The Lord is like a strong tower, where the righteous can go and be safe.
Proverbs 18:10

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Be alert, stand firm in the faith, be brave, be strong.
1 Corinthians 16:13

Cavite residents advised to get revised GCQ passes

IMUS CITY, Cavite – Cavite residents will be required to present revised passes to be able to get out of their houses during the general community quarantine (GCQ) which will be implemented May 16 to May 31 in the province.

This was disclosed by Governor Juanito Victor "Jonvic" Remulla Jr. as he reminded Cavitenos that the 8 p.m. to 5 a.m. daily curfew, the ban on liquor, mandatory wearing of face masks, social distancing and other certain rules which were strictly imposed under the enhanced community quarantine (ECQ) will still be implemented under GCQ.

He noted that the only ones who will be exempted from the GCQ curfew will be those with working


REMULLA

permits.

Remulla said the residents would have to secure a revised quarantine pass, or q-pass.

Remulla emphasized that the q-passes granted for the citizens will not be "freedom passes".

"Bagamat magandang pakinggan, ang GCQ ay hindi para maghigay ng normal na buhay katulad ng dati. Ito ay para bigyan ng umpisa ang ekonomiya, ngunit kailangan pa rin bigyan ng sapat na proteksiyon ang kalusugan ng mamamayan. Ang GCQ AY HINDI FREEDOM PASS," Remulla said.

Remulla made the remarks in messages that he posted on his Facebook last May 13.

PH judokas serving as frontliners

While most athletes and coaches stay indoors amid the ongoing coronavirus (COVID-19) pandemic, the majority of the national judo team is out on the streets, risking their lives as front-liners in the battle against this health crisis.

Two-time Olympian John Baylon, an Air Force sergeant who now shares his expertise as national coach, is deployed in Cavite since the enhanced community quarantine began two months ago.

The 34-year-old Baylon, Philippine judo's venerated luminary who won nine straight Southeast Asian Games gold medals, is also a


BAYLON

Brazilian jiu-jitsu black belter.

Airman first class Gilbert Ramirez, who bagged a silver medal in the SEA Games last year (men's 81kg), is likewise at the center of the action, busy aiding the containment of the virus in the highly-critical Sampaloc area in Manila.

"Our national coaches and athletes in the uniformed service are proudly helping the country in the campaign to stop COVID-19 from further infecting our communities," said Philippine Judo Federation president Dave Carter.

SEA Games medalists Jeneiloo Mosqueda and Helen Dawn, both police officers, have been deployed on the front line as well as the Coast Guard's Jack

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Discovery of malaria parasite's clock could pave way to new treatments

In the fight against malaria, time may now be on our side.

The parasite that causes the disease has its own internal clock, Howard Hughes Medical Institute Investigator Joseph Takahashi and colleagues report May 14, 2020, in the journal Science. The team's findings were based on experiments in mice, while an accompanying paper, by biologist Steven Haase's team at Duke University, reports similar findings in the malaria parasite that infects humans.

The discovery overturns decades of conventional wisdom about the malaria parasite and raises the possibility of new treatments for the disease in the years ahead. Malaria kills around 400,000 people per year worldwide and remains a leading cause of death in many tropical nations, particularly among young children.

Scientists could potentially harness the parasite's biological rhythms to disrupt its invasion of human cells, says Takahashi, a neuroscientist at the University of Texas Southwestern Medical Center. Thousands of the parasite's genes turn on and off in a rhythmic fashion, he found, likely influencing a broad suite of physiological processes.

"It's as if the entire parasite is under this 24-hour program," he says. "We think that if we can figure out what controls that program, we'd have a new target to try to inhibit the life cycle of the parasite."

Circadian clocks, which control metabolism on a daily rhythm, are important in virtually all living things, from bacteria to plants and animals. But little is known about the role of daily rhythms in parasites, which also have to contend with their hosts' clocks.

In malaria, Plasmodium parasites grow inside the host's red blood cells and destroy them, triggering fevers and other symptoms.

(Pvt... from page 1)

telow Escarpe and Bryn Quilliste who are both SEA Games bronze team event winners.

Other members of the national judo squad required to serve the public in the current pandemic are head coach Franco Teves of the Philippine Navy and athletes Mauro Tumampad of the airport police, PH coast guard's Alven Mendiola and PH Army's Lloyd Dennis Carpos.

"Their sacrifice is invaluable. They help keep our citizens safe amid this crisis," said Cortes.

Researchers discover potential targets for COVID-19 therapy

A team of biochemists and virologists at Goethe University and the Frankfurt University Hospital were able to observe how human cells change upon infection with SARS-CoV-2, the virus causing COVID-19 in people. The scientists tested a series of compounds in laboratory models and found some which slowed down or stopped virus reproduction. These results now enable the search for an active substance to be narrowed down to a small number of already approved drugs. Based on these findings, a US company reports that it is preparing clinical trials. A Canadian company is also starting a clinical study with a different substance.

Since the start of February, the Medical Virology of the Frankfurt University Hospital has been in possession of a SARS-CoV-2 infection cell culture system. The Frankfurt scientists in Professor Sandra Ciesek's team succeeded in cultivating the virus in cell cultures from swabs taken from two infected individuals returning from Wuhan (Hoehl et al. NEJM 2020).

Using a technique developed at the Institute for Biochemistry II at Goethe University Frankfurt, researchers from both institutions were together able to show how a SARS-CoV-2 infection changes the human host cells. The scientists used a particular form of mass spectrometry called the mPROD method, which they had developed only a few months previously. This method makes it possible to determine the amount and synthesis rate of thousands of proteins within a cell.

Potentially fatal combinations of humidity and heat are emerging across the globe

Most everyone knows that humid heat is harder to handle than the "dry" kind. And recently, some scientists have projected that later in the century, in parts of the tropics and subtropics, warming climate could cause combined heat and humidity to reach levels rarely if ever experienced before by humans. Such conditions would ravage economies, and possibly even surpass the physiological limits of human survival.

According to a new study, the projections are wrong: such conditions are already appearing. The study identifies thousands of previously rare or unprecedented bouts of extreme heat and humidity in Asia, Africa, Australia, South America and North America, including in the U.S. Gulf Coast region. Along the Persian Gulf, researchers spotted more than a dozen recent brief outbreaks surpassing the theoretical human survivability limit. The outbreaks have so far been confined to localized areas and lasted just hours, but they are increasing in frequency and intensity, say the authors. The study appears last week in the journal Science Advances.

"Previous studies projected that this would happen several decades from now, but this shows it's happening right now," said lead author Colin Raymond, who did the research as a PhD student at Columbia University's Lamont-Doherty Earth Observatory. "The times these events last will increase, and the areas they affect will grow in direct correlation with global warming."

Analyzing data from weather stations from 1979 to 2017, the authors found that extreme heat/humidity combinations doubled over the study period. Repeated incidents appeared in much of India, Bangladesh and Pakistan; northwestern Australia; and along the coasts of the Red Sea and Mexico's Gulf of California. The highest, potentially fatal, readings, were spotted 14 times in the cities of Dhahran/Dammam, Saudi Arabia; Doha, Qatar; and Ras Al Khaimah, United Arab Emirates, which have combined populations of over 3 million. Parts of southeast Asia, southern China, subtropical Africa and the Caribbean were also hit.

The southeastern United States saw extreme conditions dozens of times, mainly near the Gulf Coast in east Texas, Louisiana, Mississippi, Alabama and the Florida Panhandle. The worst spots, New Orleans and Biloxi, Miss. Such conditions also reached inland into Arkansas and along the southeastern coastal plain.

Not surprisingly, incidents tended to cluster on coastlines along confined seas, gulfs and straits, where evaporating seawater provides abundant moisture to be sucked up by hot air. In some areas further inland, moisture-laden monsoon winds or wide areas of crop irrigation appear to play the same role.

Prior climate studies failed to recognize most past incidents because climate researchers usually look at averages of heat and humidity measured over large areas and over several hours at a time. Raymond and his colleagues instead drilled directly into hourly data from 7,877 individual weather stations, allowing them to pinpoint shorter-lived bouts affecting smaller areas.

Humidity worsens the effects of heat because humans cool their bodies by sweating; water expelled through the skin removes excess body heat, and when it evaporates, it carries that heat away. The process works nicely in deserts, but less well in humid regions, where the air is already too laden with moisture to take on much more. Evaporation of sweat slows. In the most extreme instances, it could stop. In that case, unless one can retreat to an air-conditioned room, the body's core heats beyond its narrow survivable range, and organs begin to fail. Even a strong, physically fit person resting in the shade with no clothes and unlimited access to drinking water would die within hours.

Meteorologists measure the heat/humidity effect on the so-called "wet bulb" Centigrade scale; in the United States, these readings are often translated into "heat index" or "real-feel" Fahrenheit readings. Prior studies suggest that even the strongest, best-adapted people cannot carry out normal outdoor activities when the wet bulb hits 32 C, equivalent to a heat index of 152 F. Most others would crumble well before that. A reading of 35 — the peak briefly reached in the Persian Gulf crisis — is considered the theoretical survivability limit. That translates roughly to a heat index of 160 F. (The heat index actually ends at 127 F, so these readings are literally off the charts.) "It's hard to exaggerate the effects of anything that goes into the 30s," said Raymond.

COVID-19 lockdowns significantly impacting global air quality

Levels of two major air pollutants have been drastically reduced since lockdowns began in response to the COVID-19 pandemic, but a secondary pollutant — ground-level ozone — has increased in China, according to new research.

Two new studies in AGU's journal Geophysical Research Letters find nitrogen dioxide pollution over northern China, Western Europe and the U.S. decreased by as much as 40 percent in early 2020 as compared to the same time last year. Nitrogen dioxide is a highly reactive gas produced during combustion that has many harmful effects on the lungs. The gas typically enters the atmosphere through emissions from vehicles, power plants and industrial activities.

In addition to nitrogen dioxide, one of the new studies finds particulate matter pollution (particles smaller than 2.5 microns) has decreased by 35 percent in northern China. Particulate matter is composed of solid particles and liquid droplets that are small enough to penetrate deep into the lungs and cause damage.

The two new papers are part of an ongoing special collection of research in AGU journals related to the current pandemic.

Such a significant drop in emissions is unprecedented since air quality monitoring from satellites began in the 1990s, said Jenny Stavrakou, an atmospheric scientist at the Royal Belgian Institute for Space Aeronomy in Brussels and co-author of one of the papers. The only other comparable events are short-term reductions in China's emissions due to strict regulations during events like the 2008 Beijing Olympics.

The improvements in air quality will likely be temporary, but the findings give scientists a glimpse into what air quality could be like in the future as emissions regulations become more stringent, according to the researchers.

"Maybe this unintended experiment could be used to understand better the economic regulations," Stavrakou said. "It is some positive news among a very tragic situation."

However, the drop in nitrogen dioxide pollution has caused an increase in surface ozone levels in China, according to one of the new studies. Ozone is a secondary pollutant formed when sunlight and high temperatures catalyze chemical reactions in the lower atmosphere. Ozone is harmful to humans at ground-level, causing pulmonary and heart disease.

In highly polluted areas, particularly in winter, surface ozone can be destroyed by nitrogen oxides, so ozone levels can increase when nitrogen dioxide pollution goes down. As a result, although air quality has largely improved in many regions, surface ozone can still be a problem, according to Guy Brasseur, an atmospheric scientist at the Max Planck Institute for Meteorology in Harrburg, Germany, and lead author of one of the new studies.

"It means that by just reducing the [nitrogen dioxide] and the particles, you won't solve the ozone problem," Brasseur said.

Stavrakou and her colleagues used satellite measurements of air quality to estimate the changes in nitrogen dioxide pollution over the major epicenters of the outbreak: China, South Korea, Italy, Spain, France, Germany, Iran and the United States.

They found that nitrogen dioxide pollution decreased by an average of 40 percent over Chinese cities and by 20 to 38 percent over Western Europe and the United States during the 2020 lockdown, as compared to the same time in 2019.

However, the study found nitrogen dioxide pollution did not decrease over Iran, one of the earliest and hardest-hit countries. The authors suspect this is because complete lockdowns weren't in place until late March and before that, stay-at-home orders were largely ignored. The authors did see a dip in emissions during the Iranian New Year holiday after March 20, but this dip is observed during the celebration every year.

How does the brain link events to form a memory? Study reveals unexpected mental processes

A woman walking down the street hears a bang. Several moments later she discovers her boyfriend, who had been walking ahead of her, has been shot. A month later, the woman checks into the emergency room. The noises made by garbage trucks, she says, are causing panic attacks. Her brain had formed a deep, lasting connection between loud sounds and the devastating sight she witnessed.

This story, relayed by clinical psychiatrist and co-author of a new study Mohsin Ahmed, MD, PhD, is a powerful example of the brain's powerful ability to remember and connect events separated in time. And now, in their new study in mice published May 8, 2020 in Neuron, scientists at Columbia's Zuckerman Institute have shed light on how the brain can form such enduring links.

The scientists uncovered a surprising mechanism by which the hippocampus, a brain region critical for memory, builds bridges across time by firing off bursts of activity that seem random, but in fact make up a complex pattern that, over time, help the brain learn associations. By revealing the underlying circuitry behind associative learning, the findings lay the foundation for a better understanding of anxiety and trauma- and stressor-related disorders, such as panic and post-traumatic stress disorders, in which a seemingly neutral event can elicit a negative response.

"We know that the hippocampus is important in forms of learning that involve linking two events that happen even up to 10 to 30 seconds apart," said Attila Losonczy, MD, PhD, a principal investigator at Columbia's Mortimer B. Zuckerman Mind Brain Behavior Institute and the paper's co-senior author. "This ability is a key to survival, but the mechanisms behind it have proven elusive. With today's study in mice, we have mapped the complex calculations the brain undertakes in order to link distinct events that are separated in time."

The hippocampus – a small, seahorse-shaped region buried deep in the brain – is an important headquarters for learning and memory. Previous experiments in mice showed that disruption to the hippocampus leaves the animals with trouble learning to associate two events separated by tens of seconds.

"The prevailing view has been that cells in the hippocampus keep up a level of persistent activity to associate such events," said Dr. Ahmed, an assistant professor of clinical psychiatry at Columbia's Vagelos College of Physicians and Surgeons, and co-first author of today's study. "Turning these cells off would thus disrupt learning."

To test this traditional view, the researchers imaged parts of the hippocampus of mice as the animals were exposed to two different stimuli: a neutral sound followed by a small but unpleasant puff of air. A fifteen second delay separated the two events. The scientists repeated this experiment across several trials. Over time, the mice learned to associate the tone with the soon-to-follow puff of air. Using advanced two-photon microscopy and functional calcium imaging, they recorded the activity of thousands of neurons, a type of brain cell, in the animals' hippocampus simultaneously over the course of each trial for many days.

"With this approach, we could monitor, albeit in a simpler way, the process our own brains undergo when we learn to associate two events," said Dr. Losonczy, who is also a professor of neuroscience at Columbia's Vagelos College of Physicians and Surgeons.

To make sense of the information they collected, the researchers teamed up with computational neuroscientists who develop powerful mathematical tools to analyze vast amounts of experimental data.

"We expected to see repetitive, continuous neural activity that persisted during the fifteen-second gap, an indication of the hippocampus at work linking the auditory tone and the air puff," said computational neuroscientist Stefano Fusi, PhD, a principal investigator at Columbia's Zuckerman Institute and the paper's co-senior author.

Drinking sugary drinks daily may be linked to higher risk of CVD in women

Drinking one or more sugary beverages a day was associated with a nearly 20% greater likelihood of women having a cardiovascular disease compared to women who rarely or never drank sugary beverages, according to new research published May 13, 2020 in the Journal of the American Heart Association, an open access journal of the American Heart Association.

In the large, ongoing California Teacher's Study, which began in 1995, drinking one or more of any type of sugary beverage daily was associated with a 26% higher likelihood of needing a revascularization procedure, such as angioplasty to open clogged arteries, and a 21% higher likelihood of having a stroke compared to women who rarely or never drank sugary beverages. Sugary beverages in this study were defined as calorie soft drinks, sweetened bottled waters or teas and sugar-added fruit drinks, not 100% fruit juices.

There were also differences based on the type of beverage women consumed. Drinking one or more sugar-added fruit drinks daily was associated with a 42% greater likelihood of having cardiovascular disease. Drinking soft drinks such as sodas daily was associated with a 23% higher risk of cardiovascular disease overall, compared to those who rarely or never drank sugary beverages.

The study included more than 108,000 women, with an average age of 52, who had not been diagnosed with heart disease, stroke or diabetes when they enrolled in the study.

The women reported how much and what they drank via a food questionnaire. Statewide inpatient hospitalization records were used to determine whether a woman had experienced a heart attack, stroke or surgery to open clogged arteries. Women with the highest sugar-sweetened beverage intake were younger, more likely to be current smokers, obese and less likely to eat healthy foods, among other things.

"Although the study is observational and does not prove cause and effect, we hypothesize that sugar may increase the risk of cardiovascular diseases in several ways. It raises glucose levels and insulin concentrations in the blood, which may increase appetite and lead to obesity, a major risk factor for cardiovascular disease," said lead study author Cheryl Anderson, Ph.D., M.P.H., M.S., professor and interim chair of Family and Public Health, University of California San Diego, and chair of the American Heart Association's Nutrition Committee.

"In addition, too much sugar in the blood is associated with oxidative stress and inflammation, insulin resistance, unhealthy cholesterol profiles and type 2 diabetes, conditions that are strongly linked to the development of atherosclerosis, the slow narrowing of the arteries that underlies most cardiovascular disease," said Anderson.

Strengths of the study included its large sample size, extensive follow-up time and prospective data collection on sugar-sweetened beverages and lifestyle characteristics. In addition, the ability to annually link to statewide hospitalizations and procedure records resulted in accurate endpoints.

Limitations of the study included having only one measurement of sugar-sweetened beverage intake. The study was also unable to evaluate consumption of artificially sweetened beverages and/or sweetened hot beverages.

The American Heart Association recommends limiting added sugar to no more than 100 calories a day (6 teaspoons of sugar or 25 grams) for most women, and no more than 150 calories a day (9 teaspoons of sugar or 38 grams) for most men. Sugar-sweetened beverages are the biggest source of added sugars in the American diet; a typical 12-ounce can of regular soda has 130 calories and 8 teaspoons (34 grams) of sugar.

Although diet soda may provide an alternative for some people who are trying to reduce the amount of sugary drinks in their diet, they do include artificial sweeteners such as saccharin, aspartame, sucralose and others.

Scientists create first roadmap of human skeletal muscle development

An interdisciplinary team of researchers at the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at UCLA has developed a first-of-its-kind roadmap of how human skeletal muscle develops, including the formation of muscle stem cells.

The study, published in the peer-reviewed journal Cell Stem Cell, identified various cell types present in skeletal muscle tissues, from early embryonic development all the way to adulthood. Focusing on muscle progenitor cells, which contribute to muscle formation before birth, and muscle stem cells, which contribute to muscle formation after birth and to regeneration from injury throughout life, the group mapped out how the cells' gene networks – which genes are active and inactive – change as the cells mature.

The roadmap is critical for researchers who aim to develop muscle stem cells in the lab that can be used in regenerative cell therapies for devastating muscle diseases, including muscular dystrophies, and sarcopenia, the age-related loss of muscle mass and strength.

"Muscle loss due to aging or disease is often the result of dysfunctional muscle stem cells," said April Pyle, senior author of the paper and a member of the Broad Stem Cell Research Center. "This map identifies the precise gene networks present in muscle progenitor and stem cells across development, which is essential to developing methods to generate these cells in a dish to treat muscle disorders."

Researchers in Pyle's lab and others around the world already have the capacity to generate skeletal muscle cells from human pluripotent stem cells – cells that have the ability to self-renew and to develop into any cell type in the body. However, until now, they had no way of determining where these cells fall on the continuum of human development.

"We know that the muscle cells we were making in the lab were not as functional as the fully matured muscle stem cells found in humans," said Haibin Xi, first author of the new paper and an assistant project scientist in Pyle's lab. "So we set out to generate this map as a reference that our lab and others can use to compare the genetic signatures of the cells we are creating to those of real human skeletal muscle tissue."

To create this resource, the group gathered highly specific data about two different groups of skeletal muscle cells: those from the human body, ranging from the fifth week of embryonic development to middle age, and those derived from human pluripotent stem cells the researchers generated in the lab. They then compared the genetic signatures of cells from both sources.

The group obtained 21 samples of human skeletal muscle tissue from their UCLA collaborators and from colleagues at the University of Southern California and the University of Tübingen in Germany. For the pluripotent stem cell-derived muscle cells, the group evaluated cells created using their own unique method and the methods of several other groups.

The Pyle lab collaborated with the lab of Kathrin Plath, a UCLA professor of biological chemistry and member of the Broad Stem Cell Research Center, to conduct high-throughput droplet-based single-cell RNA sequencing of all of the samples. This technology enables researchers to identify the gene networks present in a single cell and can process thousands of cells at the same time. Leveraging the power of this technology and the Plath lab's bioinformatics expertise, the group identified the genetic signatures of various cell types from human tissues and pluripotent stem cells.

They next developed computational methods to focus on muscle progenitor and stem cells and mapped out their gene networks associated with every developmental stage.

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Cancer research breakthrough as DNA behavior is uncovered in 3D models

Scientists have used 3D models to break down the DNA behavior of cancer cells, in a breakthrough new study which could revolutionize treatment for the disease.

In what is a first for science, a research team led by Dr Manel Esteller, Director of the Josep Carreras Leukaemia Research Institute (IJC), demonstrated how 3D models (known as organoids) can now be used to develop a characterization of the DNA make-up – or the epigenetic fingerprint – of human cancer.

Pubished in Epigenetics, the research validates the use of these 3D samples for cancer research that could deliver new oncology treatments.

Dr Esteller, who is also Chairman of Genetics at the University of Barcelona, explains: "Frequently, promising cancer therapies fail when applied to patients in the real clinical setting. This occurs despite many of these new treatments demonstrating promising results at the preclinical stage in the lab. One explanation is that many of the tumor models used in early research phases are established cell lines that have been growing for many decades and in two dimension (2D) culture flasks. These cancer cells might not completely resemble the features of real tumors from patients that expand into three dimensions (3D). Very recently, it has been possible to grow cancers in the laboratories but respecting the 3D structure; these models are called 'organoids'.

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