

Safer CRISPR gene editing with fewer off-target hits

The CRISPR system is a powerful tool for the targeted editing of genomes, with significant therapeutic potential, but runs the risk of inappropriately editing "off-target" sites. However, a new study published July 8, 2020 in the open-access journal *PLoS Biology* by Feng Guo of Weizhou Medical University, China, and colleagues, shows that mutating the enzyme at the heart of the CRISPR gene editing system can improve its fidelity. The results may provide a therapeutically safe strategy for gene editing than using the standard enzyme system.

The CRISPR system employs an enzyme called Cas9 to cleave DNA. Cas9 will cut almost any DNA sequence. Its specificity comes from its interaction with a "guide RNA" (gRNA) whose sequence allows it to bind with the target DNA through base-pair matching. Once it does, the enzyme is activated and the DNA is cut. The CRISPR system is found in multiple bacterial species, among them, *Streptococcus pneumoniae*. Unlike some others, its gene is small enough to be made a research and

harmless gene therapy vector called adenos-associated virus, making it attractive for therapeutic purposes. A key limitation of any of the CRISPR systems, including that from *S. aureus*, is off-target cleavage of DNA. A guide RNA may bind weakly to a site whose sequence is a close but imperfect match, depending on how closely the match is and how tightly the enzyme interacts with the paired gRNA-DNA complex. The enzyme may become activated and cut the DNA strongly, with potentially harmful consequences.

5G wireless networks have few health impacts, finds study using zebrafish model

Findings from an Oregon State University study into the effects of radiofrequency radiation generated by the wireless technology that will soon be the standard for cell phones suggest few health impacts. Fifth generation or 5G wireless technology, which began being deployed worldwide in 2019, provides faster connectivity and more bandwidth, meaning higher download

speeds. But because the technology is so new, little is known about the potential health effects from its radiofrequency radiation, which is higher than the current industry standard 4G. The Oregon State study begins to change that. "Based on our study, we don't think 5G radiation is that harmful," said Subham Dasgupta, a postdoctoral fellow working in the lab of

Robyn Tangwar at Oregon State. "It's predominantly benign." Researchers conducted the research using embryonic zebrafish, a model organism often used to discover interactions between environmental stressors and biological systems. Zebrafish and humans have similar developmental processes and are similar on a genomic level, meaning zebrafish research can easily be applied to humans.

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DEPARTMENT OF TRADE & INDUSTRY

Q & A on Consumer Rights

Q:

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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 lacks fund for modular learning program – Remulla

Gov. Joynto Remulla lamented last July 13 the province's lack of funds to support the modular teaching and learning process under the blended learning system to be implemented by the Department of Education (DepEd) for the coming school year.

Remulla posted on Facebook an open letter directed to Education Secretary Leonor Briones, seeking clarification on the role of local government units in financially supporting the blended learning plan of DepEd.

"Dear Sec. Briones, please contact me if I am wrong, so that my plans to modular teaching/learning pro-

cess of DepEd, para sa 600,000 na mag-aaral ng Cavite, ay kailangan maitan maghanda ng P5 bilyon para mapatupad ito," the governor said.

"Ayon rin sa plano, ang DepEd national ay walang contribution para dito at ito ay 100% na papasagin ng LGU," he also said.

Cavite, however, only has a P4.7 billion



REMULLA



BRIONES

budget for this year, according to Remulla.

He said that almost P1 billion was already spent for response efforts to the

coronavirus disease 2019 pandemic.

P2.1 billion was allocated for the salary of government workers and for other opera-

tions of the province, while P1 billion is allotted for hospital expenses.

Aside from this, Cavite also has other programs for the 4.5 million residents in the province that likewise need funding, said Remulla.

"Sa Cavite pa lamang po ito, Pramo po ang malalayo na lalawigan at iyuhad

na mas maraming kakahant?" added the governor.

"I am not a complainer. This week we will present our Cavite Educational Plan. It is our local solution to a NATIONAL problem. It is unfortunate that at the time of COVID,

every Filipino student can study but only the rich get to learn," Remulla also said.

Deped assures sufficient budget for Learning Continuity Program

The Department of Education (DepEd) has assured that there is sufficient budget for the implementation of the Basic Education Learning Continuity Plan (BE-LCP) this upcoming school year.

This is in response to Gov. Joynto Remulla who expressed his concern over the BE-LCP funds.

In a statement, DepEd identified its strategies to fund the BE-LCP. These include modular-

ization of Programs and Projects (PAPs), use of available balance of the school main accounts and other operating expenses (MOOE), and the use of local government's Special Education Fund (SEF).

DepEd will also enhance its partnerships with development partners and access to official development assistance (ODA). It will also enhance brigada Eskwela and maximize private sector contri-

butions and will request the Department of Budget and Management (DBM) and/or Congress for a supplemental budget.

The Education Department thanked Remulla for voicing

Turn to page 2

DIYARYO KABITENYO

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ARNULFO BARCO

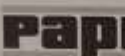
Publisher - Editor

GENER BARCO

Operations Manager

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Publishers Association of the Philippines, Inc.

Special filters in glasses can help the color blind see colors better, study finds

A new UC Davis study, conducted in collaboration with France's INSERM Stem Cell and Brain Research Institute, found that special patented glasses engineered with technically advanced spectral notch filters enhance color vision for those with the most common types of red-green color vision deficiency (anomalous trichromacy). Notably, the ability to identify and experience expanded color was also demonstrated when color blind test subjects were not wearing the glasses.

At least eight in 100 men (8%) and one in 200 women (0.5%) suffer from red-green color vision deficiency (CVD), totaling 13 million in the U.S. and 350 million worldwide. While those with normal color vision see in excess of one million hues and shades, those with CVD see a vastly diminished range of colors. People with CVD experience colors as more muted and washed out, and some colors cause confusion or are more difficult to differentiate.

Converting female mosquitoes to non-biting males with implications for mosquito control

Virginia Tech researchers have proven that a single gene can convert female Aedes aegypti mosquitoes into fertile male mosquitoes and identified a gene needed for male mosquito flight.

Male mosquitoes do not bite and are unable to transmit pathogens to humans. Female mosquitoes, on the other hand, are able to bite.

Female Aedes aegypti mosquitoes require blood to produce eggs, making them the prime carriers of the pathogens that cause Zika and dengue fever in humans.

"The presence of a male-determining locus (M locus) establishes the

male sex in Aedes aegypti and the M locus is only inherited by the male offspring, much like the human Y chromosome," said Zhiqian Tu, a professor in the Department of Biochemistry in the College of Agriculture and Life Sciences.

"By inserting Nix, a previously discovered male-determining gene in the M locus of Aedes aegypti, into a chromosomal region that can be inherited by females, we showed that Nix alone was sufficient to convert females to fertile males. This may have implications for developing future mosquito control techniques."

These findings were published in the Proceedings of the National Academy of Sciences. "We also discovered that a second gene, named *myo-sex*, was needed for male flight. This work sheds light into the molecular basis of the function of the M locus, which contains at least 30 genes," said Azadeh Aryan, a research scientist in Tu's lab and the first author on the paper.

Aryan and colleagues generated and characterized multiple transgenic mosquito lines that expressed an extra copy of the Nix gene under the control of its own promoter. Maria Sharakhova, an assistant professor of entomology in the College

(DEPED... from page 1) out his concerns closely collaborate and assured they with the LGUs to fund with the dir... ductively align this every modalities to

Republic of the Philippines
REGIONAL TRIAL COURT
 Fourth Judicial Region
 Branch 109
 Caramona, Cavite

HOME DEVELOPMENT MUTUAL FUND,
 Mortgagee,

vs.

ROMMEL A. BAPTIST married to
JOCY B. BAPTIST,
 Mortgagee,

-----X-----
NOTICE OF SHERIFF'S SALE

Upon Extra-Judicial Foreclosure of Real Estate Mortgage under Act No. 3151, as amended by Act No. 4118 filed by the mortgagee, HOME DEVELOPMENT MUTUAL FUND (herein known as Pag-IBIG Fund), with postal address at 179 Flors HLP Business Solution Center, No. 408 Shaw Boulevard, Mandaluyong City against the mortgagors, ROMMEL A. BAPTIST married to JOCY B. BAPTIST, with present address at No. 6 Palawan Street, Lomas Diocasio, Tagay City and for the satisfaction of the mortgaged debt which as of January 15, 2020 amounts to FIVE HUNDRED THIRTY FOUR THOUSAND FORTY TWO PESOS & 20/100 (P/PS534,042.20), exclusive of all legal fees and expenses incidental to this foreclosure and sale, the undersigned as his duly authorized representative will SELL in public auction on **August 13, 2020** at 1:00 o'clock in the afternoon at the Court Room of Branch 109, Regional Trial Court, Hall of Justice Building, Caramona, Cavite to the highest bidder for CASH or MANGGUSO CHECK, in Philippine currency, the mortgaged property with all the improvements thereon to wit:

TRANSFER CERTIFICATE OF TITLE NO. 087-241198719

IT IS HEREBY CERTIFIED that certain land situated in BRGY. OF LANTIC, MUN. OF CARAMONA, PRIN. OF CAVITE, ISLAND OF LUZON, bounded and described as follows:

A PARCEL OF LAND LOCATED IN BKG. 3 OF THE CONS. AND SUBD. PLAN PCS-04-02033, BEING A PORTION OF THE CONS. OF PLAN 3, PNL-10341, 4-A, PSD-01918 & LPT 1, BKG. 12, PCS-04-02036, L.R.C. REC. NO. N-25002 & 45751, SITUATED IN THE BRGY. OF LANTIC, MUN. OF CARAMONA, PRIN. OF CAVITE, ISLAND OF LUZON, BOUNDARIES ON THE NE. ALONG LINE 5.7 BY LOT 75, BKG. 3 OF THE SL. ALONG LINE 2.5 BY LOT 78 BY BKG. 3 ON THE SW. ALONG LINE 3.4 BY ROAD LOT 37, AND ON THE NW. ALONG LINE 4.1 BY LOT 34 BKG. 3, ALL OF THE CONS. AND SUBD. PLAN BEINGING AT A PT. MARKED "1" ON PLAN, BEING S. 22 DEG. 30' E. 131.18 M. FROM BLMNG) 2, CAD. 285, CARAMONA CADATHE, THENCE S. 94 DEG. 29' E. 4.94 M. TO PT. 2 THENCE S. 45 DEG. 17' W. 9.49 M. TO PT. 3, THENCE S. 04 DEG. 22' W. 4.80 M. TO PT. 4 THENCE N. 43 DEG. 17' W. 9.89 M. TO THE PT. OF BEGINNING, CONTAINING AN AREA OF FORTY (40) SQUARE METERS, MORE OR LESS, ALL PTS. REFERRED TO ARE INDICATED ON THE PLAN AND ARE MARKED ON THE GROUND BY 25 C.V.L. CONIC MONS. 15X40 CM. BEARING SW 1/4, DATE OF THE ORIG. SURVEY: JULY 28-30, 1971 AND THAT OF THE SUBD. SURVEY: OCTOBER 1-15, 2007 & WAS APPROVED ON 02/07/22, 2008.

NOTHING FOLLOWS

Prospective buyers and/or bidders are hereby required to investigate for themselves the title of the said property and the whereabouts (status, status) thereof.

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 **August 20, 2020** at the same time and place without further notice.

Caramona, Cavite, Jan. 14, 2020.

(Sgd.) **BON GERARDO D. ASCANO**
 Clerk of Court VI
 & Ex-Officio Sheriff

Prepared by:
 (Sgd.) **JOSEPH E. BORGNO**
 Sheriff in Charge

Court Secretary:
HOME DEVELOPMENT MUTUAL FUND
 179 Flors HLP Business Solution Center,
 No. 408 Shaw Boulevard, Mandaluyong City

ATTY. RAYMUNDO B. SOJANO
 AND ATTORNEY AT LAW
 8049, 02 Villadoron Street, Magiswood St.,
 High Precision, Quezon City

ROMMEL A. BAPTIST and **JOCY B. BAPTIST**
 No. 6 Palawan Street, Lomas Diocasio,
 Tagay City

Publication: **EDYARTO KABINTENO**
 Date: July 6, 13 & 20, 2020

Republic of the Philippines
OFFICE OF THE MUNICIPAL
CIVIL REGISTRAR
 Indang, Cavite

Publication Notice
 R.A. NO. 10172

NOTICE TO THE PUBLIC

CCE-0026-2020

In compliance with the publication requirement and pursuant to OCRD Memorandum Circular No. 2013-1 Guidelines in the Implementation of the Administrative Order No. 1 Series of 2012 (DB on E.A. 18172), Notice is hereby served to the public that **ABELAIDAS, OLIDAN** has filed with this Office, a petition for correction of every in the date of birth from **June 14, 1951** to **June 14, 1950** in the Certificate of Live Birth of **ABELAIDA BONATO SIERRA** of Indang, Cavite and whose parents are **Cristiano Sierra and Adelaida Rosas**.

Any person adversely affected by said petition may file his/her written opposition with this Office not later than **July 27, 2020**.

(Sgd.) **MERCUA, CHAVEZ**
 Municipal Civil Registrar

EDYARTO KABINTENO - July 13 & 20, 2020

on-skin connection with a person's body.

"The conventional approach for developing an on-skin biomedical electronic device is usually complex and often expensive to produce," he said. "In contrast, our approach is low-cost and very simple. We can make a similar device using widely available pencils and paper."

Since its invention, pencils — made of lead including various levels of graphite, clay and wax — have often been used for writing and drawing. In the study, the researchers discovered that pencils containing more than 90% graphite are able to conduct a high amount of energy created from the friction between paper and pencil caused by drawing or writing. Specifically, the researchers found pencils with 93% graphite were the best for creating a variety of on-skin bioelectronic devices drawn on commercial office copy paper.

The new tattoo: Drawing electronics on skin

One day, people could monitor their own health conditions by simply picking up a pencil and drawing on their skin. In a new study, University of Missouri engineers demonstrated that the simple combination of pencils and paper could be used to create devices that might be used to monitor personal health.

Their findings are published in the journal Proceedings of the National Academy of Sciences.

Zheng Yan, an assistant professor in the College of Engineering, said many existing commercial on-skin biomedical devices often contain two main components — a tracking component and a surrounding flexible material, such as plastic, to provide a supportive structure for the component to maintain an

Republic of the Philippines
**OFFICE OF THE MUNICIPAL
 CIVIL REGISTRAR**
 Indang, Cavite

In the office of Charge of First Year in the
 Certificate of Live Book (MCRS) of

FRUCTOLITO ISAB TEPORA CPN-0001-2020

LITO L. TEPORA
 Testator

NOTICE OF PUBLICATION

There is a petition filed for the change of first name in
 Certificate of Live Book (MCRS) of FRUCTOLITO ISAB
 TEPORA from "FRUCTOLITO" to "LITO".

NOTICE IS HEREBY GIVEN that any interested person
 is filed to notify this office and show cause why the same
 should not be granted.

Let this NOTICE be published at least once a week for two
 (2) consecutive weeks in a newspaper of general circulation as
 required under Section 5 of Republic Act No. 9048.

(Sgd.) **MERCELA CHAVEZ**
 Municipal Civil Registrar

DIYARVO KABITENYO - July 13 & 20, 2020

EXTRA-JUDICIAL SETTLEMENT OF ESTATE

NOTICE is hereby given that the estate of the late
ROELA ARABACAP RAUTIVIA who died intestate on
 February 28, 2020 in Division Office (Municipal Office, City of Gen-
 eral Santos, Cotabato, consisting of her one (1) share in the Joint
 Pass Savings Account with the Bank of the Philippine Islands
 (BPI), Tapan, Cavite Branch with Account No. 00053-0922-
 34 with a total balance of Two Hundred Forty Five Thousand
 One Hundred Eighty Three Pesos and Thirty One Centavo
 (Php 445,883.31) has been adjudicated and extra-judicially
 settled by and between her heirs in equal shares pro indiviso on
 June 9, 2020 in the Municipality of Tapan, Province of Cavite,
 Philippines before Notary Public Atty. Janet Almazán P.
 De Guzman and entered in the Historical Register as Doc. No.
 740, Page No. 52, Book No. XXV, Series of 2020.

(Sgd.) **Beth Bates (Niece Zyrre Acarap Banting
 represented by Teresita Dones Santos Acarap,
 guardian ad litem)**

Publisher: DIYARVO KABITENYO
 Date: June 24, July 6 & 13, 2020

**EXTRAJUDICIAL SETTLEMENT OF ESTATE
 EMILIO FERRE ENCIVER**

NOTICE is hereby given that the estate of the deceased
EMILIO FERRE ENCIVER who died intestate on February
 28, 2020 in Alifan, Cavite, consisting of the following
 properties:

1. Concrete apartment building located in Bonifacio St.,
 Poblacion V, Alifan, Cavite and presently owned by Ter
 Declaration No. 01-0001-00094.
2. 2014 Toyota Fortuner with Plate No. AAW 2276
 appraised at P300,000.00; and
3. One-half (1/2) share in Savings Account No. 000073-
 1964-18 with BPI Tagaytay Branch with a balance of
 P6,500,000.00 as of December 17, 2019.

has been adjudicated and extra-judicially settled by and among
 her heirs in equal shares, pro indiviso, hereto, they being
WILL TRAVELER and CYNDEL by way of absolute sale under
MS. TILATIA MORALES DE JESUS the Toyota Fortuner car
 and in consideration of the amount of P300,000.00.

on March 10, 2020 in Alifan, Cavite before Notary Public Atty.
 Daisy L. Medina and entered in the Historical Register as Doc. No.
 442, Page No. 49, Book No. 13, Series of 2020.

(Sgd.) **AB Bates**

Publisher: DIYARVO KABITENYO
 Date: July 13, 20 & 27, 2020

**EXTRA-JUDICIAL SETTLEMENT OF ESTATE
 WITH PARTITION AND WITH ABSOLUTE SALE
 OF A PORTION OF LAND**

NOTICE is hereby given that the estate of the late
ROBERTO LLAGAS LOYOLA who died intestate on
 June 18, 2011, consisting of a real property situated in the
 Municipality of Marikina, City of Marikina, Province of Cavite, covered by
 Transfer Certificate of Title No. T-1012179, containing an area
 of ONE HUNDRED SEVENTY (170) SQ. METERS has been
 adjudicated and extra-judicially settled by and among her heirs
 in equal shares pro indiviso, settling, conveying and transferring
 the EIGHTY FIVE (85) SQUARE METERS in a portion left by
 the deceased by way of EXTRA-JUDICIAL SETTLEMENT OF
 ESTATE WITH ABSOLUTE SALE OF A PORTION OF LAND
 unto **PODNER HERNANDEZ CARANAS JR.** and **BARRY R.
 ACAPAS**, her heirs, assigns and assigns in interests all
 their rights, interests and participations over the above-described
 portion of land without improvement but and in consideration of
 the sum of FOUR HUNDRED EIGHTY THOUSAND PSEOS.
 (Php 480,000.00), Philippines Certificate, on February 10, 2020
 in Tapan, Cavite, Philippines before Notary Public Atty.
 Janet Almazán P. De Guzman and entered in the Historical
 Register as Doc. No. 57, Page No. 14, Book No. XXX,
 Series of 2020.

(Sgd.) **Beth Bates and Bayares**

Publisher: DIYARVO KABITENYO
 Date: June 25, July 6 & 13, 2020

**EXTRAJUDICIAL SETTLEMENT OF ESTATE
 OF PAULINA VARIAS FERRE**

NOTICE is hereby given that the estate of the deceased
PAULINA VARIAS FERRE who died intestate on May 13,
 2006 in Alifan, Cavite, consisting of the following properties:

1. A residential land measuring 443 sq. m. located in
 Bonifacio St., Poblacion V, Alifan, Cavite covered by Tax
 Dec. No. 01-0001-00217 and more particularly described
 under Original Certificate of Title No. P-2228 (P No. 19-
 411138).
2. A residential house located in the above-mentioned
 residential land and covered by Tax Declaration No. 01-
 0005-00219.

has been adjudicated and extra-judicially settled by and among
 her heirs in equal shares, pro indiviso, on March 16, 2020 in
 Alifan, Cavite before Notary Public Atty. Daisy L. Medina and
 entered in the Historical Register as Doc. No. 443, Page No.
 45, Book No. 13, Series of 2020.

(Sgd.) **AB Bates**

Publisher: DIYARVO KABITENYO
 Date: July 13, 20 & 27, 2020

**EXTRAJUDICIAL SETTLEMENT OF ESTATE OF
 JEANNA VARIAS FERRE**

NOTICE is hereby given that the estate of the deceased
JEANNA VARIAS FERRE who died intestate on August 11,
 1977 in Alifan, Cavite, consisting of a parcel of residential
 land without improvements, measuring 2,000 sqm, more or
 less, located in Alifan, Alifan, Cavite, covered by Tax Dec.
 No. 01-0005-00250 and more particularly described in TCT
 No. T-452 has been adjudicated and extrajudicially settled by
 and among her heirs in equal shares, pro indiviso, on March
 16, 2020 in Alifan, Cavite before Notary Public Atty. Daisy L.
 Medina and entered in the Historical Register as Doc. No. 443,
 Page No. 45, Book No. 13, Series of 2020.

(Sgd.) **AB Bates**

Publisher: DIYARVO KABITENYO
 Date: July 13, 20 & 27, 2020

**Artificial energy
 source for muscle**

A chemist and biologist got on a bus.

on their bus commute to the University of Massachusetts Amherst and discovered their mutual interest in how energy is converted from one form to another — for Debold, in muscle tissue and for IVY, in solar cells.

Debold told the chemist how stomachers

or activate or enhance skeletal muscle function in MS, ALS and chronic heart failure.

All are highly debilitating because the body has no way to fix them, says muscle physiologist Debold. It doesn't have good mechanisms to control — either in lab or in nature —

neurologist got on a bus. For this isn't the set-up to a joke. Instead, three

had been seeking an alternative energy source to replace the body's usual one, a molecule called adenosine triphosphate (ATP). Such a source could control muscle activity, and might lead to new muscle repair strategies in conditions like amyotrophic lateral sclerosis, for example.

function, the molecular motor that drives movement.

As IVY notes, the usual approach to creating a new compound is to systematically test each one among millions and one somewhat haphazardly — the classic "needle in a haystack" approach.

REPUBLIC OF THE PHILIPPINES
FOURTH JUDICIAL REGION
REGIONAL TRIAL COURT
BRANCH 18, NAG, CAVITE

HOME DEVELOPMENT MUTUAL FUND (Pag-IBIG Fund)
 Mortgage Financing

FNU - 000644
 The Home-Developed Fundamentals of Real Estate Mortgage under Act 5315, as Amended by Act No. 9718.

ROSEMARIE SAYSON RUDA,
 Mortgagee/Particulars

MIDDLE OF EXTRA JUDICIAL SALE

Upon Extra-Judicial protocol for sale under Act 5315, as amended by Act 9718 and by **HOME DEVELOPMENT MUTUAL FUND (Pag-IBIG Fund)** mortgagee/particulars, a government-financed institution duly organized and existing under the laws of the Republic of the Philippines, as follows: (1) First (HDF) Mortgage Submittal under the 903rd issue (HDF) Memorandum (M) which mortgage against **ROSEMARIE SAYSON RUDA**, with postal address at 7,023 Street 22, Phase 3, Cavite Heights, Baguio, Trinidad, Nueva Ecija, for credit of 20,000,000.00 Philippine pesos on 01 February 14, 1999 amounting to two hundred seven thousand one hundred one pesos, 74/100 (207,001.74) Philippine pesos, inclusive of interest and other charges, the said mortgage being well and validly executed on September 8, 2008 at 10:00 a.m. at the meeting in said mortgage in the presence of the Office of the Court Clerk (OCC) of the Office of the Regional Trial Court, Fourth Judicial Region, Cavite, for the highest bidder, 50 cents and no Philippine coins, the following described property with all the improvements existing thereon, to-wit:

TRANSFER CERTIFICATE OF TITLE
NO. 97-000000

As shown in the plan of subdivision of Block 2 of the subdivision of Lot 10000, 10001, 10002, 10003, 10004, 10005, 10006, 10007, 10008, 10009, 10010, 10011, 10012, 10013, 10014, 10015, 10016, 10017, 10018, 10019, 10020, 10021, 10022, 10023, 10024, 10025, 10026, 10027, 10028, 10029, 10030, 10031, 10032, 10033, 10034, 10035, 10036, 10037, 10038, 10039, 10040, 10041, 10042, 10043, 10044, 10045, 10046, 10047, 10048, 10049, 10050, 10051, 10052, 10053, 10054, 10055, 10056, 10057, 10058, 10059, 10060, 10061, 10062, 10063, 10064, 10065, 10066, 10067, 10068, 10069, 10070, 10071, 10072, 10073, 10074, 10075, 10076, 10077, 10078, 10079, 10080, 10081, 10082, 10083, 10084, 10085, 10086, 10087, 10088, 10089, 10090, 10091, 10092, 10093, 10094, 10095, 10096, 10097, 10098, 10099, 10100, 10101, 10102, 10103, 10104, 10105, 10106, 10107, 10108, 10109, 10110, 10111, 10112, 10113, 10114, 10115, 10116, 10117, 10118, 10119, 10120, 10121, 10122, 10123, 10124, 10125, 10126, 10127, 10128, 10129, 10130, 10131, 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Quantum body scanner? What happens when vector vortex beams meet scattering media

Propagate light through any kind of medium — be it free space or biological tissue — and light will scatter. Robustness to scattering is a common requirement for communications and imaging systems. Structured light, with its use of projected patterns, is resistant to scattering, and has therefore emerged as a versatile tool. In particular, modes of structured light carrying orbital angular momentum (OAM) have attracted significant attention for applications in biomedical

An international team of researchers recently published a comprehensive study of VVB transmission in scattering media. The team is collaborating under the aegis of the European Union's FET-OPEN project, Cancer Scan, which proposes to develop a radically new, unified technological concept of biomedical detection deploying new ideas in quantum optics and quantum mechanics. The new concept is based on unified transmission and detection of photons in a three-dimensional

space of orbital angular momentum, entanglement, and hyperspectral characteristics. Theoretically, these elements can contribute to developing a scanner that can screen for cancer and detect it in a single scan of the body, without any risk of radiation.

As explained in their report, the team implemented a flexible platform to generate VVBs and Gaussian beams, and investigated their propagation through a medium that mimics the features of biological tissue. They demonstrate and analyze the degradation of both the spatial profile and polarization pattern of the different modes of light.

For both Gaussian beams and VVBs, the authors remark that spatial profiles undergo an abrupt change as the concentration of the medium increases beyond 0.09%, a sudden

drop in concentration. The authors observe that a portion of the VVB signal becomes completely depolarized when it passes through scattering media, but a portion of the signal preserves its structure.

How our brains remain active during familiar, repetitive tasks

New research based on earlier results in mice, suggests that our brains are never at rest, even when we are not learning anything about the world around us.

Our brains are often likened to com-

puters, with learned activity patterns that store information continuously, even when we are not learning anything new.

Why does this not cause the brain to forget what it has learned? The study, from the

University of Cambridge, Harvard Medical School and Stanford University, reveals how the brain can reliably access stored information despite dramatic changes in the brain signals that represent it.

The research, led by Dr Timothy O'Leary from Cambridge's Department of Engineering, shows that different parts of our brain may need to relearn and keep track of information in other parts of the brain as it

moves around. Their study, published in the open access journal *eLife*, provides some of the first evidence that constant changes in neural activity are compatible with long-term memories of learned skills.

Scientists discover key element of strong antibody response to COVID-19

A team led by scientists at Scripps Research has discovered a common molecular feature found in many of the human antibodies that neutralize SARS-CoV-2, the coronavirus that causes COVID-19.

The scientists, whose study appears July 13 in *Science*, reviewed data on nearly 300 anti-SARS-CoV-2 antibodies that their lab and others have found in coronavirus COVID-19 patients over the past few months. They noted that a subset of these antibodies is particularly powerful at neutralizing the virus — and these potent antibodies are all encoded, in part, by the same antibody gene, IGHV3-53.

The scientists used a powerful tool known as X-ray crystallography to image two of these antibodies attached to their target site on SARS-CoV-2. The resulting atomic structure details of this interaction should be useful to vaccine designers, as well as to scientists hoping to develop antiviral drugs targeting the same site on SARS-CoV-2.

Prior research suggests that antibodies encoded by IGHV3-53 are generally present, at least in small numbers, in healthy people's blood. The results therefore offer hope that using a vaccine to boost levels of these ever-present antibodies will protect adequately against the virus.

This type of antibody has been isolated frequently in studies of COVID-19 patients, and we can now understand the structural basis for its interaction with SARS-CoV-2," says the study's senior author Ian Wilson, DPhil, Hansen Professor of Structural Biology and Chair of the Department of Integrative Structural and Computational Biology at Scripps Research.

"This study provides important inspiration for effective COVID-19 vaccine design," says co-author Dennis Burton, PhD, professor and co-chair of the Department of Immunology and Microbiology at Scripps Research.

The research was

a collaboration chiefly involving the Wilson and Burton labs, and the Scripps Research-based Neutralizing Antibody Center of IAVI, a prominent non-profit vaccine research organization. SARS-CoV-2 so far has infected more than 13 million people around the world and killed more than 500,000, in addition to causing widespread socioeconomic disruption and damage. Developing an effective vaccine to stop the pandemic is currently the world's top public health priority.

Although several potential vaccines are already in clinical trials, scientists don't yet have a full understanding of the molecular features that would

define a protective antibody response. In the new study, the scientists took a big step toward that goal.

The team started by analyzing 294 different SARS-CoV-2 neutralizing antibodies isolated from COVID-19 patients' blood over the past few months. Antibodies are Y-shaped proteins made in immune cells called B-cells. Each B-cell makes a specific antibody type, or clone, which is encoded by a unique combination of antibody genes in the cell. The scientists found that an antibody gene called IGHV3-53 was the most common of the genes for the 294 antibodies, encoding about 10 percent of them.

The scientists also

noted that the IGHV3-53-encoded antibodies in their study contain an unusually short variant of the CDR H3 loop, normally a key target-binding element. These antibodies are nevertheless very potent against SARS-CoV-2 when compared to other antibodies not encoded by IGHV3-53.

The IGHV3-53 antibodies had yet another property suggesting that boosting their numbers would be a good and achievable aim for a SARS-CoV-2 vaccine: They appeared to have mutated only minimally from the original versions that would be circulating, initially in small numbers, in the blood of healthy people.

Scientists ID gene responsible for deadly glioblastoma

Scientists have identified an oncogene (a cancer-causing gene) responsible for glioblastoma, the deadliest brain tumor. The discovery offers a promising new treatment target for a cancer that is always fatal.

The researchers say the oncogene is essential to the survival of the cancer cells. Without it, the cancer cells die. Scientists have already developed many targeted therapies for other cancers with a similar "oncogene addiction."

"Glioblastoma is one of the most deadly cancers. Unfortunately,

there is no effective treatment option for the disease. The current standard option, radiation plus temozolomide, which displayed a 15-month better survival rate, was hailed as a great success. Clearly, better understanding and new therapeutic targets are urgently needed," said researcher Hui Li, PhD, of the University of Virginia School of Medicine and the UVA Cancer Center. "The novel oncogene we discovered promises to be an Achilles' heel of glioblastoma, with its specific targeting generally an effective

approach for the treatment of the disease." Oncogenes are naturally occurring genes that spiral out of control and cause cancer. The oncogene Li and his colleagues identified, *AVIL*, normally helps cells maintain their size and shape. But the gene can be shifted into overdrive by a variety of factors, the researchers found. This causes cancer cells to form and spread.

Blocking the gene's activity completely destroyed glioblastoma cells in lab mice but had no effect on healthy cells.

Robot jaws shows medicated chewing gum could be the future

Medicated chewing gum has been recognized as a new advanced drug delivery method but currently there is no gold standard for testing drug release from chewing gum in vitro. New research has shown a chewing robot with built-in human-like jaws could provide opportunities for pharmaceutical companies to develop medicated chewing gum.

The aim of the measured University of Beirut. The study wanted to compare the amount of xylitol remaining in the gum between the chewing robot and human participants. The research team also wanted to assess the amount of xylitol released from chewing the gum. The researchers found the chewing robot demonstrated a similar release rate of xylitol as human participants.



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