Cholesterol Drug

Applying a common cholesterol-lowering drug, Zocor (simvastatin), to the skin appears to speed wound healing in diabetic mice, a new study shows.

News in Brief

New Device Harvests Energy From Rail Track Vibrations

Much of the abundant mechanical energy around us is irregular and oscillatory, and can be somewhat difficult to efficiently tap into.

Typical energy harvesting systems tend to be built for low power applications in the milliwatts range but researchers from New York's Stony Brook University have developed a new patent-pending electromagnetic energy harvester capable of harnessing the vibrations of a locomotive thundering down a stretch of track to power signal lights, structural monitoring systems or even track switches, Gizmag wrote.

As a train rolls down the track, the load it exerts on the track causes vertical deflection. This displacement could engage a regenerative device like an electromagnetic harvester and generate enough power to operate local railway applications, which is especially useful in remote areas where electrification is not cost effective.

Harvesting such energy is much more efficient with regular, unidirectional motion, but track vibrations caused by a moving train are pulse-like, bidirectional and somewhat erratic.

Professor Lei Zuo and graduate students Gopinath Reddy Penamalli, Teng Lin and John Wang from the University's Department of Mechanical Engineering claim to have designed a new harvester capable of converting irregular, oscillatory rail track vibrations into regulated unidirectional rotational motion, similar to the way that an electric voltage rectifier converts AC voltage into DC.

"The US has the longest rail tracks in the world, approximately 140,700 miles; that are often in remote areas. It is very important but also very costly to power the track-side electrical infrastructure, such as the signal lights, cross gates, track switches and monitoring sensors," said Professor Zuo.

"Our invention (the Mechanical Motion Rectifier-based Railroad Energy Harvester) can harness 200 watts of electric energy from train-induced track deflections to power the track-side electrical devices. By using two one-way clutches, the innovative mechanical motion rectifier converts the irregular up-and-down vibration motion into unidirectional rotation of the generator, thus breaking the fundamental challenge of vibration energy harvesting and offering significant advantages of high efficiency and high reliability."

Invisible Umbrella Designed

In design and engineering, a simple rule is repeated often: the fewer moving parts, the better.

The Air Umbrella concept from designers Je Sung Park and Woo Jung Kwon takes that rule to heart by removing the only moving parts on the traditional umbrella design, IdeaConnection wrote.

Rather than a fabric or plastic canopy, the Air Umbrella uses a steady stream of air to keep the user dry. The simple plastic stick is held in the hand like any other umbrella handle.

Air is sucked up through the bottom of the handle and expelled through the top so forcefully that it creates a kind of cushion that won't let raindrops reach the user.

Simple controls on the handle would let the user modify the size of the canopy (single or double) and lengthen or shorten the handle itself.

The design is certainly creative and its aesthetic is sophisticated and minimalist. The only question is whether it would work in a real-world setting with heavy rain, sleet or even hail.

Digital Teabags Brew Drinks In 2 Minutes

The company that introduced the world to first round teabags has now developed Te, a pod-based tea-maker, which will reduce time to brew the drink from the traditional 4 minutes to 2.

According to the Cambridge Consultants, their new invention has "a disposable capsule and the ability to reduce brew time and increase drink quality", NewsTrackIndia reported.

The company has also claimed that the new prototype is "taking tea making to the next level".

The new system allows users to choose the strength of their tea; prices of capsules will vary depending on the quality of the tea, and the machines would likely be cheaper than some coffee machines.

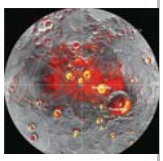
The company said that the popularity of capsule-based coffee machines like Nespresso meant that the tea industry is under pressure to produce a quicker, more consistent way for consumers to make the perfect brew.

Te is based on a traditional tea brewing method, but uses a specially engineered recirculating pump technology, incorporated in the capsule.

"While coffee systems have seen a significant amount of innovation over the last decade nothing has changed in tea brewing, leaving the tea drinker almost forgotten about," Edward Brunner, Group Leader of the Industrial and Scientific Group at Cambridge Consultants, said.

"We saw a real opportunity to use our experience in the beverage industry to level the playing field."

Ice Found On Mercury



Burning hot Mercury has ice and frozen organic materials inside permanently shadowed craters in its north pole, NASA scientists said.

Earth-based telescopes have been compiling evidence for ice on the planet closest to the sun for 20 years, but researchers were left surprised after finding organics, TG Daily said.

NASA's Messenger spacecraft, the first probe to orbit Mercury, has revealed the materials are similar to tar or coal. They are believed to have been delivered millions of years ago by comets and asteroids crashing into the planet.

"It's not something we expected to see, but then of course you realize it kind of makes sense because we see this in other places," such as icy bodies in the outer solar system and in the nuclei of comets, planetary scientist David Paige, with the University of California, Los Angeles, said.

Unlike NASA's Mars rover Curiosity, which will be sampling rocks and soils to look for organic materials directly, the Messenger probe bounces laser beams, counts particles, measures gamma rays and collects other data remotely from orbit.

The discoveries of ice and organics, painstakingly pieced together for more than a year, are based on computer models, laboratory experiments and deduction, not direct analysis.

Polar Ice Loss Accelerating

Ice loss in Antarctica and Greenland has contributed nearly half an inch to the rise in sea levels in the past 20 years, according to an assessment of polar ice sheet melting that researchers are calling the most reliable yet.

According to LiveScience, what's more, ice loss is rapidly speeding up in the north, while the rate in Antarctica has been fairly constant, the researchers report in the journal Science.

Ice loss has been notoriously difficult to measure and different studies have produced wildly different results, but the new study combines their methods to determine that the ice lost from Antarctica and Greenland accounts for .44 inches (11.1 millimeters), or a fifth, of the 2.2 inches that the seas have risen on average since 1992, said Ian Joughin, a glaciologist at the University of Washington in Seattle who collaborated on the study.

The rest of the sea level rise has been caused by melting of other ice around the world and by thermal expansion of ocean waters, which take up more space as they get warmer. Sea-level rise is not distributed evenly over the globe. Some areas, such as off the US Northeast, are disproportionately affected.

"Greenland is losing mass at about five times the rate today as it was in the early 1990s," study researcher Erik Ivins, an earth scientist at NASA's Jet Propulsion Laboratory, said in a press conference about the results. "In some contrast, Antarctica appears to be more or less constant, although for the last decade we appear to see about a 50 percent increase in ice-loss rate."

9th Science Olympiad Opens

Science Desk

Iran is hosting the 9th International Junior Science Olympiad (IJSO) 2012 in which students will answer questions related to physics, chemistry and biology.

Dr. Dina Izadi, the head of the event's Organizing Committee, said Ariaian Young Innovative Minds Institute, in cooperation with the National Institute of Genetic Engineering & Biotechnology, Payam-e Noor University in Tehran and Shahid Abbaspour University, is holding IJSO 2012 in Tehran during December 1-10.

More than 30 countries are attending the event.

According to the statutes of the IJSO, each participating country is expected to send a team of six students and three team leaders or a team of three students and one team leader.

The 8th IJSO was concluded successfully in Durban, South Africa, from 1 to 10 December 2011. Iranian students scored two bronze medals in the 8th round.

South Africa excelled by being placed 19th after winning five bronze medals.

The annual IJSO was first held in 2004 in Jakarta, Indonesia, for students under the age of 15.

Stem Cells Made From Blood

A patient's own blood has been used to make stem cells, which doctors hope will eventually be used to treat a range of diseases.

The team at the University of Cambridge says this could be one of the easiest and safest sources of stem cells, BBC said.

In a study, published in the journal Stem Cells: Translational Medicine, the cells were used to build blood vessels. However, experts caution that the safety of using such stem cells was still unclear.

Stem cells are one of the great hopes of medical research. They can transform into any other type of cell the body is built from--so they should be able to repair everything from the brain to the heart, and eyes to bone.

One source of stem cells is embryos, but this is ethically controversial and they would be rejected by the immune system in the same way as an organ transplant.

Researchers have shown that skin cells taken from an adult can be tricked into becoming stem cells, which the body should recognize as part of itself and would not reject.

The team at Cambridge looked in blood samples for a type of repair cell that whizzes through the bloodstream repairing any damage to the walls of blood vessels. These were then converted into stem cells.

Dr. Amer Rana said this method was better than taking samples from skin.

"We are excited to have developed a practical and efficient method to create stem cells from a cell type found in blood," he said.

"Tissue biopsies are undesirable, particularly for children and the elderly, whereas taking blood samples is routine for all patients."

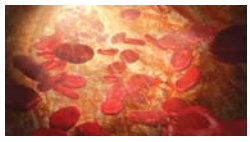
Dr. Rana said the cells also appeared to be safer to use than those made from skin.

"The fact that these appeared to be fairly stable is very promising," he said.

"The next stage obviously is to say, 'Okay, if we can do all this, let's actually make some clinical grade cells,' we can then move this technology into the clinic for the first time."

Prof Chris Mason, an expert on regenerative medicine at University College London, said there was some "beautiful work" coming out of the lab in Cambridge.

"It's a hell of a lot easier to get a blood sample than a high quality skin sample,



so that's a big benefit," he said.

"However, induced pluripotent stem cells [those converted from adult cells] are still very new, we need far more experience to totally reprogram a cell in a way we know to be safe."

The British Heart Foundation said these cells had "great potential".

The Medical Research Council said there was "rapid progress" being made in the this field.

Can Amphibious Homes Withstand Floods?

Houses that rise and fall with the level of groundwater have been touted as the latest solution to the now seemingly annual floods inundating portions of the UK every autumn.

Over the past week, days of torrential rain have flooded roads and more than 900 homes across the UK, leaving hundreds unable to return to their homes, Daily Mail reported.

The Environment Agency has warned that the flood risk remains high across the country, with 277 alerts and 204 warnings in place in England and Wales.

Now authorities are looking at a range of solutions for dealing with ever more frequent floods, including homes that float as waters rise.

Different Concepts

Baca Architects were earlier this year granted permission to build Britain's first amphibious house along the banks of the Thames in Buckinghamshire.

The house, which is a replacement for another property, rests on land, but in the event of the river bursting its banks, it is able to rise with the water to keep its inhabitants dry.

The floating house is just one idea being looked at by the Environment Agency, as it investigates new technologies for dealing with floods.

Flood risk engineer Tony Andryszewski said the agency is keen to look at how other countries deal with repeat flooding, particularly the Netherlands seen as a world leader in flood management technologies.

Homes are frequently built on stilts in Thailand, Burma, India and Bangladesh, which all have regions notoriously susceptible to catastrophic flooding.

But the more elegant solution of homes that float is more rare, although examples of different designs exist in Germany, Canada, the US and even Taggs Island in the UK.

The Baca Project currently under construction in Bucks will, however, be the UK's first fully amphibious house.

Free-Floating Pontoon

Part of the award-winning LifE (Long-term Initiatives for Flood-risk Environments) project, of which Baca is a partner, the house is designed as a free-floating pontoon resting on fixed foundations.

"The floating house is secured by four dolphins (permanent vertical posts) arranged close up to the sidewalls," Baca explains.

"The assembly is sited within a wet dock comprising retaining walls and base slab. When flooding occurs, the dock fills with water and the house rises accordingly."

Every aspect is designed to stop any water penetrating inside, so if a flood

strikes the owners can stay put.

A carefully laid out garden will act as a natural early warning flood system, with terraces set at different levels designed to flood incrementally and alert the occupants well before the water reaches a threatening level.

The lowest terrace will be planted with reeds, another with shrubs and plants, another will be lawn and the highest step will be a patio with access into the dining room.