Conserve The Energy™

It's Tomorrow™

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INSIDE...

Article : 1 Super-charging ...
Read more...

Article : 2 A new gene ...
Read more...

Article : 3 Bacteria made ...
Read more...

Article : 4 Genetic control ...
Read more...

Why ???

We the people on the earth are gifted with wonderful energy sources by the nature, which has made our routine much more smother & easier... However, this gift of the nature is ' limited '. What we have done is, with the growth of science & technology, we have started using it extremely, because of which the energy resources are going to finish in near future. Hence, let us take the pledge to conserve the energy - save the energy!!!

Tips of the Month

Article - 1 : Super-charging drug development for COVID-19

Researchers are ramping up production of a promising drug that has proven effective in obliterating SARS-CoV in cellular cultures. The team hopes that the drug might also be effective in the fight against SARS's close genetic cousin, the novel coronavirus (COVID-19). Led by Northwestern University and ShanghaiTech University, the team has produced the promising molecule, called valinomycin, in a cell-free system. With this approach, they increased production yields more than 5,000 times in just a few rapid design cycles, achieving higher concentrations of the molecule than achieved previously in cells. "Because we use cell-free systems, we can optimize production faster than in cells to further increase yields," said Northwestern's Michael Jewett, who co-led the study. "For example, pathway optimization cycles take days rather than weeks or months, and this speed could be ever so important when dealing with a pandemic like the coronavirus COVID-19 outbreak."

Jewett leads multiple projects that use cell-free biotechnology to accelerate COVID-19 therapeutics. His group takes the molecular machinery out of cells, and then uses that machinery to make a product, such as therapeutics, in a safe, inexpensive and rapid manner. The idea is akin to opening the hood of a car and removing the engine, which allows researchers to use the engine for different purposes, free from the constraints of the car. A naturally occurring peptide, valinomycin has recently emerged as a potential antiviral to treat SARS. Jewett imagines using cell-free synthetic biology to find similar molecules or to modify valinomycin to make it safer and more potent. Jewett is a member of Northwestern's Chemistry of Life Processes Institute and the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

**Source: https://www.sciencedaily.com/releases/2020/04/200413140505.htm*

** I m a g e S o u r c e : : https://www.mccormick.northwestern.edu/news/articles/2020/04/super-charging-drug-development-for-covid-19.html*

Article - 2 : A new gene therapy strategy, courtesy of nature

Scientists have developed a new gene-therapy technique by transforming human cells into mass producers of tiny nano-sized particles full of genetic material that has the potential to reverse disease processes. Though the research was intended as a proof of concept, the experimental therapy slowed tumor growth and prolonged survival in mice with gliomas, which constitute about 80 percent of malignant brain tumors in humans. The technique takes advantage of exosomes, fluid-filled sacs that cells release as a way to communicate with other cells. While exosomes are gaining ground as biologically friendly carriers of therapeutic materials -- because there are a lot of them and they don't prompt an immune response -- the trick with gene therapy is finding a way to fit those comparatively large genetic instructions inside their tiny bodies on a scale that will have a therapeutic effect.

This new method relies on patented technology that prompts donated human cells such as adult stem cells to spit out millions of exosomes that, after being collected and purified, function as nanocarriers containing a drug. When they are injected into the bloodstream, they know exactly where in the body to find their target -- even if it's in the brain. In 2017, Lee and colleagues made waves with news of a regenerative medicine discovery called tissue nanotransfection (TNT). The technique uses a nanotechnology-based chip to deliver biological cargo directly into skin, an action that converts adult cells into any cell type of interest for treatment within a patient's own body. By looking further into the mechanism behind TNT's success, scientists in Lee's lab discovered that exosomes were the secret to delivering regenerative goods to tissue far below the skin's surface. The scientists placed about 1 million donated cells (such as mesenchymal cells collected from human fat) on a nano-engineered silicon wafer and used an electrical stimulus to inject

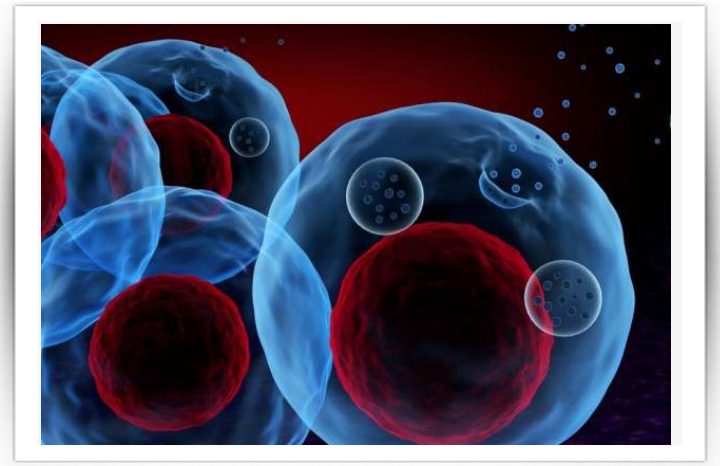

**Image Source: https://medicalxpress.com/news/2019-12-gene-therapy-strategy-courtesy-mother.html*

synthetic DNA into the donor cells. As a result of this DNA force-feeding, as Lee described it, the cells need to eject unwanted material as part of DNA transcribed messenger RNA and repair holes that have been poked in their membranes.

The electrical stimulation had a bonus effect of a thousand-fold increase of therapeutic genes in a large number of exosomes released by the cells, a sign that the technology is scalable to produce enough nanoparticles for use in humans.

**Source: https://www.sciencedaily.com/releases/2019/12/191216173700.htm*

Article - 3 : Bacteria made to mimic cells, form communities

Rice University scientists have found a way to engineer a new kind of cell differentiation in bacteria, inspired by a naturally occurring process in stem cells. They have created a genetic circuit able to produce genetically distinguished cells of Escherichia coli as the bacterium divides. By controlling this process, it is possible to create diverse communities of microbes that exhibit complex, non-native behaviors.

Rice synthetic biologist Matthew Bennett and Sara Molinari, a former student in the university's Systems, Synthetic and Physical Biology Ph.D. program, led the project to show how manipulating the genetic code of plasmids -- free-floating pieces of circular DNA in cells -- can be used to obtain stem cell-like differentiation in bacteria. "Stem cells have the remarkable ability to divide asymmetrically," Bennett said. "Upon division, the original stem cell stays the same, but the new daughter cell has a completely new phenotype. That's asymmetric cell division, and multicellular organisms use it to help control their cellular makeup. "As a synthetic biologist, I think a lot about creating and controlling differentiated cell types within a multicellular population," he said. "Here, we've taken what we know about stem cells and engineered the means to do it in bacteria." The researchers reported the development, which they call asymmetric plasmid partitioning (APP), in Nature Chemical Biology. Molinari first discovered how to force plasmids in E. coli to aggregate in a single cluster so they do not distribute homogeneously during cell division, but rather are inherited by only one of the two daughter cells. The plasmid-laden daughter cell remains identical to the progenitor cell, while its sibling becomes genetically distinct as it loses the genetic information present on the plasmids.

She then expanded the synthetic circuit to induce the simultaneous asymmetric partitioning of two plasmid species in a single cell, resulting in four genetically distinct E. coli. Some of the cells have motility programmed in; they can literally go their own way and help form patterns in the resulting colony. APP could turn simple organisms into complicated systems that enhance understanding of multicellular life. "We're pretty good at designing bacteria," Bennett

Image Source: https://biosciences.rice.edu/news/bacteria-made-mimic-cells-form-communities

said. "We've been doing that for years now. I think the field has evolved to the point where we can do amazing things with bacteria and people are asking what else we can do."

Source: https://www.sciencedaily.com/releases/2019/08/190812140351.htm

Article - 4 : Genetic control for major agricultural weeds?

Waterhemp and Palmer amaranth, two aggressive weeds that threaten the food supply in North America, are increasingly hard to kill with commercially available herbicides. A novel approach known as genetic control could one day reduce the need for these chemicals. Now, scientists are one step closer. In a study published today in Weed Science, researchers from the University of Illinois identified genetic signatures that distinguish male waterhemp and Palmer amaranth plants from females. The discovery is a crucial part of developing a genetic control system for the damaging weeds. The researchers' goal is to one day introduce genetically modified male plants into a population to mate with wild females. Modified male plants would contain a gene drive, a segment of DNA coding for maleness, which would be passed on to all its offspring, and their offspring, and so on. Ultimately, all plants in a given population would become male, reproduction would cease, and populations would crash.

It's a controversial strategy, but Pat Tranel, the U of I scientist leading the project, says they're still in the very early stages. "It's important to emphasize that we are not at the point of releasing genetically modified waterhemp and Palmer. We are doing basic research that could inform how we could do that," says Tranel, professor and associate head of the Department of Crop Sciences in the College of Agricultural, Consumer and Environmental Sciences at U of I. "We found sequences present in waterhemp and Palmer males that were not found in females, but no female-specific sequences. Then we took known males from other populations and looked for the sequences -- they were there," Tranel says. "Our sequences not only worked, they confirmed males are the heterogametic sex in these plants," Tranel says. In humans, males have an X and a Y chromosome, and male gametes, sperm, contribute either an X or a Y to the next generation. Females have two X chromosomes, and every egg carries an X. Males are heterogametic; females, homogametic. Similarly, male waterhemp and Palmer amaranth plants produce pollen with either the male-specific Y region or not.

"The fact that males are the heterogametic sex suggests that maleness is dominant. That's good in that it's easier to control the trait (maleness) if the gene for that trait is dominant," Tranel explains. "When we get to the point of identifying the specific genes for maleness, they would be an obvious target for a gene drive where you could spread that

Image Source: https://www.eurekalert.org/pub_releases/2019-07/uoic-isa071719.php

maleness gene in the population." In the meantime, however, having a set of genetic sequences that can accurately identify males before flowering could help the researchers better understand the biology of the plants and their response to the environment. For example, Tranel says the discovery could help determine if the weeds are able to switch sexes under certain conditions or if one sex is more sensitive to herbicides. Both concepts have been proposed by previous research or anecdotal reports.

Source: https://www.sciencedaily.com/releases/2019/07/190718112434.htm

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Save our Climate!

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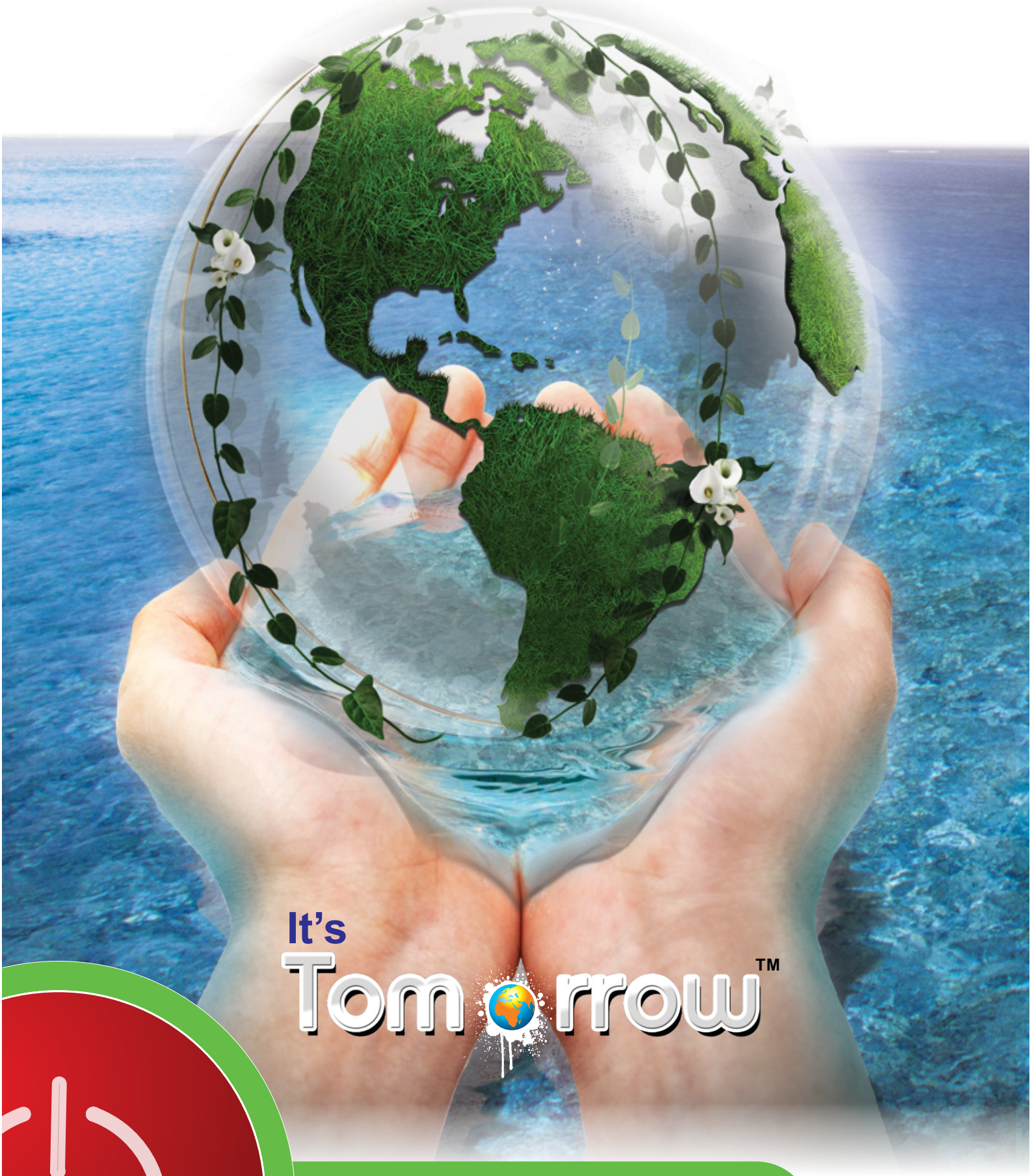
The Energy



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