests allowed scientists to pinpoint a region of the brain called the subgenual anterior cingulate cortex (sgACC) which was activated when people displayed courage.

Activity in the sgACC increased along with the degree of fear felt by snake-hating volunteers who showed bravery by moving the reptile closer.

This was not the case when scared participants succumbed to fear by increasing their distance from the snake.

Lead researcher Dr Yadin Dudai, from the Weizmann Institute of Science in Rehovot in Israel, said: Our findings delineate the importance of maintaining high sgACC activity in efforts to overcome fear."

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Research tests snakes on the brain

Imaging reveals regions that are active during acts of courage

By Laura Sanders

Researchers can now say what would happen in Samuel L. Jackson's brain if he really confronted snakes on a plane. In a terrifying sequel to the movie, volunteers were persuaded to bring a slithery serpent within centimeters of their heads while lying trapped in a brain scanner.

The experiment, published June 24 in *Neuron*, allowed researchers to watch brain activity as people quelled their fear and brought the snake closer to their heads, offering a glimpse into the courageous brain. Understanding how the brain chooses to overcome fearful impulses may help scientists treat people with phobias, panic disorders or posttraumatic stress disorder.

"This is a breakthrough study that will set the stage for a whole new area of work related to the brain and fear," comments neuroscientist Joseph LeDoux of New York University.

To see what happens in the courageous brain, researchers led by Yadin Dudai of the Weizmann Institute of Science in Rehovot, Israel, enlisted volunteers who admitted to fear of snakes but still agreed to participate.

Dudai and colleagues designed a conveyer belt carrying a large, writhing corn snake strapped by a piece of Velcro to the top of a box. "It's not a poisonous snake," Dudai says, "but for people who fear snakes, it's enough." Each volunteer was confined in an fMRI scanner with the snake behind their heads and were repeatedly given the choice to push a button to bring the snake about 11 centimeters closer or move it 11 centimeters away. A mirror showed the snake's location.

Brain regions active when participants advanced the snake, a move interpreted as courageous, were compared with those that lit up when a subject succumbed to fear and moved the snake away. A region in the front of the brain called the subgenual anterior cingulate cortex, or sgACC, was active with courage but quiet when fear took over. This region may have many functions, including regulating fear.

When the sgACC revved up, the researchers noticed that bodily indicators of fear, such as increased sweating, were reduced. Dudai hypothesizes that this brain region is crucial for directing the body to ignore fear. Stimulating this region might someday help people with phobias overcome their dread.

The new study is "certainly beginning to touch on understanding courage, but it might not necessarily explain all aspects of courage," comments neuroscientist Mohammed Milad of Harvard Medical School. Milad points out that the lab experiment lacks the altruistic components sometimes found in courage — for example, the drive to run into a burning building to save a child.

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Scientists use noses to help disabled

WASHINGTON — Severely disabled people may soon be able to use their noses to write, drive a wheelchair or surf the internet, thanks to a device developed and tested by doctors in Israel.

The device harnesses sniffing — or breathing in and out through the nose — which involves the soft palate on the roof of the mouth, according to a study published yesterday in the Proceedings of the National Academy of Sciences of the United States.

The soft palate is controlled by cranial nerves which are "always very well conserved following severe injury", Noam Sobel, a professor of neurobiology at the Weizmann Institute in Rehovot, Israel, and one of the lead authors of the study, said.

Sobel worked with other scientists from the Weizmann Institute and the Sackler Faculty of Medicine at Tel Aviv University to develop a way to convert sniffs — which the device measures as nasal pressure — into electrical signals.

Ten quadriplegics who tested the device very quickly learned to use their noses to write words, open an internet browser, and copy and paste words into a search engine.

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A novel way to drive a wheelchair

Control not to be sniffed at

A SERIES of sniffs could allow severely disabled people and even those with locked-in syndrome to communicate, surf the internet and control a wheelchair.

Noam Sobel, a neurobiologist at the Weizmann Institute of Science in Rehovot, Israel, and colleagues attached sensors to a nasal tube to pick up pressure changes when the wearer sniffs. "The control over sniffing appears to be unusually well spared following injury," Sobel says.

The device can be hooked up to software in either a computer or a wheelchair. To type text or search the internet, a series of options scroll across a screen until the sensors pick up the user's sniffs, which indicate the section or letter they want to select. Controlling a wheelchair requires users to make a series of predetermined sniffs, depending on the direction they wish to move. These "code" sniffs are complex enough to ensure the chair is not moved inadvertently, Sobel says.

In tests on three people with locked-in syndrome, two were able to use the system to write letters following a short period of training.

"The control over sniffing appears to be unusually well spared following injury."

All 11 of the people with quadriplegia given the system were able to surf the web and write emails (*Proceedings of the National Academy of Sciences*, DOI: 10.1073/pnas.1006746107).

"This set-up is far cheaper than existing eye-tracking systems," Sobel says.

Charlotte Sun HERALD

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Scientists sniff out mobility solution for the disabled

By THOMAS H. MAUGH II
LOS ANGELES TIMES

LOS ANGELES (MCT) — The severely disabled, including those "locked in" to their bodies as a result of accidents or disease, may soon have a new way to communicate and move around, Israeli scientists said Monday.

By sniffing in and out through their noses, more than a dozen quadriplegics were able to control computers that allowed them to write and to guide a wheelchair, the team reported in the Proceedings of the National Academy of Sciences.

The technology relies on the fact that quadriplegics and others retain control of their soft palettes, which regulate breathing through the nose. Even people who are not able to breathe on their own can control the new device by blocking and releasing the flow of air forced through their noses by a pump.

MOBILITY | 4

The technology "may provide a host of viable solutions for the growing population of individuals who are severely disabled," the team wrote.

The device "is pretty ingenious in giving people who can't control their environment another way to do that," said Dr. Adam Stein, chair of physical medicine and rehabilitation at North Shore-Long Island Jewish Health System in Great Neck, N.Y.

It would be particularly valuable for people who have locked-in syndrome, in which they can do little more than flutter an eye, he said. For many other patients, however, alternatives exist, including controlling devices through a breathing tube or with their tongue.

The mechanism is actually relatively simple. Small tubes inserted in the nose monitor sniffs and exhalations, allowing the user to control a computer. To control a wheelchair, for example, two short sniffs signal "forward," while two short exhalations signal "back." An exhale followed by a sniff signals "left," while a sniff followed by an exhale signals "right." Similar protocols move a cursor on a computer screen for writing.

Overall, the device has now been tested successfully in 15 severely disabled patients. The Weizmann Institute has filed for a patent on the technology used in the device and hopes to find a marketing partner.

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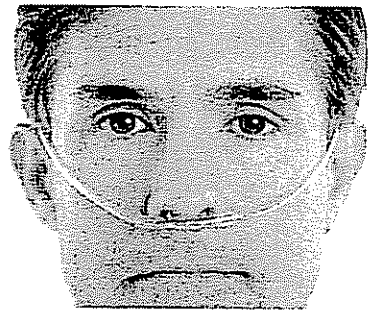
(head lines)

TECHNOLOGY

Something to Sniff At

A new device allows paralyzed people to communicate with their noses

Other than florists and allergy sufferers, most people don't do much sniffing. But scientists in Israel see the ability as a way to assist severely paralyzed people. In the August 10 issue of the *Proceedings of the National Academy of Sciences USA*, Noam Sobel and his team at the Weizmann Institute of Science in Rehovot described the first ever sniff-enabled device: a thin plastic tube with two short prongs that are inserted into the nostrils. The gadget measures nasal pressure and converts it into electrical signals that can be read by a computer. The researchers found that, by sniffing, people could quickly and accurately raise or lower their nasal pressure enough to trigger a command, similar to pressing a button.



GETTY IMAGES (top); CORBIS (bottom)

The gadget detects sniffs with a tube that rests under the nose like this common nasal cannula.

When playing a computer game using the device, healthy users performed as well as they did with a handheld mouse or joystick—without fatiguing, as happens to hands during sustained play. A quadriplegic person learned after 15 minutes of practice to use patterns of sniffing to drive an electric wheelchair, and two out of three people with locked-in syndrome—marked by complete paralysis—were able to control their sniffing enough to use the device to select letters from a virtual keyboard. One of the locked-in people was able to communicate for the first time, and the other reported that the device was easier to use than the more established ones that monitor eye movement or blinks. Because the invention is cheap to make and not easily dislodged by motion, it could become widely available for people with disabilities. —*Michele Solis*

Jewish Chronicle

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Defusing the diabetes time bomb

BY ALEX KASRIEL

LAST WEEK, a team of surgeons performed the world's first robotically assisted pancreas transplant on a women in Italy who suffers from type one diabetes.

With her new organ, the mother of two is now able to produce the correct amount of insulin – the hormone which regulates the amount of glucose in the body – and this has effectively cured her disease.

The news impresses Professor Michael Walker, a leading researcher in diabetes at the Weizmann Institute of Science in Israel. But he is not convinced of the sustainability of the technique in a population where diabetes, he says, is an epidemic.

"The challenge is to make the process of converting stem cells into insulin-producing cells efficient enough to be applied to the general population," he says. "Therefore, new sources of insulin-producing cells are essential."

Michael Walker: stem-cell research

His hope is to find a way of creating a beta cell – the cell in the pancreas which produces and releases insulin – that can be transplanted to diabetic individuals using embryonic stem cells which can be divided in a dish, in other words cloned. But cells derived from one person are not compatible with another. Walker works with immunologists at the Weizmann Institute to devise methods which would overcome these problems.

"The challenge is to make it efficient enough to be applied to the general population," he explains. "A large amount of research has to be done. It's very important not to raise false hopes. I try to emphasise the fact that the research we're doing is really long term. The cure is not going to be in the clinic in the next few years."

The Glasgow-born scientist has been researching the pancreas and its role in producing insulin at the world-class scientific centre for over two decades. He is looking at how a healthy pancreas works in order to understand what goes wrong in a non-functioning one. It is called "Basic Research".

"Until we know what the normal mechanisms are, we are at a disadvantage in solving the underlying problem," he explains. "One of the things we focus on is how the insulin producing cell actually knows when and how much insulin to release into the bloodstream."

Walker is adamant that finding a cure for diabetes is preferable to treating it with insulin injections. "Scientific research usually comes up with better ways to treat the disease but ultimately we need to find a cure," he says.

But he insists that our greatest challenge is type two diabetes. "Type two diabetes can be considered a ticking time bomb for society," he warns. "It is increasing dramatically because it's associated with obesity. In fact, obesity carries a risk factor for a whole range of other problems like hypertension and cardiovascular disease. An individual who is overweight is 80 times more likely to get diabetes than a person of normal weight. About five per cent of the UK population has diabetes and 10 per cent of the population in the UK is obese. The frightening thing about those numbers is that they're on the rise. The prediction is that they'll probably double within 15 to 20 years."

Walker says that it is up to society to promote healthy living in order to combat diabetes. He calls upon parents to educate their children, schools to set an example by banning soft drinks machines and the government to discourage the sale of unhealthy snacks. While the reason for the link between obesity and diabetes is still unclear, it is still a fact, and the NHS is ultimately responsible for the footing bill.

"Although obesity and diabetes are linked, we still have a poor understanding of the basis for the link," he says. "We believe that high levels of fats in the blood of the obese individual damage the insulin producing cells. Diabetes is an extremely expensive disease to deal with, and the healthcare system is going to be hard put to come up with ways to deal with the problem."

The Daily Telegraph

Worry gene behind junk food diets

By Richard Alleyne
Science Correspondent

THE stress of modern living could be making us eat more sugary and fatty foods, scientists claim.

Researchers have found an "anxiety gene" which, when switched on, not only causes stress but increases our craving for sweets and comfort food.

They believe it could be the reason why we are becoming an increasingly obese and stressful society. It could be the reason for the phenomenon of "comfort eating".

Israeli researchers found a way to cause the gene in mice to release varied amounts of a protein called Ucn3, making them anxious and altering their appetites.

Dr Alon Chen, of the Weizmann Institute, said: "We showed that the actions of a single gene in just one part of the brain can have profound effects on the metabolism of the whole body."

Publication: Daily Telegraph
Date: 7 May 2010

TUESDAY, JUNE 22, 2010 THE JERUSALEM POST

THE JERUSALEM POST

Prof. Ruth Arnon is named first woman to lead Israel Academy of Sciences

Prof. Binyamin Ze'ev Kedar appointed to serve as academy's vice president

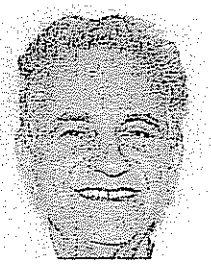
• By JUDY SIEGEL

World-renowned immunologist Prof. Ruth Arnon of the Weizmann Institute has been named the new – and first woman – president of the Israel Academy of Sciences and the Humanities, since 1961 the government's official adviser on science and planning of civilian research. She replaces Prof. Menahem Ya'ari, who held the position for two three-year terms.

The academy also announced on Monday that Arnon's vice president will be Prof. Binyamin Ze'ev Kedar. Both were elected at a general assembly of 100 academy members, and they will take office around Rosh Hashana. The social sciences and humanities are represented in the academy along with the exact sciences.

Arnon, whom *The Jerusalem Post* chose a few weeks ago as one of the "50 most influential Jews in the world," is the co-developer of the Teva drug Copaxone for reducing the frequency and severity of multiple sclerosis attacks. This was the first original Israeli drug, and it is now taken by many MS patients around the world.

PROF. RUTH ARNON



PROF. BINYAMIN ZE'EV KEDAR

She is also a member of the European Molecular Biology Organization and was president of the European Federation of Immunological Societies, as well as the recipient of numerous prestigious awards, including the Robert Koch Prize, Israel Prize, Rothschild Prize, Hadassah Women's Zionist Organization of American's Women of Achievement Prize and honorary doctorates.

Prof. Kedar is a Hebrew University historian and an expert in the Crusader period. He is chairman of the council of the Israel Antiquities Authority, a member of the Medieval Academy of America and founding editor of the journal *Crusades*.

IN THE NEWS

Humans

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Research tests snakes on the brain

Imaging reveals regions that are active during acts of courage

By Laura Sanders

Researchers can now say what would happen in Samuel L. Jackson's brain if he really confronted snakes on a plane. In a terrifying sequel to the movie, volunteers were persuaded to bring a slithery serpent within centimeters of their heads while lying trapped in a brain scanner.

The experiment, published June 24 in *Neuron*, allowed researchers to watch brain activity as people quelled their fear and brought the snake closer to their heads, offering a glimpse into the courageous brain. Understanding how the brain chooses to overcome fearful impulses may help scientists treat people with phobias, panic disorders or posttraumatic stress disorder.

"This is a breakthrough study that will set the stage for a whole new area of work related to the brain and fear," comments neuroscientist Joseph LeDoux of New York University.

To see what happens in the courageous brain, researchers led by Yadin Dudai of the Weizmann Institute of Science in Rehovot, Israel, enlisted volunteers who admitted to fear of snakes but still agreed to participate.

Dudai and colleagues designed a conveyer belt carrying a large, writhing corn snake strapped by a piece of Velcro to the top of a box. "It's not a poisonous snake," Dudai says, "but for people who fear snakes, it's enough." Each volunteer was confined in an fMRI scanner with the snake behind their heads and were repeatedly given the choice to push a button to bring the snake about 11 centimeters closer or move it 11 centimeters away. A mirror showed the snake's location.

Brain regions active when participants advanced the snake, a move interpreted as courageous, were compared with those that lit up when a subject succumbed to fear and moved the snake away. A region in the front of the brain called the subgenual anterior cingulate cortex, or sgACC, was active with courage but quiet when fear took over. This region may have many functions, including regulating fear.

When the sgACC revved up, the researchers noticed that bodily indicators of fear, such as increased sweating, were reduced. Dudai hypothesizes that this brain region is crucial for directing the body to ignore fear. Stimulating this region might someday help people with phobias overcome their dread.

The new study is "certainly beginning to touch on understanding courage, but it might not necessarily explain all aspects of courage," comments neuroscientist Mohammed Milad of Harvard Medical School. Milad points out that the lab experiment lacks the altruistic components sometimes found in courage – for example, the drive to run into a burning building to save a child.

Mail Online
health

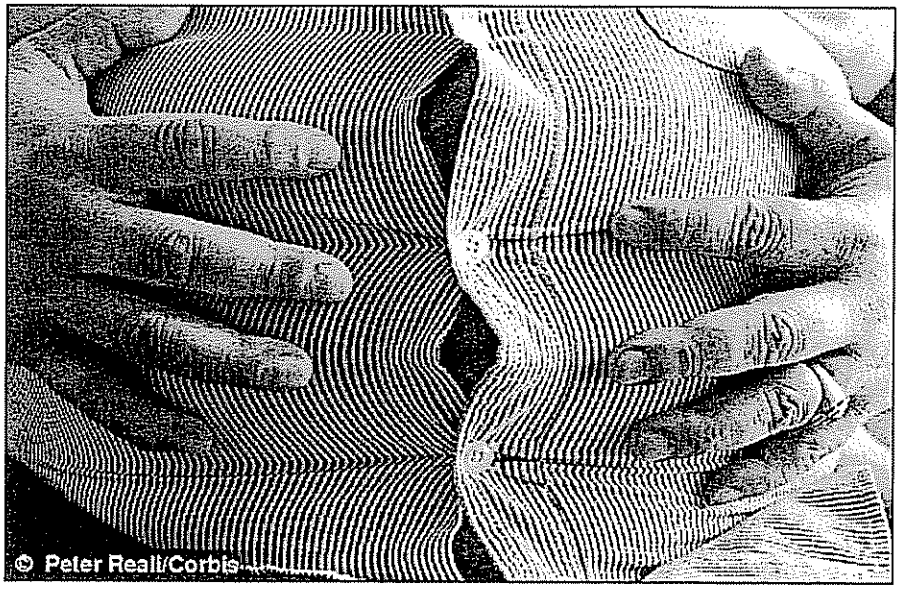
High stress levels can make you fat, researchers claim

By DAILY MAIL REPORTER
Last updated at 2:50 PM on 6th May 2010

Most people trying to lose weight know it's a case of eating less and moving more.

But weight-watchers may also do well to cut down on the stress in their lives if they want to drop a few pounds.

New research has found that that high levels of anxiety can cause people to become obese.



Weight problem: Stress activates a gene which affects the metabolism and contributes to our cravings for sweet, fatty foods, according to a new study

The Israeli study found that stress activates a gene which affects the metabolism and contributes to our cravings for sweet, fatty foods.

Dr Alon Chen, a neuro-endocrinologist at the Weizmann Institute, said: 'We showed that the actions of a single gene in just one part of the brain can have profound effects on the metabolism of the whole body.'

Publication: Daily Mail online
Date: 6 May 2010

Few people lead stress-free lives these days which may, say experts, account for the rise in obesity triggered by the stress gene.

It starts with the pressure to fit in at school at five, pass exams, get into a good university, pay off student loans, meet mortgage payments - and before you know it, you're worrying about university fees for the children.

'Stress is definitely influencing every system in the body,' said Dr Chen. 'It's not just causing anxiety, depression and post-traumatic stress disorder but is influencing metabolic syndromes such as obesity.'

In the study, published in the Proceedings of the National Academy of Sciences, the researchers discovered a 'stress switch' that can lead to both obesity and diabetes.

The scientists created their own method for changing the activity of the gene on the brain, causing it to release varied amounts of a protein called Ucn3.

They discovered that increased levels of Ucn3 caused anxiety and changes in metabolism.

With increased levels of Ucn3, the bodies of mice used more sugar and less fatty acids and metabolic rates increased, showing the first stages of type 2 diabetes.

Dr Chen added: 'Until now, the lines drawn between stress, appetite and anxiety were pointed out, but never fully explained.

' This new research may be the important missing link that can help drug developers create drugs targeting stress that could have multiple side-benefits, like preventing diabetes, promoting heart health and keeping our weight down.'

Publication: Daily Mail online
Date: 6 May 2010

Telegraph.co.uk

Scientists find anxiety gene that also makes you comfort eat

The stress of modern living could be making us eat more sugary and fatty foods, scientists claim.

By Richard Alleyne, Science Correspondent
Published: 5:00PM BST 06 May 2010

Researchers have found an "anxiety gene" which when switched on not only causes stress but increases our craving for sweets and comfort food.

They believe that the gene could be the reason why we are becoming an increasingly obese and stressful society. It could be the reason for the phenomenon "comfort eating".

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Dr Alon Chen, a neuroendocrinologist at the Weizmann Institute in Israel, said: "We showed that the actions of a single gene in just one part of the brain can have profound effects on the metabolism of the whole body.

"In essence, stress may be turning us fat."

Few people lead stress-free lives these days which may, say experts, account for the rise in obesity triggered by the stress gene.

"Stress is definitely influencing every system in the body," said Dr Chen "It's not just causing anxiety, depression and post-traumatic stress disorder but is influencing metabolic syndromes such as obesity."

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"This new research may be the important missing link that can help drug developers create drugs targeting stress that could have multiple side-benefits, like preventing diabetes, promoting heart health and keeping our weight down.

"We showed that the actions of single gene in just one part of the brain can have profound effects on the metabolism of the whole body.

"This mechanism, which appears to be a "smoking gun" tying stress levels to metabolic disease, might, in the future, point the way toward the treatment or prevention of a number of stress-related diseases."

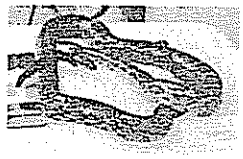
Publication: Daily Telegraph online
Date: 6 May 2010

ScienceNews
MAGAZINE OF THE SOCIETY FOR SCIENCE & THE PUBLIC
http://www.sciencenews.org/view/generic/id/60519

Snakes on the brain

Researchers delve into neural roots of courage

By Laura Sanders
Web edition : Wednesday, June 23rd, 2010



ENLARGE

SNAKES ALIVE

In the new brain imaging study, subjects had to get up close and personal with this 1.5-meter-long corn snake (*Elaphe guttata*).
Uri Nili

Researchers now can say what would happen in Samuel L. Jackson's brain if he really were to confront snakes on a plane. In a terrifying sequel to that movie scenario, researchers convinced volunteers to bring a slithery serpent within centimeters of their heads while they lay trapped in a brain scanner.

The experiment, published June 24 in *Neuron*, allowed researchers to watch brain activity as people chose to quell their fear and bring the snake closer to their heads, offering a glimpse into the courageous brain. Understanding how the brain chooses to overcome fearful impulses may help scientists treat people with phobias, panic disorders or PTSD.

"This is a breakthrough study that will set the stage for a whole new area of work related to the brain and fear," says neuroscientist Joseph LeDoux of New York University, who was not involved in the research.

Scientists have figured out much of what happens in the brain during fear, LeDoux says, but almost nothing is known about the ability to overcome the reaction.

To see what happens in the courageous brain, researchers led by Yadin Dudai of the Weizmann Institute of Science in Israel enlisted brave volunteers who admitted to being afraid of snakes but still agreed to try to overcome their fear in a laboratory experiment.

Dudai and his colleagues designed a conveyer belt that carried a large, writhing snake strapped to the top of a box with a single piece of Velcro. Sixteen volunteers were confined inside an fMRI scanner with the snake behind their heads and were repeatedly given the choice to push a button that brought the snake 11 centimeters closer, or moved it 11 centimeters away. After each choice, a mirror showed the person the snake's location.

The meter-and-a-half-long corn snake in the experiment is "actually quite a benevolent snake," says Dudai. "It's not a poisonous snake, but for people who fear snakes, it's enough."

As the subjects chose to advance the snake, a move interpreted as courageous, Dudai and his team scanned their brain activity. The team then compared which brain regions were active to the parts that lit up when a subject succumbed to fear and moved the snake away. This comparison turned up a region in the front of the brain called the subgenual anterior cingulate cortex, or sgACC, that was active when courage was on display, but quiet when fear took over. This brain region may have many functions, including regulating fear, studies suggest.

Surprisingly, when the sgACC revved up, the researchers noticed that bodily indicators of fear, such as increased sweating, were reduced. Dudai and his team hypothesize that this brain region is crucial for directing the body to ignore fear. Stimulating or activating this region might one day help people with phobias to overcome their fears.

The new study is "certainly beginning to touch on understanding courage, but it might not necessarily explain all aspects of courage," comments neuroscientist Mohammed Milad of Harvard Medical School, who studies how the brain gets rid of fear. Milad points out that the lab experiment lacks the altruistic components sometimes found in courage, for example the drive to run into a burning building to save a child.

But Milad adds that this study is the closest researchers have come to studying real courage in the lab. "The design is so clever, and daring, and novel, in many respects," he says. "To be able to take a live snake, tie it to Velcro and put it in a room is just insane. It's really amazing that they were able to do that."

SUGGESTED READING :

Bower, B. 2009. Girls have head start on snake and spider fears: Widespread dread of slithery, crawly things may start in infancy. Science News 176 (Sept. 26): 11.

Sanders, L. 2009. New findings raise questions about reliability of fMRI as gauge of neural activity. Science News 176 (Dec. 19):16.

CITATIONS & REFERENCES :

Nili, U. et al. 2010. Fear Thou Not: Activity of Frontal and Temporal Circuits in Moments of Real-Life Courage. Neuron 66(June 24):949. Doi:10.1016/j.neuron.2010.06.009

Neural Mechanisms of Courage Uncovered in Study on Fear of Snakes

TEHRAN (FNA)- A fascinating new study provided new insight into what happens in the brain when an individual voluntarily performs an action opposite to that promoted by ongoing fear and may even lead to new treatment strategies for those who exhibit a failure to overcome their fear.

The study combines snakes with brain imaging in order to uncover neural mechanisms associated with "courage."

Although there is a substantial body of research examining brain mechanisms associated with fear, far less is known about the brain mechanisms associated with courage, defined here as action in the face of ongoing fear. "By gauging properly defined actions of either overcoming fear or succumbing to it in an acute controllable fearful situation, one can render certain neural substrates of courage amenable to investigation in a brain research laboratory setting," explains senior study author, Dr. Yadin Dudai from the Weizmann Institute of Science.

To study the neural mechanisms associated with moments of real-life courage, Dr. Dudai, Uri Nili, and their colleagues devised an experimental paradigm where participants had to choose whether to advance an object closer or farther away from them while their brain was scanned with functional magnetic resonance imaging (fMRI). The objects used in the study were either a toy bear or a live corn snake. Prior to the study, participants were categorized as "fearful" or "fearless" depending on how they responded to a validated snake-fear questionnaire.

As might be expected, the researchers observed that both high subjective fear and high somatic arousal were associated with succumbing to fear and moving the snake farther away. However, somewhat surprisingly, bringing the snake closer was associated with

Science News

Brave Brains: Neural Mechanisms of Courage Uncovered in Study of Fear of Snakes

ScienceDaily (June 23, 2010) — A fascinating new study combines snakes with brain imaging in order to uncover neural mechanisms associated with "courage." The research, published by Cell Press in the June 24 issue of the journal *Neuron*, provides new insight into what happens in the brain when an individual voluntarily performs an action opposite to that promoted by ongoing fear and may even lead to new treatment strategies for those who exhibit a failure to overcome their fear.

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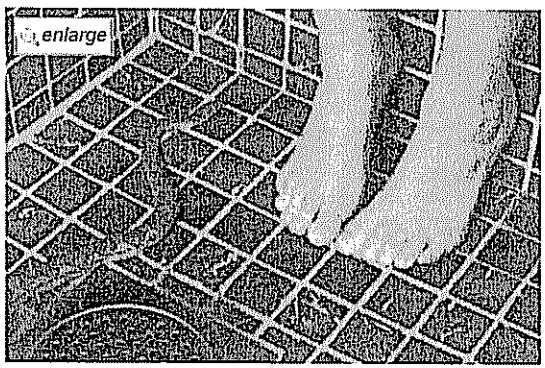

New research that uses brain imaging to study people's fear of snakes is helping uncover neural mechanisms associated with "courage." (Credit: iStockphoto)

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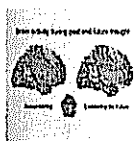

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THE JERUSALEM POST INT 30/07/2010

Weizmann invention a breath of fresh air for quadriplegics

Quadriplegics like Britain's Prof. Stephen Hawking who have difficulty even pressing buttons or moving a joystick will be able to navigate their wheelchairs and communicate with others more easily by inhaling or exhaling through the nose at a sniffing device invented at the Weizmann Institute of Science.

Prof. Noam Sobel, electronics engineers Dr. Anton Plotkin and Aharon Weissbrod, and research student Lee Sela developed the technology in the Rehovot institute's neurobiology department, which announced the achievement on July 27.

The unique device could replace the more tedious technology of blinking one's eyelids to choose letters and piece together words, use a computer or steer an electric wheelchair.

Sniffing technology, said the developers, might even be used in the future to create a sort of "third hand," to assist healthy surgeons or pilots.

The new system identifies changes in air pressure inside the nostrils and translates these into electrical signals. After the device was tested on both healthy volunteers and quadriplegics, the results showed that the method is easily mastered. Users were able to navigate a wheelchair around a complex path or play a computer game with nearly the speed and accuracy of a mouse or joystick.

"The most stirring tests were those we did with locked-in syndrome patients," said Sobel. "These are people with unimpaired cognitive function who are completely paralyzed – 'locked into' their bodies. With the new system, they were able to communicate with family members, and even initiate communication with the outside world. Some wrote poignant messages to their loved ones, sharing with them – for the first time in a very long time – their thoughts and feelings."

Four of those who participated in the experiments are already using the new writing system, and the Weizmann Institute's technology transfer arm, Yeda Research and Development Company Ltd., is investigating the possibilities for developing and distributing the technology.

The researchers created a device with a sensor that fits on the nostril's opening and measures changes in air pressure. For patients on respirators, they developed a different version of the device, which diverts airflow to the patient's nostrils. About three-quarters of the subjects on respirators were able to control their soft-palate movement to operate the device.

In collaboration with Prof. Nachum Soroker of Loewenstein Hospital Rehabilitation Center in Ra'anana, quadriplegics and locked-in patients tested the device.

One patient who had been locked in for seven months following a stroke learned to use the device over a period of several days, writing her first message to her family. Another, who had been locked in since a traffic accident 18 years earlier, wrote that the new device was much easier to use than one based on blinking. Another 10 quadriplegics succeeded in operating a computer and writing messages via sniffing.

The device can also function as a sort of steering mechanism for wheelchairs: Two successive sniffs in tell it to go forward, two out mean reverse, out and then in turn it left, and in and out turn it right. After 15 minutes of practice, a subject who is paralyzed from the neck down managed to navigate a wheelchair through a complex route – sharp turns and all. – *Judy Siegel*

THE JERUSALEM POST - FRONT 19/09/2010

Scientists come down from their ivory towers to meet the public

• By JUDY SIEGEL

A celebration of Israeli science that is comprehensible to the layman will be offered on Monday at universities and other research institutions and science museums from Kiryat Shmona in the north to Eilat in the South.

The "Scientists' Evening" events, organized by the Ministry of Science and Technology at no charge to participants, are suited for the whole family.

The events, held for the fifth time under the aegis of the European Union, include meetings with professional scientists, lectures, films, tours and hands-on experiences.

Jerusalem's Bloomfield Science Museum will be open to the public between 4 p.m. and midnight. The DEEP exhibition on unusual animal species in the depths of the oceans will be on display, with lectures and roundtable discussions.

The Hebrew University's Givat Ram campus will be open from 3 to 9:45 p.m., featuring meetings with scientists; presentations of experiments; workshops; computerized telescope displays; and presentations on fish, polymers, quantum physics of superconductors and satellites.

Tel Aviv University's activities will begin on campus at 5 p.m. Leading scientists in a variety of fields will lecture on bird migration, witchcraft in Jewish culture, brain research, and more.

Tours of the botanical gardens and the zoological park will be offered, along with theater workshops and a young people's concert with explanations. Children can watch how ice cream is made with liquid hydrogen, and do target practice with lasers.

The Eilat Marine Agriculture Center will show visitors how to rehabilitate corals and allow them to "pet" sea creatures. The Weizmann Institute of Science in Rehovot will present a three-dimensional model of molecules and offer lectures by senior researchers on brain function.

The Technion's Madatech Science Museum in Haifa is bringing physicians from Rambam Medical Center, scientists from industry and others to lecture. The museum's robot exhibition will also be open to the public.

More details and information about additional institutions can be obtained from the ministry's website (in Hebrew) at www.most.gov.il.

Meanwhile, the ministry will also open the doors of regional research and development centers to visitors of all ages for tours and workshops during the intermediate days of Succot, on September 26 and 27. Information on the free activities can also be viewed on the above website.

Greymouth Evening Star
Wednesday 28/7/2010
Page: 4
Section: General News
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Type: Provincial
Size: 551.91 sq.cms.
Frequency: MTWTFS-

Noses help disabled

Severely disabled people may soon be able to use their noses to write, drive a wheelchair or surf the internet, thanks to a device developed and tested by doctors in Israel.

The device harnesses sniffing — or breathing in and out through the nose — which involves the soft palate on the roof of the mouth, according to a study published on Monday in the Proceedings of the National Academy of Sciences of the United States.

The soft palate is controlled by cranial nerves which are "always very well conserved following severe injury", Noam Sobel, a professor of neurobiology at the Weizmann Institute in Rehovot, Israel, and one of the lead authors of the study, told AFP.

"That's why eye blinks can be used to communicate with severely injured people — because eye blinks are also controlled by cranial nerves," Sobel said.

Sobel worked with other scientists from the Weizmann Institute and the Sackler faculty of medicine at Tel Aviv University to develop a way to convert sniffs — which the device measures as nasal pressure — into electrical signals.

Able-bodied individuals who tested the device, which consists of a small cannula, like the tubes used in hospitals to deliver oxygen to patients, that sits at the opening of the nostrils and is connected to a small pressure sensor, quickly learned to play computer games and write sentences by sniffing.

Encouraged by the results in the healthy trial participants, the researchers decided to test their device on quadriplegics and "locked-in" individuals — people who are paralysed but whose mental faculties remain intact.

One, a woman who became locked-in following a stroke around seven months earlier, had to be retaught how to sniff.

But within three weeks, she was able to use the sniff-controller to write.

She "started writing with this device at once, initially answering questions and after a few days generated her first post-stroke meaningful self-initiated communication that entailed a profound, personal message to her family", the study says.

A man who had been locked-in for 18 years and was only able to communicate by blinking one eye was able to write his name by sniffing within 20 minutes of being fitted with the device.

And a quadriplegic woman with severe multiple sclerosis was able to write for the first time in 10 years, thanks to the sniff-controller. She also learned how to move a cursor on a computer screen by sniffing and now uses the device to surf the internet and write e-mails, the study says.

Ten quadriplegics who tested the device very quickly learned to use their noses to write words, open an internet browser, and copy and paste words into a search engine.

"This device allowed us to communicate with very severely disabled individuals, even with individuals who could not blink," Sobel told AFP.

"We had one patient who couldn't blink at all and she sends us emails now by sniffing. That's pretty moving," he said.

Encouraged by their success in helping severely disabled people to communicate, the researchers decided to push the envelope of the new technology and devised a code to allow an electric wheelchair to be driven by sniffs.

Ten healthy people easily mastered sniff-driving a wheelchair through a maze and a 30-year-old man who had been paralysed from the neck down for six years was as good a sniff-driver as the healthy participants by his second attempt, the study says.

"In other words, a quadriplegic person could use the sniff controller to drive an electric wheelchair with high precision following a total of only 15 minutes of practice," the study says.

Sniff-controlled technology is still in the development stage, and the Weizmann Institute has applied for a patent on the device.

"I'll be very happy if they make a buck but the real issue is, I hope someone will license it and develop it because this should go out into the world and help a lot of people," said Sobel.

If the device is mass-produced, it would be very accessible to every wallet, said Sobel.

"It should cost $10 or $20, not more.

"It's low-tech and simple, which is one of the things I like most about it," he said. — AFP

THE JERUSALEM POST THURSDAY, JUNE 3, 2010 THE JERUSALEM POST

Leading researcher: Israel needs $100m., NIH-like body to push biomedical research

• By JUDY SIEGEL

Some $100 million a year in public money is needed to finance original Israeli clinical and translational research in the biomedical sciences, and an American-style, independent National Institutes of Health must be established here to allocate funds and coordinate this work, world-acclaimed Israeli immunologist Prof. Ruth Arnon said on Wednesday.

Arnon, the vice president of the Israel Academy of Sciences and Humanities, who co-developed at the Weizmann Institute of Science the multiple sclerosis drug Copaxone, was speaking at a research day at Hadassah University Medical Center to mark the 50th anniversary of the Hebrew University-Hadassah Braun School of Public Health and Community Medicine.

Dozens of the school's graduates, both young and old, were present for the all-day jubilee event, which was led by school of public health dean Prof. Orly Manor.

Arnon said she and academy colleagues have already raised the matter with the Finance Ministry, the Council for Higher Education's Planning and Budgeting Committee and the Israel National Science Foundation.

PROF. RUTH Arnon is fighting to improve Israel's clinical research capacity. (Judy Siegel)

Arnon, who sat for years on the board of directors of the Hadassah Medical Organization, said that an NIH-like institution is urgently needed to promote clinical biomedical and biotech research and work to develop new drugs that translate from the lab to the bedside.

She headed a steering committee appointed in 2006 by the president of the academy, Prof. Menachem Ya'ari, to learn what was needed to promote biomedical research, and 16 leading scientists and physicians spent four years doing so. Leading experts from abroad helped prepare recommendations.

The Weizmann professor said that Israel is doing quite well in basic research in biology-related sciences, but "in clinical research, we are below average, and it is very worrisome."

She noted that one reason is that almost all postdoctoral students go abroad, mostly to the US, for fellowships in leading labs rather than doing them in Israel under the supervision of veteran physicians and scientists.

The National Science Foundation provides money for basic research, but it's not enough for biomedical fields, said Arnon, who added that hospitals that do not adequately encourage suitable physicians to do research should give them time off for this.

The science academy has taken upon itself to monitor where advances are made in biomedicine and biotech around the world and suggest what should be done in Israeli institutions, she concluded.

HAARETZ - FRONT | 22/06/2010
מכון ויצמן למד -

HAARETZ

Academy of Sciences and Humanities elects Prof. Ruth Arnon as its first woman president

By Asaf Shtull-Trauring

The general assembly of the Israel Academy of Sciences and the Humanities has elected Prof. Ruth Arnon, who is currently the academy's vice president, as the organization's next president. She will assume the top post in September, replacing Prof. Menahem Yaari, who has served two terms as president over the past six years.

Arnon will be the first woman to head the academy, whose membership is limited to 100 of Israel's leading experts, 55 from the natural sciences and 45 from humanities and social sciences.

The academy is involved in promoting scholarly activity in Israel and in advising the government on issues related to scientific research and planning. Arnon, who was born in 1933, told Haaretz yesterday that she intends to strengthen the ties between the academy and its counterpart organizations around the world.

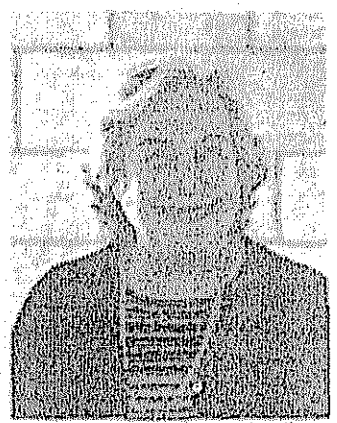
Arnon is an immunologist with a worldwide reputation. Before becoming vice president of the academy, she headed the department of chemical immunology at the Weizmann Institute of Science, Rehovot, and was dean of the biology department. She is an adviser to President Shimon Peres on scientific matters.

Her scientific research has focused on the development of advanced vaccines, cancer research and parasitic diseases. She and a colleague developed Copaxone, a drug prescribed for the treatment of multiple sclerosis.

She is a recipient of the Israel Prize and a member of the French Legion of Honor.

Arnon will be succeeded as vice president of the academy by Benjamin Z. Kedar of the history department of the Hebrew University of Jerusalem, a leading expert on the Crusades and chairman of the Israel Antiquities Authority.

He is founding editor of the journal "Crusades" and a member of the editorial board of Cambridge History of the World.



Tomer Appelbaum

Prof. Ruth Arnon

PRETORIA NEWS
Tuesday, 11 May 2010, p. 7

Piling on the kilos? Maybe it's time you put up your feet and relaxed

FIONA MACRAE
LONDON

FORGET that punishing exercise regime or elaborate diet. The key to losing weight could be as simple as putting your feet up and relaxing.

Scientists have found a gene that makes us crave sweet and fatty foods and pile on the kilos when under stress. The "comfort eating gene" has also been linked to type 2 diabetes – the form of the disease that usually occurs in middle-age and is related to obesity. It is hoped that studying the gene will lead to new diabetes drugs as well as weight loss pills. But it seems that finding time to relax could also do us the power of good.

Researcher Dr Alon Chen, of the Weizmann Institute in Israel, set out to find out why so many people reach for the biscuit tin when under pressure at home or at work.

In studies on mice, he pinpointed a gene that pumps out a protein called Ucn3 at times of stress. Produced in the brain, the protein increases appetite and affects how full we feel as well as the way the body uses insulin, a hormone crucial in the processing of sugar into energy.

Mice that were made to make more Ucn3 than usual began to show signs of diabetes, the journal Proceedings of the National Academy of Sciences reports. Ucn3 also seems to trigger a taste for sugary and fatty foods – providing the body and brain with extra fuel when under extreme stress.

But when the system is constantly activated by everyday stresses and strains, we can become fat and ill.

A new study has shown that a protein called Ucn3 and stress activates comfort eating, and the resulting increase in weight. It is is suggested that simply relaxing can reduce one's weight. PICTURE: REUTERS

Chen said: "Stress is good when you have to cope with an event, like when you meet a lion. Your metabolism is changing, you consume more sugars and more glucose goes to the muscles to help you escape the lion.

"But the stress response needs to be a tightly regulated system. The genes need to kick in at the right time. If they are not working properly, it can lead to psychiatric and metabolic disorders."

Previous work by British researchers has shown that almost two-thirds of people in the UK carry other "junk food genes" that cause them to crave fatty and sugary foods.

Those with the genetic flaw eat 100 calories more at each meal – the equivalent of a Kit Kat.

Over a week, that amounts to an extra 2 100 calories – or an extra day's food. The findings, by Dundee University, help explain why some people find it hard to resist fast food – and why some diets are doomed to fail.

Figures show the average British adult eats just over three portions of fruit and vegetables a day and will get through 22 000 ready-meals, sandwiches and sweet snacks in a lifetime. – Daily Mail

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Yoga: exercising while you relax

Postures provide benefit of relieving stress but getting in your workout


DJ REESE
FITNESS FORUM

You do moderate activities most days of the week. This is a great habit.

Congratulate yourself for maintaining regular exercise. However, you're also puzzled by a habit that's interfering with the benefits you seek. You reach for comfort foods when you're pressured. Deep down you know this is the factor that's slowing your progress, yet when you're stressed, your resolve eludes you, and there you go again.

You're not alone. Dr. Alon Chen is a neuroendocrinologist at the Weizmann Institute in Israel. He wanted to find out why so many of us crave sweet, fatty foods when we're stressed out. He discovered a protein in rats called Unc3 that switched on when they became anxious. The results were disturbing. When the rats had elevated levels of Unc3, their bodies used less fatty acids, more sugars, and showed a metabolic increase. These are the beginning signs of type 2 diabetes. Yikes!

Since not many people have stress-free lives are we too destined to become fat? The solution seems easy enough — find time to relax.

Yeah, right. You may be thinking "Great! How am I supposed to find the time to relax and also be able to exercise?" I have a suggestion. Combine the two. There is exercise you can do that can help soothe frayed nerves. It's called yoga.

Yoga postures and breathing mindfully unite to provide effective stress reduction. Nowadays, you can find yoga classes practically everywhere — from the local health club to community centers and even in hospitals. Some yoga poses are especially suited for enhancing relaxation. To do these yoga poses, all you'll need is a chair.

Downward Facing Dog — Place a chair against a wall with the seat facing you. Kneel about two to two and a half feet in front of the seat. Put your hands on the seat. Inhale and come up on your toes, lengthen your legs, elevate your hips, and angle your torso downward. Focus on lengthening your arms, legs, and back to the best of your ability. If you could have a friend gently pull back on your thighs, it would maximize the stretch by easing the weight of the upper body. Breathe regularly and hold for 30 to 45 seconds. Make this pose more challenging by placing your hands on the floor.

Chair Lower Back Stretch — Sitting in your chair, widen your legs so that when you fold forward from the hips, you are able to allow your torso to drape down. Drop your head, allowing your head and neck to relax completely. Putting a rolled-up towel at the crease of your hips can increase comfort. You can hold this pose for a few minutes, allowing your mind and body to relax more deeply with each breath. Roll up on an inhalation.

Rejuvenate your mind and body. Activate your relaxation response with yoga.

DJ Reese, a personal trainer and fitness instructor at health clubs and private settings in the mid-Hudson Valley, writes on fitness in Players. She can be reached at deejayfitness@yahoo.com

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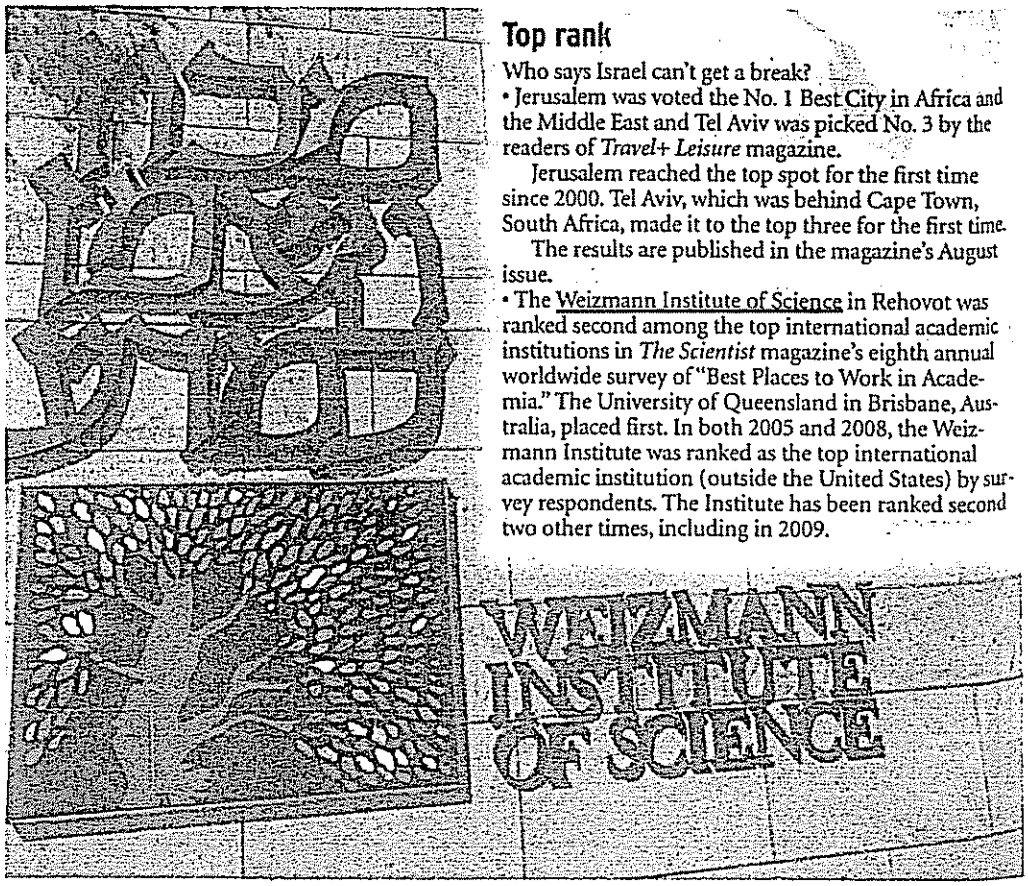

Top rank

Who says Israel can't get a break?

• Jerusalem was voted the No. 1 Best City in Africa and the Middle East and Tel Aviv was picked No. 3 by the readers of *Travel+ Leisure* magazine.

Jerusalem reached the top spot for the first time since 2000. Tel Aviv, which was behind Cape Town, South Africa, made it to the top three for the first time.

The results are published in the magazine's August issue.

• The Weizmann Institute of Science in Rehovot was ranked second among the top international academic institutions in *The Scientist* magazine's eighth annual worldwide survey of "Best Places to Work in Academia." The University of Queensland in Brisbane, Australia, placed first. In both 2005 and 2008, the Weizmann Institute was ranked as the top international academic institution (outside the United States) by survey respondents. The Institute has been ranked second two other times, including in 2009.

THE JERUSALEM POST - FRONT 29/09/2010

Prof. Israel Dostrovsky, a founder of the Weizmann Institute of Science, dies at 92

• By JUDY SIEGEL

A founder and former president of Rehovot's Weizmann Institute of Science and one of Israel's leading scientists, Prof. Israel Dostrovsky, died on Tuesday at the age of 92.

He was born in Odessa in the former Soviet Union in 1918 and arrived here with his family as a baby. After attending primary and secondary school in Jerusalem, he went to study in England and received a bachelor's degree in chemistry and doctorate in physical chemistry, both from University College, London.

After working as a lecturer in chemistry at University College, he joined the Weizmann Institute in 1948, shortly before its dedication. Immediately upon joining the staff of Weizmann, he was appointed director of the isotope research department, a position he held for 17 years.

Between 1971 and 1975, Dostrovsky served as the the Weizmann Institute's vice president and then president, and in 1975 he was named "institute professor," a prestigious title awarded by Weizmann faculty and administration to outstanding scientists who made significant and meaningful contributions to science or to the country.

Between 1980 and 1990, he headed the institute's Center for Energy Research. When he turned 80, the Israel Academy of Sciences and Humanities held a special scientific conference in Jerusalem and at Weizmann to honor the occasion.

ISRAEL DOSTROVSKY

As a state appointee, Dostrovsky served as research director at the Israel Atomic Energy Commission; chairman of the National Council for Research and Development; director-general of the Israel Atomic Energy Commission; and chairman of the desalination committee.

Between 1973 and 1981, he also served as a member of the scientific advisory committee of the United Nations International Atomic Energy Agency in Vienna. He was a member of the Israel Academy of Sciences and Humanities and an honorary life member of the New York Academy of Science. He received the Israel Prize in 1995 and the Ramsey Medal and Prize; Tel Aviv's Weizmann Prize and honorary doctorates from Tel Aviv University and the Technion-Israel Institute of Technology.

THE JERUSALEM POST

SCIENCE & HEALTH

SUNDAY, APRIL 18, 2010 THE JERUSALEM POST

Darwin's finch and the evolution of smell

NEW WORLDS

• BY JUDY SIEGEL-ITZKOVICH

Smell and speech are completely different, but odor may play a role in avian communication, according to Weizmann Institute of Science researchers. Darwin's finches – 14 related species of songbirds found on the Galapagos and Cocos Islands – will forever be enshrined in history for having planted the seeds of the theory of evolution. Today, exactly 150 years after Darwin's famous book, finches can still teach us about evolution. An international group of researchers, among them Prof. Doron Lancet and Dr. Tsviya Olender of the Rehovot institute's molecular genetics department, recently produced the full genome of the zebra finch and analyzed it. Their report, which appeared two weeks ago in *Nature*, is especially significant for what it reveals about the learning of language and speech. For the Weizmann scientists, however, the findings have provided an interesting twist on the evolution of the sense of smell.

Song birds – like humans – are capable of complex communication through sound. The similarity between bird song and human language makes birds a useful scientific model for probing how this ability developed, what neuronal mechanisms are required and which genes encode them. Significantly, the scientific team found that a large percentage of genes expressed in the finch brain are devoted to vocal communication. They also found that the expression levels of a number of genes, specifically those belonging to the important class of micro-RNAs, change after the bird is exposed to song. This implies that such genes might be involved in a bird's ability to learn new tunes.

"The senses are sophisticated means of interacting with the environment. In our lab, we are primarily interested in smell," says Olender, who joined the project along with Lancet in order to map the genes encoding smell receptors in the finch. In doing so, they were entering the fray on a long-standing debate over whether the sense of smell is important for birds. Some positive evidence exists: Homing pigeons have been shown to use smell to help them navigate. In contrast, a computer-aided analysis of the chicken genome had shown that out of 500 genes encoding smell receptors, a mere 70 produce active proteins. Lancet and Olender have now conducted a similar analysis of the zebra finch genome. Their findings revealed that while the finch has the same total number of smell genes, it possesses three times as many that are active. Around 200 of the finch's genes can produce functional smell