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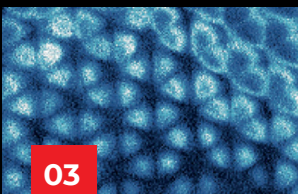


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OF TURKEY

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WHAT IS LABMEDYA ?
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NEW BIONICS CENTER ESTABLISHED AT MIT WITH \$24 MILLION GIFT



Interdisciplinary research center funded by philanthropist Lisa Yang aims to mitigate disability through technologies that marry human physiology with electromechanics.

A deepening understanding of the brain has created unprecedented opportunities to alleviate the challenges posed by disability. Scientists and engineers are taking design cues from biology itself to create revolutionary technologies that restore the function of bodies affected by injury, aging, or disease — from prosthetic limbs that effortlessly navigate tricky terrain to digital nervous systems that move the body after a spinal cord injury.

With the establishment of the new K. Lisa Yang Center for Bionics, MIT is pushing forward the development and deployment of enabling technologies that communicate directly with the nervous system to mitigate a broad range of disabilities. The center's scientists, clinicians, and engineers will work together to create, test, and disseminate bionic technologies that integrate with both the body and mind.

The center is funded by a \$24 million gift to MIT's McGovern Institute for Brain Research from philanthropist Lisa Yang, a former investment banker committed to advocacy for individuals with visible and invisible disabilities. Her previous gifts to MIT have also enabled the establishment of the K. Lisa Yang and Hock E. Tan Center for Molecular Therapeutics

in Neuroscience, Hock E. Tan and K. Lisa Yang Center for Center for Autism Research, Y. Eva Tan Professorship in Neurotechnology, and the endowed K. Lisa Yang Post-Baccalaureate Program.

"The K. Lisa Yang Center for Bionics will provide a dynamic hub for scientists, engineers, and designers across MIT to work together on revolutionary answers to the challenges of disability," says MIT President L. Rafael Reif. "With this visionary gift, Lisa Yang is unleashing a powerful collaborative strategy that will have broad impact across a large spectrum of human conditions — and she is sending a bright signal to the world that the lives of individuals who experience disability matter deeply."

AN INTERDISCIPLINARY APPROACH

To develop prosthetic limbs that move as the brain commands or optical devices that bypass an injured spinal cord to stimulate muscles, bionic developers must integrate knowledge from a diverse array of fields — from robotics and artificial intelligence to surgery, biomechanics, and design. The K. Lisa Yang Center for Bionics will be deeply interdisciplinary, uniting experts from three MIT schools: Science, Engineering, and Architecture and Planning. With clinical and surgical collaborators at Harvard Medical School, the center will ensure that research advances are tested rapidly and reach people in need, including those in traditionally underserved communities.

To support ongoing efforts to move toward a future without disability, the center will also provide four endowed fellowships for MIT graduate students working in bionics or other research areas focused on improving the lives of individuals who experience disability.

"I am thrilled to support MIT on this major research effort to enable powerful new solutions that improve the quality of life for individuals who experience disability," says Yang. "This new commitment extends my philanthropic investment into the realm of physical disabilities, and I look forward to the center's positive impact on

countless lives, here in the U.S. and abroad."

The center will be led by Hugh Herr, a professor of media arts and sciences at MIT's Media Lab, and Ed Boyden, the Y. Eva Tan Professor of Neurotechnology at MIT, a professor of biological engineering, brain and cognitive sciences, and media arts and sciences, and an investigator at MIT's McGovern Institute and the Howard Hughes Medical Institute.

A double amputee himself, Herr is a pioneer in the development of bionic limbs to improve mobility for those with physical disabilities. "The world profoundly needs relief from the disabilities imposed by today's nonexistent or broken technologies. We must continually strive towards a technological future in which disability is no longer a common life experience," says Herr. "I am thrilled that the Yang Center for Bionics will help to measurably improve the human experience for so many."

Boyden, who is a renowned creator of tools to analyze and control the brain, will play a key role in merging bionics technologies with the nervous system. "The Yang Center for Bionics will be a research center unlike any other in the world," he says. "A deep understanding of complex biological systems, coupled with rapid advances in human-machine bionic

interfaces, mean we will soon have the capability to offer entirely new strategies for individuals who experience disability. It is an honor to be part of the center's founding team."

CENTER PRIORITIES

In its first four years, the K. Lisa Yang Center for Bionics will focus on developing and testing three bionic technologies:

digital nervous system, to eliminate movement disorders caused by spinal cord injuries using computer-controlled muscle activations to regulate limb movements while simultaneously stimulating spinal cord repair; brain-controlled limb exoskeletons, to assist weak muscles and enable natural movement for people affected by stroke or musculoskeletal disorders; and bionic limb reconstruction, to restore natural, brain-controlled movements as well as the sensation of touch and proprioception (awareness

of position and movement) from bionic limbs.

A fourth priority will be developing a mobile delivery system to ensure patients in medically underserved communities have access to prosthetic limb services. Investigators will field-test a system that uses a mobile clinic to conduct the medical imaging needed to design personalized, comfortable prosthetic limbs and to fit the prostheses to patients where they live. Investigators plan to initially bring this mobile delivery system to Sierra Leone, where thousands of people suffered amputations during the country's 11-year civil war. While the population of persons with amputation continues to increase each year in Sierra Leone, today less than 10 percent of persons in need benefit from functional prostheses. Through the mobile delivery system, a key center objective is to scale up production and access of functional limb prostheses for Sierra

Leoneans in dire need.

"The mobile prosthetics service fueled by the

overjoyed that this pilot project will give Sierra Leoneans (especially in rural areas) access to



K. Lisa Yang Center for Bionics at MIT is an innovative solution to a global problem," says Julius Maada Bio, president of Sierra Leone. "I am proud that Sierra Leone will be the first site for deploying this state-of-the-art digital design and fabrication process. As leader of a government that promotes innovative technologies and prioritizes human capital development, I am

quality limb prostheses and thus improve their quality of life."

Together, Herr and Boyden will launch research at the bionics center with three other MIT faculty: assistant professor of media arts and sciences Canan Dagdeviren, Walter A. Rosenblith Professor of Cognitive Neuroscience Nancy Kanwisher, and David H. Koch (1962)

Institute Professor Robert Langer. They will work closely with three clinical collaborators at Harvard Medical School: Marco Ferrone, an orthopedic surgeon; Matthew Carty, a plastic surgeon; and Nancy Oriol, Faculty Associate Dean for Community Engagement in Medical Education.

"Lisa Yang and I share a vision for a future in which each and every person in the world has the right to live without a debilitating disability if they so choose," adds Herr. "The Yang Center will be a potent catalyst for true innovation and impact in the bionics space, and I am overjoyed to work with my colleagues at MIT, and our accomplished clinical partners at Harvard, to make important steps forward to help realize this vision."

<https://news.mit.edu/2021/new-bionics-center-established-mit-24-million-gift-0923>

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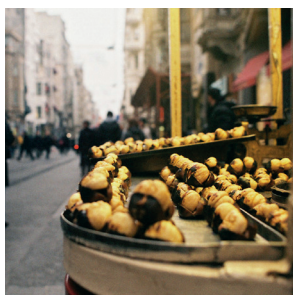
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WINTER TASTES OF TURKEY

Winter is near so we thought it would be nice to introduce some of the delicacies you might come across in Istanbul during the year's coldest months. Some can be found on any busy street, whereas others need to be pursued into a restaurant.. These tastes are so much a part of Turkish culture, that they don't just fill our stomach, but also shape our winter experience too.

KESTANE (CHESTNUTS)



Chestnuts are perhaps the most symbolic streetfood that is associated with winter. During your travels in Istanbul, it is inevitable that you will come across

a street vendor roasting chestnuts. The look and the smell of it catches you so that it is hard to resist not indulging in some. This winter delicacy is also high in fibers and has a low glycemic index which means that as well as being tasty, chestnuts are actually healthy snack option. You can find a lot of chestnuts vendors on the ever busy Istiklal Avenue in Beyoğlu.

SALEP



Salep is a Turkish drink that is only consumed in winter. It warms you up and gives you a unique taste combined with cinnamon on top. It is quite filling, so it's best not to drink it with a

dessert. Most of the coffee and teashops offer salep in winter season, so it's easy to find on a cold winter day. It is produced from tubers of wild orchids and helps to fight coughs and uneasiness of the stomach.

BOZA



Boza is a famous Ottoman drink that has a cultural history dating back to 17th century. In cold winter nights, Boza sellers used to go around in neighborhoods with a gallon of Boza on their back calling with a certain rhythm "Boooooo- Zaaaaa" a practice that continues in some parts of the city. For a truly unique experience

of drinking boza, pay a visit to the historical "Vefa Bozacısı" This charming café was established in 1876 and has become an iconic destination to consume the traditional drink. To really drink it like a local, enjoy with leblebi (roasted chickpeas) and cinnamon sprinkled on top. Another good reason to drink boza is its nutritional qualities. It contains lactic acid that few foods contain. It is also a rich source of vitamin A, B and E and highly recommended for pregnant women to consume.

LEBLEBI (ROASTED CHICKPEAS)



I've already mentioned that it's typical to consume them with Boza, but leblebi (roasted chickpeas) are in themselves a winter delicacy. Many stores roast chickpeas in daytime so that you can go and buy some warm, freshly-roasted chickpeas on your way home. Leblebi are low on fat and high in healthy carbohydrates, so good to consume. You can taste freshly-roasted leblebi in Mısır Çarşısı (the Spice Bazaar), somewhere you might have already included it in your tour plan.

TURŞU (PICKLES)



Pickles mainly help us to preserve our vegetables

throughout winter. With a sour and salty taste pickle is a cultural winter delicacy in Turkey. Many fish vendors and fish serving boats in Eminönü, serve pickles in a glass with its only juices. Drinking the pickle juice is believed to protect you from the cold. The most common types of pickles in Turkey are cabbage, green pepper, and cucumber, but you can also find almost any other vegetable preserved this way. If you want your loved ones to taste this delicacy, there are many pickle shops in Istanbul where you can buy a jar of pickles as a gift for family or friends. To try some handmade pickles and/or to get them as a gift, you should check out Asri Turşucu in Cihangir. They have a rich variety of pickles and a long history tracing back to 1930s.

KABAK TATLISI (PUMPKIN DESSERT)



Pumpkin dessert is a typical winter food that you have to try. Pumpkin is cooked in syrup in the oven and served with hazelnuts crumbled on top. It is also common to pour tahini sauce on it. You can try it in many restaurants all around Istanbul during winter. Although you can find it in many restaurants, Çiya Restaurant in Kadıköy has a mouthwatering pumpkin dessert that you might want to try. They also have various types of Kebabs and traditional



foods that you can have a full gourmet experience.

AYVA TATLISI (QUINCE DESSERT)



Quinces are winter fruits that are highly common in Turkey. Since quinces grow quickly and give abundance of fruit all at once, there are many ways to preserve them. One way is making a dessert with it. Similar to pumpkin dessert, quinces are also cooked in oven with syrup. It is also usual that it is served with clotted cream on top. It is a traditional delicacy that will sweeten your winter days.

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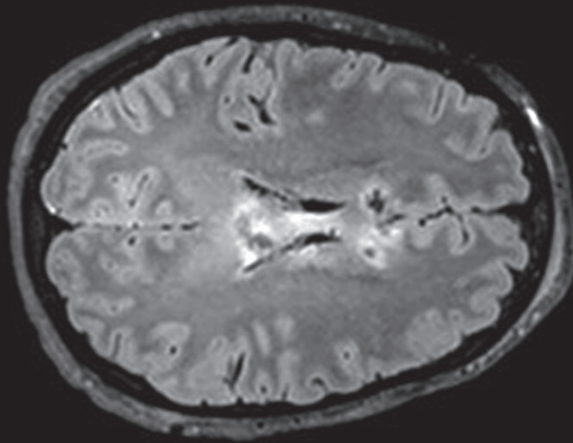
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A BLOOD TEST MAY HELP PREDICT RECOVERY FROM TRAUMATIC BRAIN INJURY



High levels of a key blood protein point to brain shrinkage and damage to message – sending axons



Elevated blood levels of a specific protein may help scientists predict who has a better chance of bouncing back from a traumatic brain injury.

The protein, called neurofilament light or NfL for short, lends structural support to axons, the tendrils that send messages between brain cells. Levels of NfL peak on average at 10 times the typical level 20 days after injury and stay above normal a year later, researchers report September 29 in *Science Translational Medicine*. The higher the peak NfL blood concentrations after injury, the tougher the recovery for people with traumatic brain injury (TBI) six and 12 months later, shows the study of 197 people treated at eight trauma centers across Europe for moderate to severe TBI.

Brain scans of 146 participants revealed that their peak NfL concentrations predicted the extent of brain shrinkage after six months, and axon damage at six and 12 months after injury, neurologist Neil

Graham of Imperial College London and his colleagues found.

These researchers also had a unique opportunity to check that the blood biomarker, which gives indirect clues about the brain injury, actually measured what was happening in the brain. In 18 of the participants that needed brain surgery, researchers sampled the fluid surrounding injured neurons. NfL concentrations there correlated with NfL concentrations in the blood.

“The work shows that a new ultrasensitive blood test can be used to accurately diagnose traumatic brain injury,” says Graham. “This blood test can predict quite precisely who’s going to make a good recovery and who’s going to have more difficulties.”

Study participants were adults and mostly male, so more work needs to be done to determine if these findings apply to women, children and people with mild TBI.

“No two traumatic brain injuries are alike,” says David Okonkwo, director of the Neurotrauma Clinical Trials Center at the University of Pittsburgh. Scientists have been looking for biomarkers of TBI injury such as NfL to develop injury-specific interventions, and Okonkwo says these new findings are promising for patients whose injury has damaged their axons.

“We have not had the tools to measure a specific injury type of an individual patient,” Okonkwo says. While this test probably is still a few years from use in U.S. clinics, other large research groups are looking for ways to use NfL and other blood-based biomarkers for diagnosing TBI and creating opportunities for intervention.

onal marker neurofilament light predicts long-term outcomes and progressive neurodegeneration after traumatic brain injury

Research Article|Science Translational Medicine|

2020 TOKYO OLYMPIC GAMES



Olympic games ended after one year delay and without audience.

We are still going through a pandemic measures since 2019, and we had to postpone everything, including the most important things, during this duration. The 2020 Tokyo Olympics was another organization affected by this situation. Although the Olympic Games took a shorter time than the pandemic, they gave us a taste of excitement, fighting spirit and sportsmanship as well as improved our morale.

Let’s look at the overall standings at the Olympic Games: The USA took the first place with 39 gold, 41 silver and 33 bronze medals, overtaking China, which was long behind. China was second with 38 gold, 32 silver and 18 bronze medals. Japan finished third with 27 gold, 14 silver and 17 bronze. Turkey finished the games in 35th place

with 13 medals, two gold and two silver as well as 9 bronze. The medals that Turkey won in the 2020 Olympic Games were as follows;

- Mete Gazoz, Archery, Gold Medal
- Busenaz Sürmeneli, Box, Gold Medal
- Eray Şamdan, Karate, Silver Medal
- Buse Naz Çakıroğlu, Box, Silver Medal
- Hakan Reçber, Taekwondo, Bronze Medal
- Hatice Kübra İlgün, Taekwondo, Bronze Medal
- Rıza Kayaalp, Wrestling, Bronze Medal
- Yasemin Adar, Wrestling, Bronze Medal
- Ferhat Arıcan, Gymnastics, Bronze Medal
- Taha Akgül, Wrestling, Bronze Medal
- Ali Sofuoğlu, Karate, Bronze Medal
- Merve Çoban, Karate, Bronze Medal
- Uğur Aktaş, Karate, Bronze Medal

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A MATERIAL MADE ENTIRELY OUT OF ELECTRONS

No camera could have possibly imaged the crystal, so the scientists had to get creative. Instead, they managed to get their snapshot using a scanning tunneling microscope (STM), which uses a probe to detect the exact location of the gridlocked electrons by observing how they respond to a tiny jolt of electricity. It's a move that other scientists unrelated to the experiment was particularly clever.

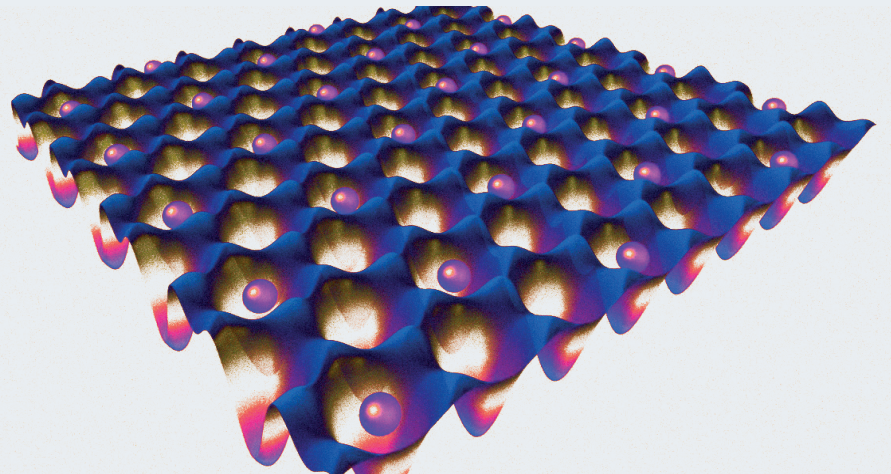
"I think that's a great advancement, being able to perform STM on this system," Columbia University physicist Carmen Rubio said.

THIS IS WHAT A SOLID MADE OF ELECTRONS LOOKS LIKE

If the conditions are just right, some of the electrons inside a material will arrange themselves into a tidy honeycomb pattern — like a solid within a solid. Physicists have now directly imaged these 'Wigner crystals', named after the Hungarian-born theorist Eugene Wigner, who first imagined them almost 90 years ago.

Researchers had convincingly created Wigner crystals and measured their properties before, but this is the first time that anyone has actually taken a snapshot of the patterns, says study co-author Feng Wang, a physicist at the University of California, Berkeley. "If you say you have an electron crystal, show me the crystal," he says. The results were pub-

THIS IS THE FIRST TIME SOMEONE CLAIMING TO MAKE A WIGNER CRYSTAL PRESENTED PROOF.



lished on 29 September in Nature.

To create the Wigner crystals, Wang's team built a device containing atom-thin layers of two similar semiconductors: tungsten disulfide and tungsten diselenide. The team then used an electric field to tune the density of the electrons that moved freely along the interface between the two layers.

In ordinary materials, electrons zoom around too quickly to be significantly affected by the repulsion

travelled slowly enough, that repulsion would begin to dominate their behaviour. The electrons would then find arrangements that minimize their total energy, such as a honeycomb pattern. So Wang and his colleagues slowed the electrons in their device by cooling it to just a few degrees above absolute zero.

A mismatch between the two layers in the device also helped the electrons to form Wigner crystals.

distances apart, so pairing them together creates a honeycomb 'moiré pattern', similar to that seen when overlaying two grids. That repeating pattern created regions of slightly lower energy, which helped the electrons settle down.

GRAPHENE TRICK

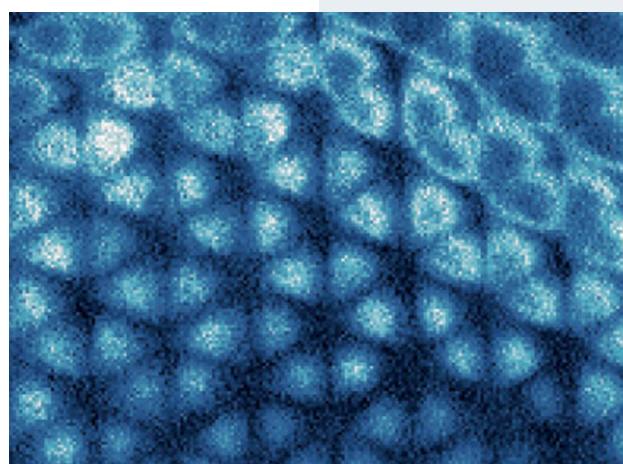
The team used a scanning tunnelling microscope (STM) to see this Wigner crystal. In an STM, a metal tip hovers above the surface of a sample, and a voltage causes electrons to jump down from the tip, creating an electric current. As the tip moves across the surface, the changing intensity of the current reveals the location of electrons in the sample.

Initial attempts to image the Wigner crystal by applying the STM directly on the double-layer device were unsuccessful, Wang says, because the current destroyed the fragile Wigner arrangements. So the team added a layer of graphene, a single-atom sheet of carbon, on top. The presence of the Wigner crystal slightly changed the electron

structure of the graphene directly above, which was then picked up by the STM. The images clearly show the neat arrangement of the underlying Wigner electrons. As expected, consecutive electrons in the Wigner crystal are nearly 100 times farther apart than are the atoms in the semiconductor device's actual crystals.

"I think that's a great advancement, being able to perform STM on this system," says Carmen Rubio Verdú, a physicist at Columbia University in New York City. She adds that the same graphene-based method will enable STM studies of a number of other interesting physical phenomena beyond Wigner crystals. Kin Fai Mak, a physicist at Cornell University in Ithaca, New York, agrees. "The technique is non-invasive to the state you want to probe. To me, it is a very clever idea."

Nature 598, 21 (2021)



This scanning tunneling microscope image of a graphene sheet reveals that a 'Wigner crystal' — a honeycomb arrangement of electrons — has formed inside a layered structure underneath. Credit: H. Li et al./Nature

between their negative charges. But Wigner predicted that if electrons

The atoms in each of the two semiconductor layers are slightly different



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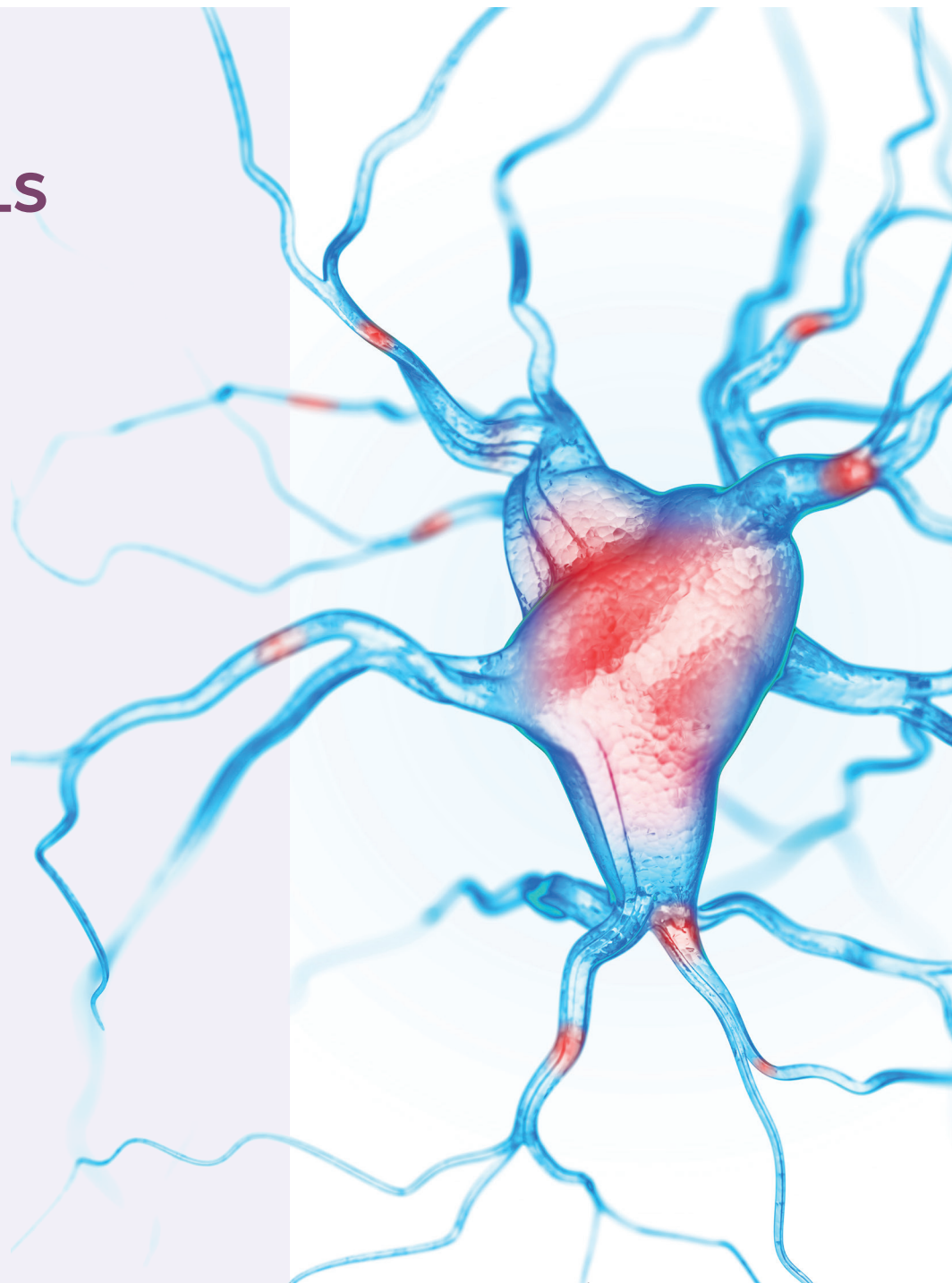
SCIENTISTS 3D PRINTED BRAIN CELLS



A team of scientists, using a new laser technique, managed to 3D print living, functioning mouse brain cells in the lab.

A group of researchers including a Concordia PhD student have developed a new method of bioprinting adult neuron cells. They're using a new laser-assisted technology that maintains high levels of cell viability and functionality. PhD candidate and 2020-21 Public Scholar Hamid Orimi and his co-authors present the feasibility of a new bioprinting technology they developed in a recent paper published in the journal *Micromachines*. They demonstrate how the methodology they created, called Laser-Induced Side Transfer (LIST), improves on existing bioprinting techniques by using bioinks of differing viscosities, allowing for better 3D printing. Orimi, his Concordia co-supervisor Sivakumar Narayanswamy in the Gina Cody School of Engineering and Computer Science, CRHMR co-supervisor Christos Boutopoulos and co-authors at the Université de Montréal first presented the method in the *Nature* journal *Scientific*

Reports in 2020. Orimi co-wrote the newer paper with lead author Katiane Roversi, Sebastien Talbot and Boutopoulos at UdeM and Marcelo Falchetti and Edroaldo da Rocha at Federal University of Santa Catarina in Brazil. In it, the researchers demonstrate that the technology can be used to successfully print sensory neurons, a vital component of the peripheral nervous system. This, they say, is promising for the long-term development of bioprinting's potential, including disease modelling, drug testing and implant fabrication. Viable and functional The researchers used dorsal root ganglion (DRG) neurons from the peripheral nervous system of mice to test their technology. The neurons were suspended in a bioink solution and loaded into a square capillary above a biocompatible substrate. Low-energy nanosecond laser pulses were focused on the middle of the capillary, generating microbubbles that expanded and ejected a cell-laden microjet onto the substrate below it. The samples were briefly incubated, then washed and re-incubated for 48 hours. The team then ran several tests to measure the printed cells' capacities. A viability assay found that 86 percent of the cells remained alive two days after printing. The researchers note that viability rates improved when the laser used lower energy. The



thermomechanics associated with higher laser energy use was more likely to damage the cells. Other tests measured neurite outgrowth (in which developing neurons produce new projections as they grow in response to guidance cues), neuropeptide release, calcium imaging and RNA sequencing. Overall, the results were generally encouraging, suggesting that the technique could be an important contribution to the field of bioprinting. "In general, people often leap to conclusions when

we talk about bioprinting," Orimi says. "They think that we can now print things like human organs for transplants. While this is a long-term objective, we are very far from that point. But there are still many ways to use this technology." Nearest at hand is drug discovery. The team hopes to get approval to continue their research into cell grafting, which can assist greatly in drug discovery, such as for nerve recovery medicines. Another advantage to using this technology, Orimi says, is a decrease in

animal testing. This not only has a humanitarian aspect -- fewer animals will be euthanized to carry out experiments meant to benefit humans -- but it will also produce more accurate results, since testing will be carried out on human, not animal, tissue.

Article: Bioprinting of Adult Dorsal Root Ganglion (DRG) Neurons Using Laser-Induced Side Transfer (LIST). *Concordia University Micromachines* 2021, 12(8), 865; <https://doi.org/10.3390/mi12080865>

UNIVERSITY STUDENTS PRODUCE UNMANNED 'SPACE EXPLORATION VEHICLE'

Students of the "Rover Team" working in the field of robotics at Gebze Technical University (GTU) produced a prototype of an unmanned space exploration vehicle that can move over rough terrain and interfere with objects, taking samples from the objects they encounter and analyzing them.

With the vehicle they completed in about 6 months, the students who participated in the European Rover Challenge, one of the most prestigious space and robotics competitions held in Poland this year, ranked 11th among 60 teams.

The students, who continue their work on the vehicle, aim to get better grades by participating in the University Rover Challenge competition to be held in the USA next year.

Yunus Emre Eyüboğlu, the team leader and second year student of the Mechanical Engineering Department, explained that the team was established last year to work in the field of robotics and participate in competitions.

Eyüboğlu stated that there are 35 members from different departments in the team, and there are 5 sub-teams: electronics, software, mechanics, science and promotion.

Eyüboğlu stated that the exploration vehicles known



The space exploration vehicle, designed and prototyped by Gebze Technical University students in 6 months, can move autonomously over rough terrain and analyze samples taken from objects.

as "rover" are vehicles designed to conduct scientific research on different planets, and they also produced prototypes last year to participate in the competitions held in this field.

Eyüboğlu said, "It is a vehicle that can manipulate objects with the robot arm on it, then take soil samples and examine them, and can drive autonomously."

"SOFTWARE AND DESIGN BELONGS TO US"

Eyüboğlu gave the following information about the features of the vehicle:

"The software and design



of the vehicle belongs to us. One of its most distinctive features is that it can go from one place to another in a field by deciding on its own. For example when we start it from A and say 'Go to C', the vehicle avoids obstacles and creates its own route. With the 6-axis robotic arm in front of it, it can manipulate the objects encountered on the road. When it comes across an interesting object, it takes it and analyzes it."

Eyüboğlu drew attention to the fact that they entered the finals in the 6th place in the qualifying stage and said:

"Later, our ranking dropped because we couldn't compete in some missions in the finals. This is because we can't take the batteries of our vehicle by plane. Therefore, we shipped the batteries. We thought we would get them when we went to Poland later, but when we went to Poland, not even one person at the customs spoke English. We couldn't agree with the ones at the customs, so we sent the cargo. We couldn't compete in technical duties because our electronic components remained in customs. We got to the 11th place by only performing the pres-

entation task. When we looked at the scoreboard, we could jump 3 places up in the ranking even if we only entered the missions."

Referring to their short and medium-term goals, Eyüboğlu said, "Currently, we want to participate in the University Rover Challenge, which will be held in the USA next year. We can compete in Poland again. Maybe we can all be part of a formation, a start-up, with the experience we gained here." used the phrases.

'GHOST ENGINE' PRODUCED BY TURKISH ENGINEERS WILL NOT LEAVE 'TRACE' IN WATER



The boat and yacht engine produced by a company in Konya, besides having electric and environmentally friendly technology, works with high efficiency with low energy consumption compared to its counterparts.

Dewjet company, which started its activities on the production of electric motors in the industrial site in the central Karatay district, started to work on the production of boats and jet engines with the support of the Ministry of Industry and Technology.



Under the leadership of the company's manager, Muhammed Ali Okka, an environmentally friendly and outboard electric jet engine was designed with

the outstanding efforts and efforts of Turkish engineers who are experts in their fields.

The electric motor, which works with low energy consumption and high efficiency compared to its counterparts, can be used in the defense industry as well as in boats and yachts.

The domestic engine, which draws attention with its 40 kilograms weight compared to the engines over 200 kilograms of the brands that dominate the market in the world, does not leave any traces in the water with its unique design. The engine, whose prototype was tested and successful results were registered, was made ready for mass production.

HIGHLY EFFICIENT AND ENVIRONMENTALLY FRIENDLY

Muhammed Ali Okka, said that the company was established to produce

electric boats and yacht engines in the field of advanced technology.

Pointing out that there is a rapid transition to electric



motors in sea and land vehicles, Okka emphasized that the change in climate and the damage caused by fossil fuel engines to the environment are effective in this.

Okka pointed out that two types of engines are used in marine vehicles, "In terms of impact systems, there are propellers and jet engines. Fossil fuel engines are rapidly banned in developed countries due to the damage they cause to the environment with their high emission values. Electric ones are also highlighted with supports. Propeller engines are less efficient than jet engines."

Explaining that they started working on domestic jet engine production with 17 engineers from different branches who are experts

in their fields, Okka said that the design became flesh and bone after a 5-year R&D process.

"THIS GHOST ENGINE IS NOT ON THE RADAR"

Okka stated that at the end of last year, the work in the company they founded on electric water jet technology accelerated and said:

"We have got the European, USA and Turkish patents of the electric jet engine. It is unique in the world, lighter than its counterparts, no service cost, low cost, long lasting. Since there is no shaft in our engine, the propeller range is very wide, which gives our engine extra efficiency.

Due to its silence, it is in serious demand from the

defense industry. Traceless, propeller engines leave a large trail of foam and bubbles behind. Visually, the trace in the water is minimized. This ghost engine is not on the radar. It has such an advantage. It's also pretty quiet. It can cover 30%-40% more range than engines in the same segment. Since it works in water, it does not need a cooling system. This makes the battery last longer. It increases the range and lightens the engine as well.

They will publish their work in the academic field once the tests of the engine are completed by accredited institutions, Okka reported that the mass production design of the jet engine has been completed.

DUTCH SCIENTISTS MAY HAVE SOLVED MYSTERY OF WHY SOME TWINS ARE IDENTICAL

The medical mystery of what causes some twins to be born identical may have been solved by scientists in the Netherlands, raising hopes for treatment of congenital disorders that disproportionately afflict them.

Identical twins form after a fertilised egg, called a zygote, splits into two embryos sharing exactly the same genes. The reason for the split is unknown.

The prevailing theory has been that the biological process that leads to "monozygotic twinning" is random. But international researchers led by the Vrije Universiteit Amsterdam believe they have found a common "signature" on the DNA of identical twins.

The research, published in the journal Nature Communications, looked at the epigenetic modifications in twins' DNA, factors that can switch genes "on" or "off" without changing their underlying sequence. It found that identical twins from across the world shared similar marks at 834 points across their genome, the sum total of an organism's DNA.

The shared marks, the scientists say, can allow researchers to determine, with up to 80% accuracy whether an individual is an identical twin, including those unaware they had lost their twin in the womb, known as vanishing twin syndrome, or been separated at birth.

It is yet to be proved that the chemical marks on the DNA are the cause of identical twins being conceived,

as it remains possible that is a consequence of the twinning process. But it is said to be a plausible

working theory, and the discovery of the common marks could be helpful for a wide group of people.

Article: Identical twins carry a persistent epigenetic signature of early genome programming



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TINY RARE FOSSIL FOUND IN 16 MILLION YEAR OLD AMBER



Microscopic tardigrades have thrived on Earth for more than 500 million years, and may well outlive humans, but the tiny creatures don't leave behind many fossils.

Hiding in plain sight, the third-ever tardigrade fossil on record has been found suspended within a piece of 16-million-year-old Dominican amber.

The find includes a newly named species, *Paradorphyribius chronocaribbeus*, as a relative of the modern living family of tardigrades known as *Isohypsibiodea*. It's the first tardigrade fossil from the Cenozoic, our current geological era that began 66 million years ago.

Beneath a microscope, tiny tardigrades look like water bears. Although they are commonly found in water -- and at times, serving as the nemesis in "Ant-Man and the Wasp" -- tardigrades are known for their ability to survive and even thrive in the most extreme environments.

These tiny, pudgy ani-

mals are no longer than one millimeter. They have eight legs with claws at the end, a brain and central nervous system, and something sucker-like called a pharynx behind their mouth that can pierce food. Tardigrades are the smallest-known animal with legs.

All of these details are incredibly well preserved in the new fossil specimen, down to its tiny claws.

progression through Earth history."

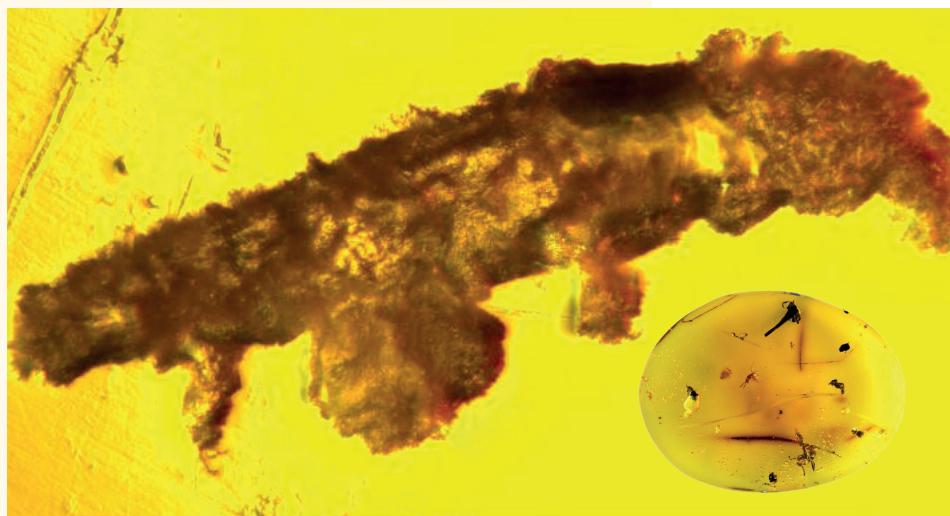
The fossil allowed researchers to see evolutionary aspects that aren't present in modern tardigrades, which means they can understand how they've changed over millions of years.

At first, the researchers didn't even notice the tardigrade was trapped in the piece of amber.

to rely on imaging techniques usually reserved for cellular and molecular biology shows how challenging it is to study fossil tardigrades," said Javier Ortega-Hernández, study coauthor and assistant professor of organismic and evolutionary biology at Harvard University, in a statement. "We hope that this work encourages colleagues to look more closely at their amber samples with similar techniques

our planet today."

Tardigrades can tolerate extremes better than most forms of life -- like surviving five mass extinction events on Earth -- and some recently traveled to the International Space Station. It's not the first time tardigrades have gone to space -- and there may even be some of them on the moon after a mission carrying them crashed into its surface.



This is a close-up view of the newly discovered tardigrade species trapped in amber.

"The discovery of a fossil tardigrade is truly a once in a generation event," said Phil Barden, senior author of the study and assistant professor of biology at New Jersey Institute of Technology, in a statement.

"What is so remarkable is that tardigrades are a ubiquitous ancient lineage that has seen it all on Earth, from the fall of the dinosaurs to the rise of terrestrial colonization of plants," Barden said. "Yet, they are like a ghost lineage for paleontologists with almost no fossil record. Finding any tardigrade fossil remains is an exciting moment where we can empirically see their

This 16 million year old Dominican amber includes a tardigrade fossil as well as three ants, a beetle and a flower.

"It's a faint speck in amber," said Barden. "In fact, *Pdo. chronocaribbeus* was originally an inclusion hidden in the corner of an amber piece with three different ant species that our lab had been studying, and it wasn't spotted for months."

Close observational analysis helped the researchers determine where the new species belongs on the tardigrade family tree.

"The fact that we had

to better understand these cryptic organisms."

The new species is the first definitive fossil for the modern *Isohypsibiodea* family of tardigrades found across both marine and land environments today.

"We are just scratching the surface when it comes to understanding living tardigrade communities, especially in places like the Caribbean where they've not been surveyed," said Barden. "This study provides a reminder that, for as little as we may have in the way of tardigrade fossils, we also know very little about the living species on

The tiny animals are related to arthropods and have a deep origin during the Cambrian Explosion, when multiple species of animals suddenly appear in Earth's fossil record, 541 million years ago. More tardigrade fossils could be hiding within other pieces of amber that have already been studied -- researchers just have to look close enough and have the expertise of what they're looking for when it comes to microscopic fossils.

And tardigrades could outlive humans. It's because they would be largely unaffected by things that could potentially spell doom for Earth and human life in the future, like asteroids, supernovae or gamma ray bursts. As long as the world's oceans don't boil away, tardigrades will live on.

Article: A tardigrade in Dominican amber

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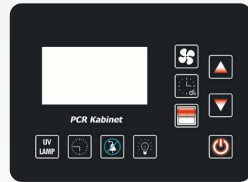
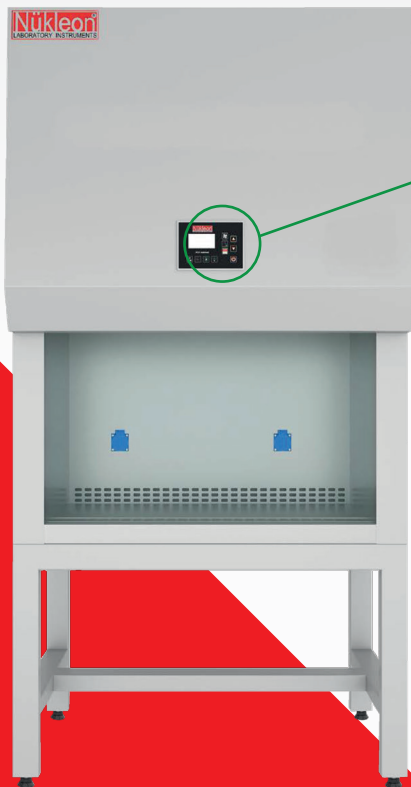
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A LAND THAT TURNS INTO HEAVEN

The sound of Skiboards sliding on the snow, a conclave of amateur mountaineers and scattered figurines of snowmen. All these are lesser known persona of Turkey. Winters in Turkey are definitely worth an experience. Some even say that Turkey is better visited in the colder months.

If you are looking for a totally unique skiing experience, then you are in for a real treat if you are planning to spend your winter in Turkey. There are several ski areas in Turkey along with world-class heli-skiing. Besides this, cherish other winter sports too and witness the authentic local life. Right from competitively priced hotels to cheap round trip flights, get prepared to have your mind blown away.

Turkey winter season continues from December till February. It could get chilly

and even rainy at times. So, if you do not find frequent showers of rain and nippy weather, then you must definitely go for it. In case you are wondering if there's snow in Turkey, then you will be delighted to know the answer is yes.

WHY WINTER IN TURKEY?

Turkey has three different climate zones due to its immense size. The winters in Turkey starts from mid-December and ends in mid-March. Different regions of Turkey experience different quality of winter. It can range from mild to snowy or from rainy to dry cold. Temperatures may vary from -13°C to 24°C depending upon the climate zone. Erzurum is the coldest place in Turkey during the season.

Turkey has always been perceived as a summer holiday destination, but Turkey is a good choice for

your winter getaways too. Turkey is quieter in winter, so you won't have to deal with a lot of tourist crowd. This also brings us to the second most important point, which is expenses. The place is cheaper, especially the accommodation and your choices are also wide. Another important aspect of your trip is experiencing the culture. During winter, because of the less crowd, you will have better access to public places and people.

HOT-AIR BALLOONING IN CAPPADOCIA



The vast amount of travelers may arrive in

Cappadocia between April and October but in winter, when the fairy chimney formations are topped with a dusting of snow, the landscape here is at its most magical.

The best way to experience the sinewy valleys, filled with hoodoo rocks and spiky cones, in all their snowy glory is from the air.

Cappadocia's hot-air ballooning is one of Turkey's most famous activities and top of most tourists' things to do list. Ballooning runs year-round here (though it sometimes has to be called off due to inclement weather) and provides bird's-eye panoramic views across the landscape.

You'll need to wrap up warm and be prepared for sub-zero temperatures when being picked up for your ballooning tour, as balloon flights take off just after dawn.

For your best chance of snowy landscapes, come in January or February. Although snow is possible any time from November through to April, these two months generally bring the most snow.

LAKE ÇILDİR SLEIGHING



A favorite winter destination for Turkish tourists, who flock here during February, Lake Çıldır is still well off most foreign visitor's radars. This high-altitude lake, in Turkey's mountainous northeastern corner, is a winter wonderland and well worth the long journey out here.

The lake is Turkey's second biggest, measuring 123 square kilometers.

During the winter months, Lake Çıldır freezes solid and is surrounded by a landscape of snowy mountains. Locals run horse-sleigh trips and ice-fishing trips out onto the lake throughout the depths of winter. It's a highly popular way to experience this fantastical snow-blanketed landscape, which seems to have dropped straight out of a storybook.

Sleighting tours often include a visit to one of the ice-fishing sites on the lake, where local villagers demonstrate their traditional winter fishing skills.

As well as the traditional sleighing activities, snow mobile rental and other more modern transport methods are available on the lake.

On winter weekends, the lake gets very busy with visitors, so try to come midweek.

SKIING AT ULUDAĞ



Uludağ is Turkey's busiest ski center, thanks to it being within easy reach of Istanbul.

Reached by either road from the city of Bursa, 36 kilometers to the north, or by the Bursa Teleferik, which is the longest cable-car ride in the world, the ski resort area on the slopes here offers full

facilities for a day of skiing or snowboarding and full rental facilities for ski equipment.

From the resort area, there are 28 kilometers of pistes ranging from beginner to experienced skier levels, with 16 lifts available for transport to the various slopes.

For those who want a ski break, rather than just a day trip, there are 27 hotels in the resort area.

The ski season here runs from late-December to early-March but is generally at its best during January and February.

PALANDÖKEN SKIING



Palandöken Ski Center (also known as Ejder 3200) sits on the slopes of Mount Palandöken, seven kilometers from the city of Erzurum in Turkey's northeast.

This ski resort is generally thought to be Turkey's best with excellent facilities combined with 43 kilometers of slopes (making up 22 pistes). There are 13 ski lifts, including a main cable car, connecting the ski runs.

With the resort area sitting at 2,200 meters, this is Turkey's highest altitude ski center and so attracts plenty of adventurous, experienced skiers, who want to ski off-piste down the treeless high-altitude slopes.

There are trails here,

though, that are also good for beginner and intermediate skiers and snowboarders, and facilities for families such as a toboggan park.

If skiing isn't enough, Palandöken is also where you come for winter tandem paragliding.

Due to the resort's high altitude, the ski season here tends to be longer than at other Turkish ski centers, with skiing possible usually for around 150 days annually from December through to April.

Regular public transport from Erzurum to the resort area means that ski day trips are easy. The ski center itself has plenty of hotel accommodation as well as cafés, restaurants, and spa facilities.

Come on a weekday if you can because on the weekends, the main ski runs can get packed.

DISCOVER LAKE ABANT



Surrounded by thick pine tree forest, Lake Abant is a freshwater lake in north-west Turkey, 39 kilometers south of the city of Bolu. The lake sits at the center of a national park at around 1,200 meters high and covers an area of just over 1.2 square kilometers.

With walking trails looping around the lake and both bike and horse riding available on the trails, it's a year-round destination for

visitors wanting a nature escape. In winter, though, photographers flock here to capture snaps of the winter wonderland vistas on strolls around the lake. During the depths of this season, the entire lake surface freezes, and the pine trees are frozen white, turning the lake area into a sublime snowy panorama.

Sitting roughly halfway between Istanbul and Ankara, this one of Turkey's most accessible destinations to seek out Turkey's wintry vistas.

SKIING AT SARIKAMIS



It may not be as popular as Turkey's other ski centers, but Sarikamis is something of an in-the-know secret among winter sports lovers.

Sitting 55 kilometers southwest of Kars, Sarikamis is particularly revered among its fans for its excellent powder snow, which skiers here claim are the best snow conditions in Turkey.

The long season skiing opportunities, usually from early December through to April, also make it a favorite destination with winter visitors.

There are four long pistes, surrounded by thick pine forest, and three connecting lifts.

Skiing and snowboarding here is good for beginners through to advanced skiers, and the resort area has five hotels and full equip-

ment rental facilities.

KARTEPE



Kartepe, one of the top ski resorts in Turkey, especially a favorite among Istanbulites for its proximity to the city.

Located in Kocaeli province -- 100 kilometers (60 miles) east of Istanbul -- the 1,640-meter high winter destination offers mesmerizing views of both the Gulf of Izmit, Sapanca Lake, and forests for amateur and professional skiers alike.

And for those who are not that into sports involving snow and ice and cold, Kartepe features various outdoor activities, including natural hiking, bird watching, paragliding, and horseback riding.

Visitors may also participate in zip-lining, mountain biking, paintball, and safari tour activities just outside the resort.

Kartepe's 21 ski pistes stretch for 17 kilometers (10 miles) with three ski lifts and two teleskis.

Last season, a total of 100,000 people, including some 15,000 foreigners visited the facilities.

And when is it not covered with snow and ice, Kartepe hosts football clubs for summer training camps, offering natural grass pitches and two fitness facilities at FIFA standards.

MICROBES' MYSTERY DNA HELPS DEFEAT VIRUSES AND HAS GENOME EDITING POTENTIAL

Seven years ago, an understanding of nature inspired a revolutionary new technology, when researchers turned a defense system used by bacteria to thwart viruses into the gene-editing tool now known as CRISPR. But for another emerging gene editor the understanding has lagged the applications. For several years, researchers have been adapting retrons—mysterious complexes of DNA, RNA, and protein found in some bacteria—into a potentially powerful way to alter genomes of single cell organisms. Now, biology is catching up, as two groups

far has appeared only as a preprint, reports a similar finding.

The new understanding of retrons' natural function could boost efforts to put them to work. Retrongs are "quite efficient tools for accurate and efficient genome editing," says Rotem Sorek, a microbial genomicist at the Weizmann Institute of Science and an author of the *Cell* study. But they don't rival CRISPR yet, in part because the technology hasn't been made to work in mammalian cells.

In the 1980s, researchers studying a soil bacterium were puzzled to find many copies of short sequences of single-stranded DNA littering the cells. The mystery deepened when they learned each bit of DNA was attached to an RNA with a complementary base sequence. Eventually they realized an enzyme called reverse transcriptase had made that DNA from the attached RNA, and that all three molecules—RNA, DNA, and enzyme—formed a complex.

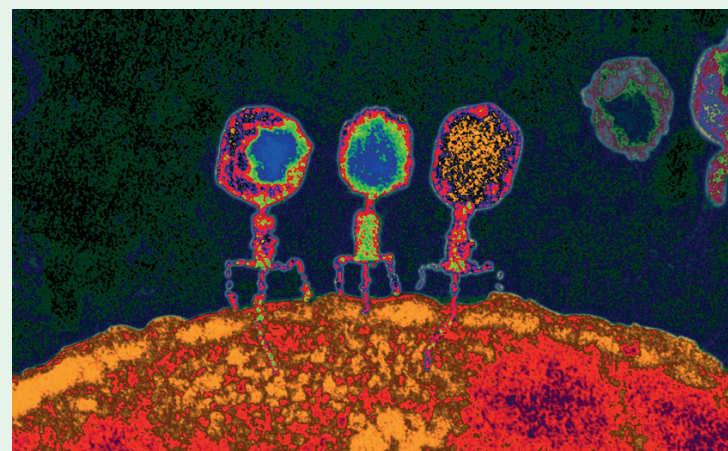
Similar constructs, dubbed retrongs for the reverse transcriptase, were found in many bacteria. "They really are a remarkable biological entity, yet nobody knew what they were for," says Ilya Finkelstein, a biophysicist at the University of Texas, Austin.

Sorek came upon an early hint of their function when he and his colleagues searched through 38,000 bacterial genomes for

genes used to fight off phages. Such genes tend to be close to one another, and his team developed a computer program that searched for new defense systems next to the genes for the CRISPR and other known antiviral constructs. One stretch of DNA stood out to Weizmann graduate student Adi Millman

protein—to defeat a variety of viruses.

For a retron called Ec48, Sorek and colleagues showed the associated protein delivers the coup de grâce by homing in on a bacterium's outer membrane and altering its permeability. The researchers concluded that the



because it included a gene for a reverse transcriptase flanked by stretches of DNA that didn't code for any known bacterial proteins. By chance, she came across a paper about retrongs and realized that the mysterious sequences encoded one of their RNA components. "That was a nontrivial leap," Sorek says.

The team then noticed that the DNA encoding retron components often accompanied a protein-coding gene, and the protein varied from retron to retron. The team decided to test its hunch that the cluster of sequences represented a new phage defense. They went on to show that bacteria needed all three components—reverse transcriptase, the DNA-RNA hybrid, and the second

retron somehow "guards" another molecular complex that is the bacterium's first line of antiviral defense. Some phages deactivate the complex, which triggers the retron to unleash the membrane-destroying protein and kill the infected cell, Millman, Sorek, and their team reported on 6 November in *Cell*.

A second group has reached similar conclusions. Led by Athanasios Typas, a microbiologist at the European Molecular Biology Laboratory (EMBL), Heidelberg, the group realized that next to the genes coding for a retron in a *Salmonella* bacterium was a gene for a protein toxic to *Salmonella*. The team discovered the retron normally keeps the toxin under wraps, but activates



Sparking thoughts of CRISPR's beginnings, the genetic elements called retrongs can only edit single-cell organisms so far.

report evidence that, like CRISPR, retrongs are part of the bacterial immune arsenal, protecting the microbes from viruses called phages.

Last week in *Cell*, one team described how a specific retron defends bacteria, triggering newly infected cells to self-destruct so the virus can't replicate and spread to others. The *Cell* paper "is the first to concretely determine a natural function for retrongs," says Anna Simon, a synthetic biologist at Strand Therapeutics who has studied the bacterial oddities. Another paper, which so

it in the presence of phage proteins.

The two groups met at an EMBL meeting in the summer of 2019. "It was refreshing to see how complementary and converging our work was," Typas says. The teams simultaneously posted preprints on their work in June on bioRxiv. Even before these discoveries, other researchers had taken advantage of retrons' then-mysterious features to devise new gene editors. CRISPR easily targets and binds to or cuts desired regions of the genome, but

mutated. They combined them with CRISPR's "guide RNA," which homes on the targeted DNA, and the CAS9 enzyme that acts as CRISPR's molecular scissors. Once CAS9 cut the DNA, the cell's DNA repair mechanisms replaced the yeast gene with the DNA generated by the retron's reverse transcriptase.

CRISPEY enabled Stanford graduate student Shi-An Anderson Chen and his colleagues to efficiently make tens of thousands of yeast mutants, each different by just one base. That let them determine, for example, which bases were essential for yeast to thrive in glucose. "CRISPEY is very cool and extremely powerful," says Harmit Malik, an evolutionary biologist at the Fred Hutchinson Cancer Research Center. This year, two other teams—led by geneticist George Church at Harvard University and Massachusetts Institute of Technology synthetic biologist Timothy Lu—described similar feats in bacteria in bioRxiv preprints.

so far it isn't very adept at introducing new code in the target DNA. Retrongs, combined with elements of CRISPR, seem able to do better thanks to their reverse transcriptases: They can manufacture lots of copies of a desired sequence, which can be spliced efficiently into the host genome. "Because CRISPR-based systems and retrongs have different strengths, combining them is a highly promising strategy," Simon says.

In 2018, researchers in Hunter Fraser's Stanford University lab introduced a retron-derived base editor, dubbed CRISPEY (Cas9 retron precise parallel editing via homology). First, they made retrongs whose RNA matched yeast genes, but with one base

Researchers are excited about retrongs, but caution they have a lot to learn about how to turn these bacterial swords into plowshares. "It could be that retrongs will be as revolutionary as CRISPR has been," Simon says. "But until we understand more about the natural biology and synthetic behavior of retrongs, it is difficult to say."

<https://www.science.org/content/article/microbes-mystery-dna-helps-defeat-viruses-and-has-gene-editing-potential>

WORLD HEALTH ORGANIZATION SAYS GENE EDITING SUPERHUMANS MUST BE ILLEGAL



After the now-infamous scientist He Jiankui experimentally gene-hacked several human embryos and allowed them to be born as babies, the genetics research community began to scramble to for new ground rules.

Now some of those rules are starting to take shape, The Wall Street Journal reports. A special World Health Organization advisory panel issued two new reports that issue recommendations and ethical guidelines for the international research community around thorny genetics ethics questions.

Unfortunately for anyone who'd hoped that recent advances in CRISPR tech meant they could gene-hack their way into some swole muscles, for instance, it seems like human augmentation outside of medical necessity is getting the axe.

"We want people to look at what is happening now and what we need to do to shape the way the



New framework aims to prevent unfair and potentially dangerous applications of experimental techniques, including altering DNA to enhance athletic ability

research will proceed," Dalhousie University gene editing ethicist and committee member Françoise Baylis told the WSJ.

Alongside gene editing meant to augment human performance, the reports also urged against germline edits, or any genetic alteration that a patient would pass along to their future

children. Instead, ethicists generally agree — and the committee recommended — that it's best to focus on edits intended to treat or reverse diseases.

The report also sought to make sure that gene therapies would be distributed equitably throughout the world. Too commonly, its authors said, clinical trials will be conducted in poorer countries while the resulting therapies end up in wealthier nations, with high price tags attached.

WHO reports run into similar issues as other international treaties: it's not clear who, exactly, will enforce them beyond voluntary adherence.

"It is still a very open question in my mind of who is responsible for doing it," Jeffrey Kahn, a Johns Hopkins University bioethicist who worked on a similar report last year, told the WSJ, "and who is going to step up."

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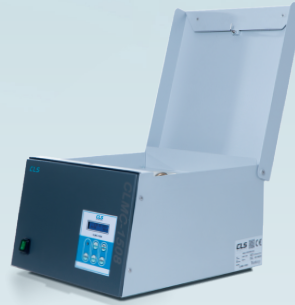
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