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

DIYARYO KABITENYO
Nagmamalasakit sa lalawigan

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

Cavite donates speedboat, jet skis to PCG

The Philippine Coast Guard (PCG) received last May 19 a speedboat and personal watercraft, commonly called 'jet skis,' from the provincial government of Cavite.

In a Facebook post, the PCG said the donations include a twin-engine 150-horsepower speedboat and four Yamaha VX-C WaveRunner personal watercraft.

It said the maritime assets will be used in enforcing maritime laws and in search and rescue operations in vicinity waters off Cavite to "ultimately ensure the safety of lives and properties at sea".

The PCG said Commodore Leovigildo Panopio, commander of the PCG National Capital Region District (PCG)-Central Luzon, thanked Gov. Jonvic Remulla for the donation in a courtesy visit.

PERSONAL WATERCRAFT. The four jet skis donated by the provincial government of Cavite to the Philippine Coast Guard (PCG). The PCG said last May 19 the donated maritime assets will be used to help uphold maritime laws and in search and rescue operations. (Photo courtesy of PCG)

Panopio said the new water assets will "greatly help" in intensifying the presence of the PCG in the province and to better serve the locals through upholding maritime security, safety, and environmental protection.

DOH eyes herd immunity in NCR, Cavite, 7 other areas by November

The government targets to achieve herd immunity in identified coronavirus disease 2019 (Covid-19) high-risk areas by November, a health official said last May 19.

Department of Health Undersecretary and National Vaccination Operations Center (NVOC) chairperson Myrna Cabotaje said the government will intensify its vaccination drive in these areas which include the National Capital Region (NCR), Bulacan, Cavite, Rizal, Laguna, Pampanga, Batangas, Metro Cebu, and Metro Davao dubbed as 'NCR Plus 8'.

"Ang target natin was 108,000 per day na jabs, so ibig

Turn to page 2

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(DOH... from page 1)

sabihin, iyong mga ibinibigay nating mga supplies are enough. Ang gagawin natin for the next couple of weeks ay talagang isa-isahin iyong mga focused LGUs natin, iyong NCR Plus 8 para makita ano ba iyong kapasidad nila," Cabotaje said in a Laging Handa briefing.

As of May 18, Cabotaje said there are about 3,299,470 jabs that have been utilized for the inoculation of priority groups under categories A1 (health workers), A2 (senior citizens), and A3 (persons with comorbidities).

Some 2,512,942 Filipinos received their first dose of Covid-19 jabs, while 786,528 of them have been fully vaccinated.

Cabotaje said the government is confident to vaccinate at least 100,000 to 200,000 Filipinos daily once a steady supply of Covid-19 jabs becomes available.

With the arrival of more vaccines between June and August, she said the government is now ready for further expansion of the Covid-19 vaccination program.

The inoculation coverage will be expanded to categories A4 (government and economic front line workers) and A5 (indigent population), she said.

Cabotaje reiterated that the government will be focusing on the expansion of its vaccination drive in NCR Plus 8 areas.

Proteins that predict future dementia, Alzheimer's risk, identified

The development of dementia, often from Alzheimer's disease, late in life is associated with abnormal blood levels of dozens of proteins up to five years earlier, according to a new study led by researchers at the Johns Hopkins Bloomberg School of Public Health. Most of these proteins were not known to be linked to dementia before, suggesting new targets for prevention therapies.

The findings are based on new analyses of blood samples of over ten thousand middle-aged and elderly people — samples that were taken and stored during large-scale studies decades ago as part of an ongoing study. The researchers linked abnormal blood levels of 38 proteins to higher risks of developing Alzheimers within five years. Of those 38 proteins, 16 appeared to predict Alzheimer's risk two decades in advance.

Although most of these risk markers may be only incidental byproducts of the slow disease process that leads to Alzheimer's, the analysis pointed to high levels of one protein, SVEP1, as a likely causal contributor to that disease process.

The study was published May 14 in Nature Aging.

"This is the most comprehensive analysis of its kind to date, and it sheds light on multiple biological pathways that are connected to Alzheimer's," says study senior author Josef Coresh, MD, PhD, MHS, George W. Comstock Professor in the Department of Epidemiology at the Bloomberg School. "Some of these proteins we uncovered are just indicators that disease might occur, but a subset may be causally relevant, which is exciting because it raises the possibility of targeting these proteins with future treatments."

More than six million Americans are estimated to have Alzheimer's, the most common type of dementia, an irreversible fatal condition that leads to loss of cognitive and physical function. Despite decades of intensive study, there are no treatments that can slow the disease process, let alone stop or reverse it. Scientists widely assume that the best time to treat Alzheimer's is before dementia symptoms develop.

Efforts to gauge people's Alzheimer's risk before dementia arises have focused mainly on the two most obvious features of Alzheimer's brain pathology: clumps of amyloid beta protein known as plaques, and tangles of tau protein.

EXTRAJUDICIAL SETTLEMENT OF ESTATE OF SPOUSES EPIMACO A. VELASCO and YOLANDA YMSON

NOTICE is hereby given that the estate of the late **SPOUSES EPIMACO A. VELASCO and YOLANDA YMSON** who both died intestate on January 27, 2014 and on March 30, 2014 respectively, both residents of Tanza, Cavite until the time of their death consisting of a parcel of land without improvement erected thereon, identified as Lot No. 1088, located in Barangay Santol, Tanza, Cavite, covered by Transfer Certificate of Title No. T-64368, of the Registry of Deeds of Cavite, with a total area of FORTY FIVE THOUSAND EIGHT HUNDRED FIFTY FIVE SQUARE METERS (45,855), more or less, has been adjudicated and extrajudicially settled by and among their heirs on December 7, 2020 in Tanza, Cavite, Philippines before Notary Public Atty. Julius B. Arca and entered in his Notarial Register as Doc. No. 405; Page No. 97; Book No. XXXIX; Series of 2020.

(Spd.) **EILEEN YVONNE VELASCO-SANTOS**
(for herself and as Attorney-in-fact of her siblings namely: Eric V. Velasco, Maria Therese Yasmin Velasco-Banez and Erlissa Yvette Velasco-Foster) and MARIA ASUNCION R. FORTIT (Attorney-in-fact of Erwina Velasco Javier)

Publication : DIYARYO KABITENYO
Dates : May 10, 17 & 24, 2021

REPUBLIC OF THE PHILIPPINES
PROVINCE OF CAVITE
MUNICIPALITY OF NAIC

NOTICE TO THE PUBLIC

CFN-0001-2021 R.A 9048
CCE-0816-2020 R.A. 10172

In compliance with the publication requirement and pursuant to OCRG Memorandum Circular No. 2013-1 Guidelines in the Implementation of the Administrative Order No. 1, Series of 2012 (IRR on R.A. 10172), Notice is hereby served to the public that **PERLITA DIROY CASTRO** has filed with this Office a petition for **CHANGE OF FIRST NAME** in her Certificate of Live Birth from **"FELISA"** to **"PERLITA"** and **CORRECTION OF ENTRY** in **Date of Birth** from **"January 30, 1961"** to **"January 31, 1961"** in her Certificate of Live Birth and whose parents are Domingo M. Diroy and Beatriz B. Aava.

Any person adversely affected by said petition, may file his written opposition with this Office not later than **May 31, 2021**.

(Spd.) **GLORIA P. BAGO**
Municipal Civil Registrar

DIYARYO KABITENYO - May 17 & 24, 2021

REPUBLIC OF THE PHILIPPINES
LOCAL CIVIL REGISTRY OFFICE
PROVINCE OF CAVITE
MUNICIPALITY OF NAIC

NOTICE OF PUBLICATION

In compliance with Sec. 5 of R.A. 9048, a notice is hereby served to the public that (Petitioner) has filed with this Office a petition for Change of First Name from JUAN to JUN JUAN in the birth certificate of JUAN BALACANO SALCEDO, born on JUNE 24, 1957 at NAIC, CAVITE, child of spouses CONRADO SALCEDO and IDA BALACANO.

Any person adversely affected by said petition, may file his written opposition to this Office not later than **June 7, 2021**.

(Spd.) **GLORIA P. BAGO**
Municipal Civil Registrar

DIYARYO KABITENYO - May 24 & 31, 2021

Republic of the Philippines
Province of Cavite
OFFICE OF THE CITY CIVIL REGISTRAR
Trece Martires City

NOTICE OF PUBLICATION

In compliance with Section 5 of Republic Act No. 9048, notice is hereby served to the public that **FREDERICK B. SIERRA** has filed with this office a **PETITION FOR CHANGE OF FIRST NAME** from **"ALFIE"** to **"FREDERICK"** in the Certificate of Live Birth of ALFIE DILAG SIERRA who was born on **JANUARY 8, 1982** at **TRECE MARTIRES CITY, CAVITE** and whose parents are **ANDRES ROSAIRO SIERRA** and **PURIFICACION SALCEDO DILAG**.

Any person adversely affected by said petition may file his/her written opposition with this office not later than **June 7, 2021**.

MAXIMO JR. L. LONTOC
City Civil Registrar

DIYARYO KABITENYO - May 24 & 31, 2021

REPUBLIC OF THE PHILIPPINES
FOURTH JUDICIAL REGION
REGIONAL TRIAL COURT
BRANCH 15
NAIC, CAVITE

IN THE MATTER OF THE PROBATE OF THE LAST WILL AND TESTAMENT OF THE LATE DELFIN ARAC AGUINALDO

SP PROC. NO. NC-2019-04

MA. TERESA B. PUNO
Petitioner.

x----------x

ORDER

After the appointment of, **MA. TERESA B. PUNO**, as the executrix of the estate of the decedent, **DELFIN ARAC AGUINALDO**, as per order dated December 18, 2020.

This shall serve as NOTICE TO ALL CREDITORS, having money claims against the decedent to file them in this Court, which shall not be more than twelve (12) nor less than six (6) months after the date of the first publication.

At her expense, petitioner, Ma. Teresa B. Puno, is directed to have this Order published three (3) weeks successively in a newspaper of general circulation in the Province of Cavite, and to be posted for the same period in four public places in the Province of Cavite and in two public places in the Municipality of Naic, Cavite.

Provide copy of this Order to the petitioner and counsel for their compliance.

SO ORDERED.

Naic, Cavite, February 04, 2021.

(Spd.) **LEBIO C. CASTIGADOR**
Presiding Judge

Publication : DIYARYO KABITENYO
Dates : May 24, 31 and June 7, 2021

Cells from the center of tumors most likely to spread around the body

Researchers from the Francis Crick Institute, Royal Marsden, UCL and Cruces University Hospital have found that cells from different parts of kidney tumours behave differently, and surprisingly, cells within the centre of a tumour are the most aggressive and have the highest chance of spreading around the body.

Cancers can spread to other parts of the body, with cells taking hold as secondary tumours which make the disease much harder to treat. Understanding the mechanics of this spread, a process called metastasis, could lead to new treatments that block this migration.

In their multidisciplinary study published May 17 in Nature Ecology and Evolution, scientists led by the Litchfield lab at UCL and the Turajlic, Swanton, and Bates labs at the Crick, analysed 756 cancer biopsy samples from different regions within tumours from the TRACERx Renal study.

They found that cells at the centre of tumours have a less stable genome and a higher potential to spread to secondary sites around the body. By contrast cells at the tumour edge had lower rates of metastasis, as well as lower rates of growth and genetic damage.

"Cancer cells in the central zone of the tumour face harsh environmental conditions, as there's a lack of blood supply and oxygen. They have to adapt to survive, which makes them stronger and more aggressive.

EXTRAJUDICIAL SETTLEMENT OF ESTATE WITH WAIVER OF RIGHTS

NOTICE is hereby given that the estate of the deceased **SPS. IMELDA CONVENTO married to SOCRATES CONVENTO**, consisting of a parcel of land with improvements existing thereon, with an area of ONE HUNDRED (100) SQUARE METERS more or less, embraced and covered by Transfer Certificate of Title No. T-10784 and a parcel of land without improvements existing thereon, with an area of ONE HUNDRED TWENTY THREE (123) SQUARE METERS more or less, embraced and covered by Transfer Certificate of Title No. T-107855 of the Registry of Deeds for the City of Cavite, both situated in the District of Caridad, City of Cavite, Is Of Lumin has been adjudicated and extrajudicially settled by and among their heirs in pro-endivee sharing with waiver of share, right and participation over the above-described properties in favor of MARIA ROSARIO CONVENTO SORIANO, married to JOSE P. SORIANO on December 12, 2019 in Quezon City, Philippines before Notary Public Atty. Rogelio J. Bolivar and entered in his Notarial Register as Doc. No. 212; Page No. 44; Book No. XV II; Series of 2019.

(Sgd.) **Legal heirs (Maria Rosario Convento Soriano with marital consent of Jose P. Soriano)**

Publication : DIYARYO KABITENYO
Dates : May 24, 31 and June 7, 2021

Machine learning (AI) accurately predicts cardiac arrest risk

A branch of artificial intelligence (AI), called machine learning, can accurately predict the risk of an out of hospital cardiac arrest – when the heart suddenly stops beating – using a combination of timing and weather data, finds research published online in the journal Heart.

Machine learning is the study of computer algorithms, and based on the idea that systems can learn from data and identify patterns to inform decisions with minimal intervention.

The risk of a cardiac arrest was highest on Sundays, Mondays, public holidays and when temperatures dropped sharply within or between days, the findings show.

This information could be used as an early warning system for citizens, to lower their risk and improve their chances of survival, and to improve the preparedness of emergency medical services, suggest the researchers.

Out of hospital cardiac arrest is common around the world, but is generally associated with low rates of survival. Risk is affected by prevailing weather conditions.

But meteorological data are extensive and complex, and machine learning has the potential to pick up associations not identified by conventional statistical approaches, say the Japanese researchers.

DEED OF EXTRA JUDICIAL SETTLEMENT OF THE ESTATET OF SERGIO SAYOTO, SR. WITH WAIVER OF RIGHTS

NOTICE is hereby given that the estate of the late **SERGIO SAYOTO, SR.** who died intestate on September 3, 2013, at Dasmariñas City, Cavite, consisting of two (2) parcels of land with improvements located at Brgy. Poblacion, Dasmariñas, Cavite, consisting of an aggregate land area of TWO HUNDRED SIXTY FIVE (265) SQUARE METERS and covered by Transfer Certificates of Title No. T-1306037 and an area of FIFTY SQUARE METERS AND FIFTY DECIMETERS (50.50) and covered by Transfer Certificate of Title No. T-1306038 of the Registry of Deeds for the Province of Cavite, and improvement covered by Tax Declaration No. 05-005-00409 (house and fence) of the City Assessor's Office has been adjudicated and extra-judicially settled by and among his heirs in the following manner:

1. TCT No. T-1306038 (50.50 sq. m. shall exclusively belong to SERGIO SAYOTO, JR.

2. TCT No. T-1306037 shall exclusively belong in co-ownership to the following heirs with their respective shares, to wit:

a. ANICIA SAYOTO GUEVARRA - 44.2 sq. mts.
b. DAIVA SAYOTO BADILLO - 58.9 sq. mts.
c. SYLVIA SAYOTO UTANES - 58.9 sq. mts.
d. JOSEFINA SAYOTO SERVIDA - 58.9 sq. mts.
e. NECITAS SAYOTO - 44.2 sq. mts.

3. Improvement (House and Fence) shall belong to all heirs in equal shares.

(n) April 13, 2021 at Dasmariñas City, Cavite, Philippines before Notary Public Atty. Marian O. Dapalay and entered in her Notarial Register as Doc. No. 506; Page No. 100; Book No. 16; Series of 2021.

(Sgd.) **All Heirs**

Publication : DIYARYO KABITENYO
Dates : May 17, 24 & 31, 2021

EXTRAJUDICIAL SETTLEMENT OF ESTATE OF DECEASED JULIETA V. SANCHEZ WITH ABSOLUTE SALE

NOTICE is hereby given that the estate of the deceased **JULIETA V. SANCHEZ** who died intestate and single on September 28, 2002 at the University of Perpetual Help Medical Center, Las Piñas City, consisting of the following properties:

TRANSFER CERTIFICATE OF TITLE NO. 35952 (T-40308-A)
REGISTRY OF DEEDS FOR THE PASAY CITY METRO MANILA DIST. IV

A parcel of land situated in the Barrio of Pamplona, Municipality of Las Piñas, Province of Rizal, Island of Luzon, containing an area of FIVE HUNDRED FORTY SIX (546) SQUARE METERS, more or less,
including all the improvements constructed thereon;

TRANSFER CERTIFICATE OF TITLE NO. 244195 (T-47938-A)
REGISTRY OF DEEDS FOR THE PROVINCE OF RIZAL

A parcel of land situated in the Barrio of Pamplona, Municipality of Las Piñas, Province of Rizal, containing an area of TWO HUNDRED SEVENTY SEVEN (277) SQUARE METERS, more or less,
including all the improvements constructed thereon;

TRANSFER CERTIFICATE OF TITLE NO. 163739
REGISTRY OF DEEDS FOR THE PROVINCE OF CAVITE

A parcel of land situated in the Barrio of Ning, Municipality of Bacoor, Province of Cavite, Island of Luzon, containing an area of FOUR HUNDRED ONE (401) SQUARE METERS, more or less;

TRANSFER CERTIFICATE OF TITLE NO. (118277) (S-86513) T-53784-A
REGISTRY OF DEEDS FOR THE PROVINCE OF RIZAL

A parcel of land situated in the Barrio of Pamplona, Municipality of Las Piñas, Province of Rizal, containing an area of ONE HUNDRED AND EIGHTY NINE (189) SQUARE METERS, more or less,

has been adjudicated and extrajudicially settled by and between her heirs; and for and in consideration of the amount of ONE MILLION THREE HUNDRED TWENTY THREE THOUSAND PESOS (P1,323,000.00), they do hereby sell, transfer and convey, unto MARILYN M. LOZADA and JOSEPH MATTHEW M. LOZADA that certain parcel of land covered by TCT NO. (118277) (S-86513) T-53784-A of the Registry of Deeds for the Province of Rizal, including the improvements constructed thereon on May 7, 2021 at Imus City, Cavite before Notary Public Atty. Carlos Emmanuel C. Mamaya and entered in his Notarial Register as Doc. No. 335; Page No. 67; Book No. VII; Series of 2021.

(Sgd.) **Both Heirs**

Publication : DIYARYO KABITENYO
Dates : May 17, 24 & 31, 2021

EXTRAJUDICIAL SETTLEMENT OF ESTATE

NOTICE is hereby given that the estate of the late **ARCADIO ARIAS** and **AUREA ARIAS** who both died intestate on April 10, 1945 at Ospital ng Maynila and on January 6, 1955 at Elias Street, Sampaloc, Manila, respectively, both residents of Tanza, Cavite at the time of their death, consisting of parcel of land situated in Barangay Punta, Municipality of Tanza, Province of Cavite, containing an area of FORTY THOUSAND NINE HUNDRED FIFTY FIVE SQUARE METERS (40,955), more or less, covered by Transfer Certificate of Title No. (9814) RT-13453 of the Registry of Deeds for the Province of Cavite; as they are succeeded by their only child named FILOMENA P. ARIAS, married to Narciso F. Alarca by way of right representation; FILOMENA P. ARIAS and NARCISO P. ALARCA both died intestate on March 29, 1963 and on January 17, 1963 respectively, both residents of Tanza, Cavite at the time of their death, succeeded by his only daughter ELEODORA ALARCA, married to Domingo Y. Pangan also both deceased by way of right of representation; ELEODORA ALARCA and DOMINGO Y. PANGAN both died intestate on June 7, 1993 in Rosario, Cavite and on April 29, 2008 at Sto. Nino De Tanza Medical and Diagnostic Center, Tanza, Cavite, respectively, both residents of Tanza, Cavite at the time of their death, succeeded by his two children namely: RAMESES ALARCA PANGAN and RHODORA ALARCA PANGAN has been adjudicated and extrajudicially settled by and between their heirs on May 14, 2021 at Tanza, Cavite, Philippines before Notary Public Atty. Julius B. Arca and entered in his Notarial Register as Doc. No. 351; Page No. 71; Book No. XL; Series of 2021.

(Sgd.) **ROMANO AGUSTIN DIOSANA PANGAN, Son and Attorney-in-fact of RAMESES ALARCA PANGAN and REGINALD PANGAN FLORES, Son and Attorney-in-fact of RHODORA PANGAN FLORES**

Publication : DIYARYO KABITENYO
Dates : May 17, 24 & 31, 2021

DEED OF EXTRAJUDICIAL SETTLEMENT OF WITH ABSOLUTE SALE

NOTICE is hereby given that the estate of the deceased **ALEJANDRO V. OBILLO** who died intestate on December 21, 2016 at Tanza Family General Hospital and Pharmacy located in Barangay Daang Amaya II, Tanza, Cavite, consisting of (2) parcels of land one (1) with an area of ONE HUNDRED FIFTY ONE (151) square meters and another with an area of ONE HUNDRED FOURTEEN (114) square meters both without improvement erected thereon both located in Malawin, Tanza, Cavite and embraced by Transfer Certificate of Title Nos. T-353683 and T-803183, respectively, has been adjudicated and extrajudicially settled by and between his heirs; and for and in consideration of the total sum of EIGHT HUNDRED THOUSAND PESOS (P800,000.00), Philippine currency, they do hereby CEDE, TRANSFER, and CONVEY ABSOLUTELY and UNCONDITIONALLY by way of absolute sale, all their interest and rights of titled dominion over the (2) parcels of land one (1) with an area of ONE HUNDRED FIFTY ONE (151) square meters and another with an area of ONE HUNDRED FOURTEEN (114) square meters both without improvement erected thereon both located in Malawin, Tanza, Cavite and embraced by Transfer Certificate of Title Nos. T-353683 and T-803183 in favor of EDWIN INABANGAN ICAGOY on May 14, 2021 in Tanza, Cavite before Notary Public Atty. Julius B. Arca and entered in his Notarial Register as Doc. No. 352; Page No. 71; Book No. XL; Series of 2021.

(Sgd.) **Heirs-Sellers and ANALYN ICAGOY EBORA, Attorney-In-Fact of BUYER EDWIN INABANGAN ICAGOY**

Publication : DIYARYO KABITENYO
Dates : May 17, 24 & 31, 2021

Western diet may increase risk of gut inflammation, infection

Eating a Western diet impairs the immune system in the gut in ways that could increase risk of infection and inflammatory bowel disease, according to a study from researchers at Washington University School of Medicine in St. Louis and Cleveland Clinic.

The study, in mice and people, showed that a diet high in sugar and fat causes damage to Paneth cells, immune cells in the gut that help keep inflammation in check. When Paneth cells aren't functioning properly, the gut immune system is excessively prone to inflammation, putting people at risk of inflammatory bowel disease and undermining effective control of disease-causing microbes. The findings, published May 18 in Cell Host & Microbe, open up new approaches to regulating gut immunity by restoring normal Paneth cell function.

"Inflammatory bowel disease has historically been a problem primarily in Western countries such as the U.S., but it's becoming more common globally as more and more people adopt Western lifestyles," said lead author Ta-Chiang Liu, MD, PhD, an associate professor of pathology & immunology at Washington University.

A new theory for what's happening in the brain when something looks familiar

When a person views a familiar image, even having seen it just once before for a few seconds, something unique happens in the human brain.

Until recently, neuroscientists believed that vigorous activity in a visual part of the brain called the inferotemporal (IT) cortex meant the person was looking at something novel, like the face of a stranger or a never-before-seen painting. Less IT cortex activity, on the other hand, indicated familiarity.

But something about that theory, called repetition suppression, didn't hold up for University of Pennsylvania neuroscientist Nicole Rust. "Different images produce different amounts of activation even when they are all novel," says Rust, an associate professor in the Department of Psychology. Beyond that, other factors -- an image's brightness, for instance, or its contrast -- result in a similar effect.

In a paper published in the Proceedings of the National Academy of Sciences, she and postdoctoral fellow Vahid Mehrpour, along with Penn research associate Travis Meyer and Eero Simoncelli of New York University, propose a new theory, one in which the brain understands the level of activation expected from a sensory input and corrects for it, leaving behind the signal for familiarity.

Evidence suggests bubonic plague had long-term effect on human immunity genes

Scientists examining the remains of 36 bubonic plague victims from a 16th century mass grave in Germany have found the first evidence that evolutionary adaptive processes, driven by the disease, may have conferred immunity on later generations of people from the region.

"We found that innate immune markers increased in frequency in modern people from the town compared to plague victims," said the study's joint-senior author Paul Norman, PhD, associate professor in the Division of Personalized Medicine at the University of Colorado School of Medicine. "This suggests these markers might have evolved to resist the plague."

The study, done in conjunction with the Max Planck Institute in Germany, was published online May 13 in the journal Molecular Biology and Evolution.

The researchers collected DNA samples from the inner ear bones of individuals in a mass grave in the southern German city of Ellwangen which experienced bubonic plague outbreaks in the 16th and 17th centuries. Then they took DNA samples from 50 current residents of the town.

They compared their frequency spectra -- the distribution of gene variants in a given sample -- for a large panel of immunity-related genes.

Among the current inhabitants, the team found evidence that a pathogen, likely Yersinia pestis which causes bubonic plague, prompted changes in the allele distribution for two innate pattern-recognition receptors and four Human Leukocyte Antigen molecules, which help initiate and direct immune response to infection. An allele is a variant form of a gene.

"We propose that these frequency changes could have resulted from Y.pestis plague exposure during the 16th century," Norman said.

The findings are the first evidence that evolutionary processes, prompted by Y. pestis, may have been shaping certain human immunity-relevant genes in Ellwangen and possibly throughout Europe for generations.

And since the plague tormented Europe for nearly 5,000 years, the study suggests that these immunity genes may have been pre-selected in the population long ago but recently became selected through epidemic events.

"Although the lethality of the plague is very high without treatment it remains likely that specific individuals are protected from, or more susceptible to, severe disease through polymorphism in the determinants of natural immunity," the study said. "In this case, any change in allele frequencies that occurred during a given epidemic crisis could be evident as genetic adaptation and detectable in modern day individuals."

Later simulations showed that natural selection likely drove these allele frequency changes.

"I think this study shows that we can focus on these same families of genes in looking at immunity to modern pandemics," Norman said. "We know these genes were heavily involved in driving resistance to infections."

The study also demonstrates that, so far, no matter how deadly the pandemic there are always survivors.

"It sheds light on our own evolution," Norman said. "There will always be people who have some resistance. They just don't get sick and die and the human population bounces back."

Still, he doesn't want people to get the wrong message, especially in the era of Covid-19.

"I wouldn't want to discourage anyone from taking a vaccine for the current pandemic," Norman said. "It's a much safer bet than counting on your genes to save you."

A gentler strategy for avoiding childhood dental decay

The combination of a carb-heavy diet and poor oral hygiene can leave children with early childhood caries (ECC), a severe form of dental decay that can have a lasting impact on their oral and overall health.

A few years ago, scientists from Penn's School of Dental Medicine found that the dental plaque that gives rise to ECC is composed of both a bacterial species, Streptococcus mutans, and a fungus, Candida albicans. The two form a sticky symbiosis, known scientifically as a biofilm, that becomes extremely virulent and difficult to displace from the tooth surface.

Now, a new study from the group offers a strategy for disrupting this biofilm by targeting the yeast-bacterial interactions that make ECC plaques so intractable. In contrast to some current treatments for ECC, which use antimicrobial agents that can have off-target effects, potentially harming healthy tissues, this treatment uses an enzyme specific to the bonds that exist between microbes.

"We thought this could be a new way of approaching the problem of ECC's that would intervene in the synergistic interaction between bacteria and yeast," says Geelsu Hwang, an assistant professor in Penn Dental Medicine and senior author on the study, published in the journal mBio. "This offers us another tool for disrupting this virulent biofilm."

The work builds off findings from a 2017 paper by Hwang and colleagues, including Hyun (Michel) Koo of Penn Dental Medicine, which found that molecules call mannans on the Candida cell wall bound tightly to an enzyme secreted by S. mutans, glycosyltransferases (Gftb). In addition to facilitating the cross-kingdom binding, Gftb also contributes to the stubbornness of dental biofilms by manufacturing glue-like polymers called glucans in the presence of sugars.

While some cases of ECC are treated with drugs that kill the microbes directly, potentially reducing the number of pathogens in the mouth, this doesn't always effectively break down the biofilm and can have off-target effects on "good" microbes as well as the soft tissues in the oral cavity.

Hwang and colleagues wanted to try a different approach that would directly target the insidious interaction between yeast and bacteria and opted to target the mannans in the Candida cell surface as a point of contact.

Using three different mannan-degrading enzymes, they applied each to a biofilm growing on a tooth-like surface in a human saliva medium and left it for five minutes. Following the treatment, they noted that the overall biofilm volume was reduced. Using powerful microscopy, they also observed drastic reductions in the biofilm thickness and interactions between bacteria and yeast. The pH of the surrounding medium was higher when exposed to the enzymes, indicating an environment that is not as acidic and thus less conducive to tooth decay.

They also measured how easy it was to break up the biofilm after treatment, using a device that applies a stress, akin to tooth brushing.

"The biofilm structure was more fragile after the enzyme treatment," Hwang says. "We were able to see that the biofilms were more easily removed."

To confirm the mechanism of their approach -- that the mannan-degrading enzymes were weakening the binding between yeast and bacteria -- the team used atomic-force microscopy to measure the bonds between Candida and Gftb. The therapy, they found, reduced this binding force by 15-fold.

Finally, they wanted to get a sense of how well-tolerated these enzymes would be when used in the oral cavity, especially since children would be the patient group targeted.

Applying the enzymes to human gingival cells in culture, they found no harmful impact, even when they used a concentrated form of the enzymes. In addition, they observed that the treatment didn't kill the bacteria or yeast, a sign that it could work even if the microbes developed mutations that would lend them resistance against other types of therapies.

The researchers kept the application time relatively short at five minutes though they hope to see activity in an even shorter time, like the two minutes that is recommended for tooth brushing.

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Icing muscle injuries may delay recovery

A study using a mouse model of eccentric contraction (*1) has revealed that icing injured muscles delays muscle regeneration. The discovery was made by a research group including Associate Professor ARAKAWA Takamitsu and then PhD. Student KAWASHIMA Masato from Kobe University's Graduate School of Health Sciences, and Chiba Institute of Technology's Associate Professor KAWANISHI Noriaki et al. In addition, the researchers illuminated that this phenomenon may be related to pro-inflammatory macrophages' (*2, 3, 4) ability to infiltrate damaged cells. This research raises questions as to whether or not severe muscle injuries (such as torn muscles) should be iced.

These research results were published online as one of the Journal of Applied Physiology's Articles in Press on March 25, 2021.

The research results revealed that applying an ice pack to a severe muscle injury resulting from eccentric contraction may prolong the time it takes to heal.

The cause of this phenomenon is that icing delays the arrival of pro-inflammatory macrophages, which are responsible for the phagocytosis (*5), or removal, of damaged tissue. Furthermore, this makes difficult for the macrophages to sufficiently infiltrate the damaged muscle cells.

Research Background

Skeletal muscle injuries encompass a range of damage to muscles; from a microcellular level to a severe level. These injuries include not only those that happen during sports or schools' physical education lessons but also external injuries that occur as a result of accidents and disasters.

Colorectal cancer screening to begin at age 45, lowered from 50

Prompted by a recent alarming rise in cases of colorectal cancer in people younger than 50, an independent expert panel has recommended that individuals of average risk for the disease begin screening exams at 45 years of age instead of the traditional 50.

The guideline changes by the U.S. Preventive Services Task Force (USPSTF), published in the current issue of JAMA, updates its 2016 recommendations and aligns them with those of the American Cancer Society, which lowered the age for initiation of screening to 45 years in 2018.

Colorectal cancer (CRC) is one of the most preventable malignancies, owing to its long natural history of progression and the availability of screening tests that can intercept and detect the disease early. Overall incidence of CRC in individuals 50 years of age and older has declined steadily since the mid-1980s, largely because of increased screening and changing patterns of modifiable risk factors.

"A concerning increase in colorectal cancer incidence among younger individuals (ie, younger than 50 years; defined as young-onset colorectal cancer) has been documented since the mid-1990s, with 11% of colon cancers and 15% of rectal cancers in 2020 occurring among patients younger than 50 years, compared with 5% and 9%, respectively, in 2010," said Kimmie Ng, MD, MPH, first author of an editorial in JAMA accompanying the article about the guideline change of the USPSTF. Ng is the director of the Young-Onset Colorectal Cancer Center at Dana-Farber Cancer Institute.

The causes of the increase in young-onset CRC aren't currently known.

Lowering the recommended age to initiate screening "will make colorectal cancer screening, which is so important, available to millions more people in the United States, and hopefully many more lives will be saved by catching colorectal cancer earlier, as well as by preventing colorectal cancer," said Ng.

The USPSTF is an independent panel of experts funded by the U.S. Department of Health and Human Services. It systematically reviews the evidence of effectiveness of preventive services and develops recommendations. American health insurance groups are required to cover, at no charge to the patient, any service that the USPSTF recommends with a grade A or B level of evidence, regardless of how much it costs.