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

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Nagmamalasakit sa lalawigan

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

Cavite conducts vaccination simulation

The Provincial Health Office of Cavite, led by Dr. Nonie John Dalisay, conducted a vaccination simulation in Trece Martires City to assess its readiness when Covid-19 vaccines finally arrived. The mock exercise was held at the Women's Health and Wellness Center, General Emilio Aguinaldo Memorial Hospital (GEAHM) Compound in Barangay San Agustin, one of the five identified vaccination sites in the province. Dalisay supervised the simulation with Dr. Romula Lua, chief of hospitals. Doctors, nurses, and medical professionals from GEAMH participated in the exercise, where several real-life scenarios were re-enacted.


DALISAY

CvSU gets P20.2-M grant from DoST-PCAARRD for extension projects

Cavite State University recently received a total budget of P20,219,480 from the Department of Science and Technology-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (DoST-PCAARRD) for three extension projects to be implemented this year.

The first approved project, with P3,162,672 budget, is titled "Enhancing the Agri-Aqua Food Value Chain through Smart Technologies toward Food Resiliency in the New Normal in Calabarzon." It aims to enhance the food value chain for coffee in the region toward improving agricultural productivity, competitiveness, efficiency and inclusive food sustainability.

Community-based farm enterprises, technology-based startups/spinoffs, and coffee farmers, cooperatives, associations, traders and retailers in Calabarzon will benefit from the project through key approaches to strengthen the network of stakeholders and processes, increase volume of

Turn to page 2


ROBLES

DIYARYO KABITENYO
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ARNULFO BARCO
Publisher - Editor

GENER BARCO
Operations Manager

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Recycle anaesthetics to reduce carbon emission of healthcare, study concludes

New research has highlighted the value of recycling general anaesthetic used in routine operations.

In the UK, healthcare accounts for more than five per cent of national greenhouse gas emissions, and as much as 10 per cent in the US. Inhaled general anaesthetics are particularly potent greenhouse gases and as little is metabolised almost all that is administered is breathed out to end up in the atmosphere. The commonly used anaesthetic agents have been considered to vary considerably from as little as 1.5 for sevoflurane to more than 60 kg carbon dioxide equivalence for an hour's anaesthetic with desflurane. However, research led by a team from the University of Exeter have discovered that the original assumptions failed to consider the manufacture of the anaesthetics, questioning the validity of the initial assumptions and the subsequent conclusions.

Led by the University of Exeter and funded by Innovate UK, the study published in Resources, Conservation and Recycling set out to model different anaesthetic scenarios including the application of new vapour capture recycling technology allowing for waste anaesthetic to be captured, extracted and purified and remarketed.

The new research built on the last analysis of the carbon footprint of inhalational anaesthesia by Jodi Shearman and colleagues in 2012 and analysed the synthetic process of the commonly used anaesthetics, sevoflurane, isoflurane and desflurane, the use of nitrous oxide, as well as the injectable anaesthetic, propofol in a carefully conducted life cycle analysis.

(CvSU... from page 1)

duction, improve quality of produce, and ensure sustainable food value chain for coffee. It will be spearheaded Engr. Gerry Castillo, Director of the National Coffee Research, Development and Extension Center (NCRDEC).

Also given funding amounting to P10,977,107.20 is the second phase of the Science for Convergence of Agriculture and Tourism (SciCAT) dubbed as SciCAT Avenues or Access to Value-adding and Engaging iNnovations toward sUstainability of agri-Education and agri-touriSm.

It will capacitate Silan AgriFarm and other interested individuals on agri-tourism management, transferring package of technologies, building strong partnerships for sustainable farm tourism services, and promoting digital tourism as a marketing strategy.

The project will also provide assistance in developing tour packages that comply with health protocols, increasing generated income from the production of fresh processed agricultural products, evaluating clients' feedback as design support mechanism toward continual improvement, and securing Department of Tourism (DoT) accreditation as a farm tourism site. Dr. Lilibeth Novicio, Professor 3 of the College of Agriculture, Food, Environment and Natural Resources (CAFENR) will handle the project.

Meanwhile, the second phase of DoST-PCAARRD-CvSU Agri-Aqua Technology Business Incubator (ATBI) Project was granted a budget of P6,079,700.80. This project supports the government's efforts in revitalizing the economy by equipping the incubatees with basic knowledge in agriculture, food technology, marketing, accounting and business management.

ATBI will also provide incubatees with facilities and equipment that will support their business operations, assist in the creation of innovative and sustainable agri-business through the development of cost-effective way to link the research base knowledge of universities and incubatees, introduce additional technology that will complement their operations; and help them build their market base through customer acquisition among the institution's linkages. Dr. Almira Magcawas, Director for Extension Services, will lead this undertaking.

CvSU, with main campus in Indang, Cavite, is headed by Dr. Hernando Robles.

REPUBLIC OF THE PHILIPPINES
Regional Trial Court
Fourth Judicial Region
Branch 20
Imus, Cavite

NATIONAL HOME MORTGAGE FINANCE CORPORATION,
Mortgagee/Assignee,

-versus-

Extra-Judicial Foreclosure of Real Estate Mortgage Under Act No. 3135, as Amended, Republic Act No. 4118

FC NO. 16956-20

ZOSIMAR R. GAYON,
Mortgagor,

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

NOTICE OF EXTRA-JUDICIAL SALE

Upon extra-judicial petition for sale under Act 3135 as amended by Act 4118 file by **NATIONAL HOME MORTGAGE FINANCE CORPORATION, mortgagee/ assignee,** with principal office address at 104 Amorsolo St., Legaspi Village, Makati City against **ZOSIMAR R. GAYON, mortgagor** with residence and postal address at 2737 Paulino St., Tambo, Parañaque City/ Lakersfield Subd., Lot 80 Blk. 7 Toclong, Kawit, Cavite, to satisfy the mortgage indebtedness which as of September 30, 2019 amounts to **SIX HUNDRED TWENTY TWO THOUSAND SEVEN HUNDRED TWENTY FIVE PESOS & 27/100 (Php622,725.27),** Philippine Currency, including interest and penalty charges but excluding attorney's fees, sheriff's fees and all other charges incidental to the foreclosure and sale, the undersigned Sheriff IV will sell at Public Auction on **March 16, 2021 at 10:00 a.m.** or soon thereafter at the main entrance of the Office of the Clerk of Court, RTC Imus, Bulwagan Ng Katarungan, Aguinaldo Highway, Imus, Cavite, to the highest bidder for cash and in Philippine Currency, the following property with all the improvements thereon, to wit:

TRANSFER CERTIFICATE OF TITLE No. T-459516

A parcel of land (Lot 80 Blk. 7, of the consol. subd. plan, Pcs-042151-008660, being a portion of the consol. of Lots 1 & 2, Psu-246995, LRC Rec. No.), sit. in the Brgy. of Toclong, Mun. of Kawit, Prov. of Cavite. Bounded on the SE., along line 1-2 by Lot 79, Blk. 7 of the consol. subd. plan; on the SW., along line 2-3 by the Property of Leonila Octavio (Psu-247242); on the NW., along line 3-4 by Lot 81, blk. 7 on the 4-1 by Rd. Lot 17, both of the consolidation/subdivision plan. x x x x containing an area of **THIRTY SIX (36) SQ. METERS x x x**

All sealed bid must be submitted to the undersigned on the stated time and date.

In the event the public auction should not take place on the said date, it shall be held on **March 23, 2021 at 10:00 a.m.** without prior notice.

Prospective bidders/buyers are hereby to investigate for themselves the title to the said property and encumbrances thereon if any there be.

Imus, Cavite, Philippines, January 26, 2021.

(Sgd.) **ANSELMO P. PAGUNSAN, JR.**
Sheriff IV

APPROVED:

(Sgd.) **ARMIE A. FRANCISCO**
Clerk of Court V
Officer-in-Charge

Copy Furnished:

NATIONAL HOME MORTGAGE FINANCE CORPORATION
#104 Amorsolo St., Legaspi Village, Makati City

ZOSIMAR R. GAYON
2737 Paulino St., Tambo, Parañaque City
Lakersfield Subd., Lot 80 Blk. 7, Toclong, Kawit, Cavite

Publication Dates: DIYARYO KABITENYO
February 15, 22 and March 1, 2021

New gene-editing tool allows for programming of sequential edits over time

Researchers from the University of Illinois Chicago have discovered a new gene-editing technique that allows for the programming of sequential cuts -- or edits -- over time.

CRISPR is a gene-editing tool that allows scientists to change the DNA sequences in cells and sometimes add a desired sequence or genes. CRISPR uses an enzyme called Cas9 that acts like scissors to make a cut precisely at a desired location in the DNA. Once a cut is made, the ways in which cells repair the DNA break can be influenced to result in different changes or edits to the DNA sequence.

The discovery of the gene-editing capabilities of the CRISPR system was described in the early 2010s. In only a few years, scientists became enamored with the ease of guiding CRISPR to target almost any DNA sequence in a cell or to target many different sites in a cell in a single experiment.

"A drawback of currently available CRISPR-based editing systems is that all the edits or cuts are made all at once. There is no way to guide them so that they take place in a sequential fashion, one after the other," said UIC's Bradley Merrill, associate professor of biochemistry and molecular genetics at the College of Medicine and lead author of the paper.

Merrill and colleagues' new process involves the use of special molecules called guide RNA that ferry the Cas9 enzyme within the cell and determine the precise DNA sequence at which Cas9 will cut. They call their specially engineered guide RNA molecules "proGuides," and the molecules allow for the programmed sequential editing of DNA using Cas9.

Their findings are published in the journal Molecular Cell.

While proGuide is still in the prototype phase, Merrill and colleagues plan to further develop their concept and hope that researchers will be able to use the technique soon.

"The ability to preprogram the sequential activation of Cas9 at multiple sites introduces a new tool for biological research and genetic engineering," Merrill said. "The time factor is a critical component of human development and also disease progression, but current methods to genetically investigate these processes don't work effectively with the time element. Our system allows for gene editing in a pre-programmed fashion, enabling researchers to better investigate time-sensitive processes like how cancer develops from a few gene mutations and how the order in which those mutations occur may affect the disease."

This research was supported by grants from the National Institutes of Health (R21OD027080, F30CA225058 and F30HD090938) and by the UIC Center for Clinical and Translational Sciences.

REPUBLIC OF THE PHILIPPINES
FOURTH JUDICIAL REGION
REGIONAL TRIAL COURT
OFFICE OF THE CLERK OF COURT
TRECE MARTIRES CITY

BDO UNIBANK, INC.,
Mortgagee,

Foreclosure Case No. F-044-20

-versus-

JUNREY REVILLA DASIG, AS REPRESENTED BY HIS ATTORNEY-IN-FACT, ELIZABETH REVILLA DASIG,
Mortgagors.

X- -X

NOTICE OF EXTRA-JUDICIAL SALE

Upon Extra-Judicial Petition for Sale under Act 3135, as amended by Act. 4118, filed by Mortgagee, **BDO UNIBANK, INC.,** with business address at BDO Corporate Center, 7899 Makati Avenue, Makati City against the Mortgagors, **JUNREY REVILLA DASIG, AS REPRESENTED BY HIS ATTORNEY-IN-FACT, ELIZABETH REVILLA DASIG,** with residence and postal addresses at (1) Lot 38 Blk 1, Kensington 7, Lancaster New City, Brgy. Navarro, Gen. Trias, Cavite. (2) Lot 37, Blk 1, Kensington 7, Brgy. Navarro, Gen. Trias, Cavite; and (3) No. 338-B, Juliard Homes I, Subd. Med., Imus, 4103 Cavite, to satisfy the mortgage indebtedness as of **31 January 2020,** amounts to **ONE MILLION EIGHT HUNDRED SEVENTY NINE THOUSAND FOUR HUNDRED SEVENTY TWO PESOS & 37/100 (P1,879,472.37),** Philippine Currency, including interest, penalties, and other charges as of said date but exclusive of all the other expenses incidental to this foreclosure and sale, the undersigned Sheriff will sell at public auction on **April 22, 2021** at 10:00 o'clock in the morning at the main entrance of the Government Center Bldg. located at the Provincial Capitol Compound, Trece Martires City, to the highest bidder of CASH and in Philippine Currency the following described property with all the improvements thereon; to wit:

TRANSFER CERTIFICATE OF TITLE No. 057-2016014830

LOT NO. 38 **BLOCK NO.:** 1 **PLAN NO:** PCS-04-028223
PORTION OF: BLK 14, PSD-04-225691 AND LOT 1686, SFDME (FRS-04-005311)
LOCATION: BARANGAY OF NAVARRO, MUNICIPALITY OF GENERAL TRIAS, PROVINCE OF CAVITE, ISLAND OF LUZON
BOUNDARIES:

LINE	DIRECTION	ADJOINING LOT(S)
1-2	NW	ROAD LOT 8, PCS-04-028223
2-3	NE	LOT 37, BLOCK 1, PCS-04-028223
3-4	SE	LOT 58, BLOCK 1 PCS-04-028223
4-1	SW	LOT 39, BLOCK 1, PCS-04-028223

AREA : FORTY ONE SQUARE METERS (41), MORE OR LESS

TRANSFER CERTIFICATE OF TITLE No. 057-2016064284

LOT NO. 37 **BLOCK NO.:** 1 **PLAN NO:** PCS-04-028223
PORTION OF: BLK 14, PSD-04-225691 AND LOT 1686, SFDME (FRS-04-005311)
LOCATION: BARANGAY OF NAVARRO, MUNICIPALITY OF GENERAL TRIAS, PROVINCE OF CAVITE, ISLAND OF LUZON
BOUNDARIES:

LINE	DIRECTION	ADJOINING LOT(S)
1-2	NE	LOT 36, BLOCK 1, PCS-04-028223
2-3	SE	LOT 58, BLOCK 1, PCS-04-028223
3-4	SW	LOT 38, BLOCK 1 PCS-04-028223
4-1	NW	ROAD LOT 8, PCS-04-028223

AREA : FORTY ONE SQUARE METERS (41), MORE OR LESS

All sealed bids must be submitted to the undersigned on the above stated time and date.

In the event the public auction should not take place on the said date and time, it shall be held on **April 29, 2021** without further notice.

Prospective bidders/buyers are hereby enjoined to investigate for themselves the title to the said property and encumbrances thereon, if any there be.

Trece Martires City, **February 09, 2021.**

(Sgd.) **REYNALDO L. SALOMA**
Sheriff IV

Copy Furnished:

BDO UNIBANK, INC.,
RISK MANAGEMENT GROUP-REMEDIAL MANAGEMENT UNIT
11th Floor, BDO South Tower, BDO Corporate Tower
7899 Makati Avenue, Makati City 0726

JUNREY REVILLA DASIG and ELIZABETH REVILLA DASIG
(1) Lot 38 Blk. 1, Kensington 7, Lancaster New City, Brgy. Navarro, Gen. Trias, Cavite
(2) Lot 37 Blk. 1, Kensington 7, Brgy. Navarro, Gen. Trias, Cavite
(3) No. 338-B, Juliard Homes I, Subd. Med., Imus, 4103 Cavite

WARNING: IT IS ABSOLUTELY PROHIBITED TO REMOVE, DEFACE OR DESTROY THIS NOTICE OF EXTRA JUDICIAL SALE ON OR BEFORE THE DATE OF SALE

Publication : DIYARYO KABITENYO
Dates : February 15, 22 and March 1, 2021

Measuring hemoglobin levels with AI microscope, microfluidic chips

One of the most performed medical diagnostic tests to ascertain the health of patients is a complete blood count, which typically includes an estimate of the hemoglobin concentration. The hemoglobin level in the blood is an important biochemical parameter that can indicate a host of medical conditions including anemia, polycythemia, and pulmonary fibrosis.

In AIP Advances, by AIP Publishing, researchers from SigTuple Technologies and the Indian Institute of Science describe a new AI-powered imaging-based tool to estimate hemoglobin levels. The setup was developed in conjunction with a microfluidic chip and an AI-powered automated microscope that was designed for deriving the total as well as differential counts of blood cells.

Often, medical diagnostics equipment capable of multiparameter assessment, such as hematology analyzers, has dedicated subcompartments with separate optical detection systems. This leads to increased sample volume as well as an increase in cost of the entire equipment.

"In this study, we demonstrate that the applicability of a system originally designed for the purposes of imaging can be extended towards the performance of biochemical tests without any additional modifications to the hardware unit, thereby retraining the cost and laboratory footprint of the original device," said author Srinivasan Kandaswamy.

EXTRA-JUDICIAL SETTLEMENT OF THE ESTATE OF THE DECEASED ALFREDO L. SANTOS

NOTICE is hereby given that the estate of the deceased **ALFREDO L. SANTOS,** who died intestate on October 28, 2020 at Cavite City, Philippines, consisting of an account with METROBANK, Plaridel, Bulacan Branch, to wit:

TYPE OF ACCOUNT	ACCOUNT NO.	AMOUNT
Savings	327-3-32730365-3	P50,069.05

has been adjudicated and extra-judicially settled by and among his heirs in equal shares pro indiviso on February 8, 2021 at the City of Cavite, Philippines before Notary Public Atty. Antonia B. Caboco and entered in her Notarial Register as Doc. No. 94; Page No. 20; Book No. LXIV; Series of 2021.

(Sgd.) **All Heirs**

Publication : DIYARYO KABITENYO
Dates : February 15, 22 and March 1, 2021

EXTRAJUDICIAL SETTLEMENT OF ESTATE With DEED OF ABSOLUTE SALE

NOTICE is hereby given that the estate of the late **TERESITA SISAVAN GENOVA** who died intestate on April 5, 2011 at Cavite City, consisting of a parcel of land with no improvement found thereon, located at Manila Cavite Road Cor. Don Pedro Bautista St., Brgy. 2 (C. Tirona) Dalahican, Cavite City, covered by TCT-19835, containing an area of Two Hundred (200) square meters has been adjudicated and extrajudicially settled by and among her heirs; and for and in consideration of the sum of SEVEN HUNDRED THOUSAND PESOS (P700,000.00), Philippine Currency, they do hereby SELL, CEDE, TRANSFER and CONVEY by way of Deed of Absolute Sale the above-mentioned parcel with a total lot area of TWO HUNDRED (200) square meters, more or less, unto ERWIN BERNARDO PACHECO, his heirs and assigns the above described parcel of land on February 6, 2021 at Cavite City, Philippines before Notary Public Atty. Sikat V. Agbuntag and entered in her Notarial Register as Doc. No. 3518; Page No. 88; Book No. 3; Series of 2021.

(Sgd.) **ALGEN SISAVAN GENOVA for himself and as representative of ALFREDO PONTINO GENOVA and CEDIE SISAVAN GENOVA by virtue of Special Power of Attorney and Vendor**

Publication : DIYARYO KABITENYO
Dates : February 15, 22 and March 1, 2021

Republic of the Philippines
Fourth Judicial Region
REGIONAL TRIAL COURT
BRANCH 89
City of Bacoor

PETITION FOR CANCELLATION OF THE NOTICE OF LIS PENDENS ON TCT NO. T-925277 OF THE REGISTRY OF DEEDS OF THE PROVINCE OF CAVITE

LRC #843-2015-93

ORLANDO NARCISO, MARRIED TO SEUNG HEE KANG
Petitioner.

ORDER

The above-entitled petition was referred to the undersigned Assisting Judge in October 2020 pursuant to Supreme Court Administration Order No. 193-2019.

The petition is for the cancellation of the Notice of Lis Pendens annotated in Transfer Certificate of Title No. T-925277.

NOTICE IS GIVEN that said petition is set for hearing on **APRIL 16, 2021 at 1:30 in the afternoon.** All interested parties/persons are directed to appear and show cause why the same should not be granted.

Let this Order be published once a week for two (2) consecutive weeks in a newspaper of general circulation in the Province of Cavite.

The Process Server of this Court is ordered to post copies of this Order in three (3) conspicuous places in the City of Bacoor where the subject property is located.

Furnish copies of this Order and the petition the Registrars of Deeds of the Province of Cavite and the City of Bacoor.

SO ORDERED.

Done in chamber, Bacoor City, December 17, 2020.

(Sgd.) **AMALIA S. GUMAPOS-RICABLANCA**
Assisting Judge

Publication : DIYARYO KABITENYO
Dates : February 22 and March 1, 2021

Republic of the Philippines
Province of Cavite
Municipality of Alfonso

OFFICE OF THE MUNICIPAL CIVIL REGISTRAR

NOTICE FOR PUBLICATION

In compliance with Section 5 of R.A. No. 9048, a notice is hereby served the public that **GREGORIA G. MATUTO** has filed with this office a petition for change of first name from **YOYANG** to **GREGORIA** in the birth certificate of **YOYANG GONZALES** who was born on **28 November 1960 at Matagbac, Alfonso, Cavite,** and whose parents are **Arcadio Sales Gonzales and Sofia Hermino Ligsa.**

Any person adversely affected by said petition may file his written opposition with this Office not later than **March 8, 2021.**

(Sgd.) **TERESITA A. GALANG**
Civil Registrar

DIYARYO KABITENYO - February 22 and March 1, 2021

DEED OF EXTRAJUDICIAL SETTLEMENT, PARTITION AND ADJUDICATION OF THE ESTATE OF SPOUSES ARSENIO LARA AND MONICA LARA

NOTICE is hereby given that the estate of the deceased **SPOUSES ARSENIO LARA and MONICA LARA,** who both died intestate on July 10, 2014 and April 26, 2018, respectively, both at Paang Buaya 2, City of Imus, Cavite, consisting of a parcel of land together with the house erected thereon, situated in the Bo. of Paang Buaya, Mun. of Imus, Prov. of Cavite, covered by Transfer Certificate of Title No. T-122358 of the Registry of Deeds for the Province of Cavite, containing an area of SIX HUNDRED SIXTY NINE (669) SQUARE METERS, more or less, has been adjudicated and extrajudicially settled by and among their heirs in equal share, pro indiviso on February 15, 2021 at Imus, Cavite before Notary Public Atty. Gabriel B. Octava and entered in his Notarial Register as Doc. No. 289; Page No. 58; Book No. IV; Series of 2021.

(Sgd.) **All Heirs**

Publication : DIYARYO KABITENYO
Dates : February 22, March 1 & 8, 2021

Republic of the Philippines
MUNICIPAL CIVIL REGISTRY OFFICE
MUNICIPALITY OF TANZA
Province of Cavite

NOTICE OF PUBLICATION

In compliance with Sec. 5 of Rep. Act No. 9048, a notice is hereby served to the public that **JASMIN P. MONZON** has filed with this office a petition for **CHANGE OF FIRST NAME** (OCRG & LCRO Copy) from **"HERMINIA"** to **"JASMIN"** in the **CERTIFICATE OF LIVE BIRTH** of one **HERMINIA CERRADO PROFETA,** who was born on **MAY 9, 1961 at Tanza, Cavite** and parents were **GREGORIO SUCK PROFETA & POTENCIANA ENRIQUEZ CERRADO.**

Any person adversely affected by said petition may file his written opposition with this Office not later than **March 15, 2021.**

(Sgd.) **MA. THERESA J. CESA**
Municipal Civil Registrar

DIYARYO KABITENYO - March 1 & 8, 2021

Hormone helps prevent muscle loss in mice on high fat diets

A new study suggests that a hormone known to prevent weight gain and normalize metabolism can also help maintain healthy muscles in mice. The findings present new possibilities for treating muscle-wasting conditions associated with age, obesity or cancer, according to scientists from the University of Southern California Leonard Davis School of Gerontology.

The research, published this month in the American Journal of Physiology-Endocrinology and Metabolism, addresses the related problems of age and obesity-induced muscle loss, conditions which can lead to increased risk of falls, diabetes and other negative health impacts. It also adds to a growing number of findings describing beneficial effects of MOTS-c, a mitochondrial-derived peptide that is known to mimic the effects of exercise.

People with SARS-CoV-2 antibodies may have low risk of future infection, study finds

People who have had evidence of a prior infection with SARS-CoV-2, the virus that causes COVID-19, appear to be well protected against being reinfected with the virus, at least for a few months, according to a newly published study from the National Cancer Institute (NCI). This finding may explain why reinfection appears to be relatively rare, and it could have important public health implications, including decisions about returning to physical workplaces, school attendance, the prioritization of vaccine distribution, and other activities.

For the study, researchers at NCI, part of the National Institutes of Health, collaborated with two health care data analytics companies (HealthVerity and Aetion, Inc.) and five commercial laboratories. The findings were published on Feb. 24 in JAMA Internal Medicine.

"While cancer research and cancer care remain the primary focus of NCI's work, we were eager to lend our expertise in serological sciences to help address the global COVID-19 pandemic, at the request of Congress," said NCI Director Norman E. "Ned" Sharpless, M.D., who was one of the coauthors on the study. "We hope that these results, in combination with those of other studies, will inform future public health efforts and help in setting policy."

"The data from this study suggest that people who have a positive result from a commercial antibody test appear to have substantial immunity to SARS-CoV-2, which means they may be at lower risk for future infection," said Lynne Penberthy, M.D., M.P.H., associate director of NCI's Surveillance Research Program, who led the study. "Additional research is needed to understand how long this protection lasts, who may have limited protection, and how patient characteristics, such as comorbid conditions, may impact protection. We are nevertheless encouraged by this early finding."

Antibody tests -- also known as serology tests -- detect serum antibodies, which are immune system proteins made in response to a specific foreign substance or infectious agent, such as SARS-CoV-2.

This study was launched in an effort to better understand whether, and to what degree, detectable antibodies against SARS-CoV-2 protect people from reinfection with the virus. Working with HealthVerity and Aetion, NCI aggregated and analyzed patient information collected from multiple sources, including five commercial labs (including Quest Diagnostics and Labcorp), electronic medical records, and private insurers. This was done in a way that protects the privacy of an individual's health information and is compliant with relevant patient privacy laws.

The researchers ultimately obtained antibody test results for more than 3 million people who had a SARS-CoV-2 antibody test between Jan. 1 and Aug. 23, 2020. This represented more than 50% of the commercial SARS-CoV-2 antibody tests conducted in the United States during that time. Nearly 12% of these tests were antibody positive; most of the remaining tests were negative, and less than 1% were inconclusive.

About 11% of the seropositive individuals and 9.5% of the seronegative individuals later received a nucleic acid amplification test (NAAT) -- sometimes referred to as a PCR test -- for SARS-CoV-2. The research team looked at what fraction of individuals in each group subsequently had a positive NAAT result, which may indicate a new infection. The study team reviewed NAAT results at several intervals: 0-30 days, 31-60 days, 61-90 days, and >90 days because some people who have recovered from a SARS-CoV-2 infection can still shed viral material (RNA) for up to three months (although they likely do not remain infectious during that entire period).

The team found that, during each interval, between 3% and 4% of the seronegative individuals had a positive NAAT test. But among those who had originally been seropositive, the NAAT test positivity rate declined over time.

Human lung and brain organoids respond differently to SARS-CoV-2 infection in lab tests

COVID-19, the disease caused by the pandemic coronavirus SARS-CoV-2, is primarily regarded as a respiratory infection. Yet the virus has also become known for affecting other parts of the body in ways not as well understood, sometimes with longer-term consequences, such as heart arrhythmia, fatigue and "brain fog."

Researchers at University of California San Diego School of Medicine are using stem cell-derived organoids – small balls of human cells that look and act like mini-organs in a laboratory dish -- to study how the virus interacts with various organ systems and to develop therapies to block infection.

"We're finding that SARS-CoV-2 doesn't infect the entire body in the same way," said Tariq Rana, PhD, professor and chief of the Division of Genetics in the Department of Pediatrics at UC San Diego School of Medicine and Moores Cancer Center. "In different cell types, the virus triggers the expression of different genes, and we see different outcomes."

Rana's team published their findings February 11, 2021 in Stem Cell Reports.

Like many organs, the team's lung and brain organoids produce the molecules ACE2 and TMPRSS2, which sit like doorknobs on the outer surfaces of cells. SARS-CoV-2 grabs these doorknobs with its spike protein as a means to enter cells and establish infection.

Rana and team developed a pseudovirus -- a noninfectious version of SARS-CoV-2 -- and labeled it with green fluorescent protein, or GFP, a bright molecule derived from jellyfish that helps researchers visualize the inner workings of cells. The fluorescent label allowed them to quantify the binding of the virus' spike protein to ACE2 receptors in human lung and brain organoids, and evaluate the cells' responses.

The team was surprised to see approximately 10-fold more ACE2 and TMPRSS2 receptors and correspoodingly much higher viral infection in lung organoids, as compared to brain organoids. Treatment with viral spike protein or TMPRSS2 inhibitors reduced infection levels in both organoids.

"We saw dots of fluorescence in the brain organoids, but it was the lung organoids that really lit up," Rana said.

Besides differences in infectivity levels, the lung and brain organoids also differed in their responses to the virus. SARS-CoV-2-infected lung organoids pumped out molecules intended to summon help from the immune system -- interferons, cytokines and chemokines. Infected brain organoids, on the other hand, upped their production of other molecules, such as TLR3, a member of the toll-like receptor family that plays a fundamental role in pathogen recognition and activation of innate immunity.

Rana explained that, while it might seem at first like the brain organoid reaction is just another form of immune response, those molecules can also aid in programmed cell death. Rana's team previously saw a similar brain cell response to Zika virus, an infection known to stunt neonatal brain development.

"The way we are seeing brain cells react to the virus may help explain some of the neurological effects reported by patients with COVID-19," Rana said.

Of course, organoids aren't exact replicas of human organs. They lack blood vessels and immune cells, for example. But they provide an important tool for studying diseases and testing potential therapies. According to Rana, organoids mimic the real-world human condition more accurately than cell lines or animal models that have been engineered to over-express human ACE2 and TMPRSS2.

"In animals over-expressing ACE2 receptors, you see everything light up with infection, even the brain, so everyone thinks this is the real situation," Rana said. "But we found that's likely not the case."

In addition to their work with the pseudovirus, the team validated their findings by applying live, infectious SARS-CoV-2 to lung and brain organoids in a Biosafety Level-3 laboratory -- a facility specially designed and certified to safely study high-risk microbes.

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For selenium in rivers, timing matters

Selenium contamination of freshwater ecosystems is an ongoing environmental health problem around the world. A naturally occurring trace element, selenium levels are high in some geologic formations like sedimentary shales that form much of the bedrock in the Western United States. Soils derived from this bedrock, and weathering of shale outcrops, can contribute high levels of selenium to surrounding watersheds.

New research out February 23, 2021 in Environmental Science & Technology from UConn Assistant Professor of Natural Resources and the Environment Jessica Brandt with Travis Schmidt and colleagues at the United States Geological Survey (USGS) investigates some of the complexities of selenium and how it moves through the ecosystem during runoff events and as a result of seasonal irrigation of selenium-enriched soils.

The research focused on the Lower Gunnison River Basin in Colorado, an area impacted by selenium-enriched bedrock known as the Upper Cretacous Mancos Shale, and designated critical habitat for the endangered razorback sucker (Xyrauchen texanus) and Colorado pikeminnow (Ptychocheilus lucius). Between June 2015 and October 2016, the research team sampled water and wildlife across six sampling trips and along 60 river miles between Austin and Grand Junction, CO.

Brandt explains that the focus of the study was on the timing of selenium movement through the riverine food web. Particulate matter including algae take up selenium from the water at the base of the food web.

Mouse study shows bacteriophage therapy could fight drug-resistant Klebsiella pneumoniae

Using viruses instead of antibiotics to tame troublesome drug-resistant bacteria is a promising strategy, known as bacteriophage or "phage therapy." Scientists at the National Institutes of Health have used two different bacteriophage viruses individually and then together to successfully treat research mice infected with multidrug-resistant Klebsiella pneumoniae sequence type 258 (ST258). The bacterium K. pneumoniae ST258 is included on a CDC list of biggest antibiotic resistance threats in the United States. High rates of morbidity and mortality are associated with untreated K. pneumoniae infections.

Phage therapy has been pursued for about a century, though conclusive research studies are rare and clinical results -- from a handful of reports -- have provided mixed results. In the new paper published in the journal mBio, the NIH scientists note that phages are of great interest today because of a dearth of alternative treatment options for drug-resistant infections. Bacterial resistance has emerged against even the newest drug combinations, leaving some patients with few or no effective treatment options.

In research conducted in Hamilton, Montana, at Rocky Mountain Laboratories -- part of the NIH's National Institute of Allergy and Infectious Diseases -- and in collaboration with the National Cancer Institute in Bethesda, Maryland, scientists completed a series of studies on research mice infected with ST258. They treated the mice with either phage P1, phage P2, or a combination of the two, all injected at different times following ST258 infection. The scientists had isolated phages P1 and P2 in 2017 from raw sewage that they screened for viruses that would infect ST258 -- an indication that phages can be found just about any place. Phages P1 and P2 are viruses from the order Caudovirales, which naturally infect bacteria.

Each of the three experimental treatment regimens helped the mice recover from ST258 infection. The scientists noted that the dose of phage provided was less vital to recovery than was the timing of when the dose was received. Mice treated 1 hour after infection showed the strongest recovery, followed by those treated eight hours after infection and then those treated at 24 hours.