Dreamarks

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MAGAZINE

Archer EV Jet AirCraft

ARCHER aircraft is designed to be safe, sustainable, with its expected payload of over 1,000 pounds, can carry four passengers plus a pilot. The glossy black-and-gray eVTOL air taxi is capable of top speeds up to 150 mph (241 km/h) and can fly as far as 100 miles (160 km) on a charge. It is optimized for back-to-back short-distance trips of around 20 miles (32 km), with a charging time of approximately 10 minutes in-between.

TeraHertz Spectroscopy Applicabilities

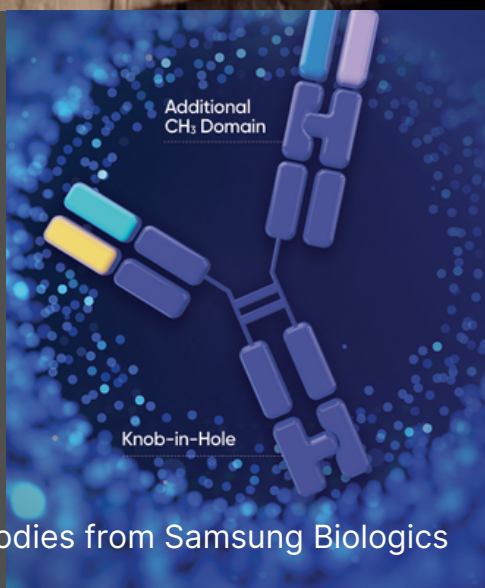
Nanoplastic Filtration

Glycine, The Components of Stars in Our Bodies

What is S-DUAL™ Bispecific Antibodies

Widely Used for Cancer and Autoimmune Disease Treatment,

S-DUAL™ Bispecific Antibodies Offer Potentials for Nanoscale Physio-Chemical Biological Treatments



S-Dual Bispecific Antibodies from Samsung Biologics

IN THIS ISSUE

Dreamarks Magazine

About Dreamarks

HRH Prince William Arthur Phillips Louis
Author, Conceptor, Strategist, World Leader
Programmer, Scientist, Technocrats
Sole Protector & Legal Guardian of Dreamarks

Gina Al ilmi
Writer, Books Author, Conceptor, Scientist,
Graphic & Web Designer, Researcher
Sole Founder & Main Director of Dreamarks

Bogor, West Java Indonesia
www.dreamarks.com
gina@dreamarks.com
@dream.pathways

Without our realizing it, microplastics have become a hidden poison whose presence goes unnoticed. From mineral water, tea, coffee, snacks, sugar, rice, and various other products packaged in plastic, all are susceptible to this toxic contamination. How can we filter out microplastics for a healthier life?

Revealing Our Universal Structure Bits

We continue this 2nd Edition of Dreamarks Magazine with a brief of Glycine as sugary structures since The Early Building Blocks of Stars Found in Comets 67P to The Earth Crystals Formations, Till Its Newly Found Latest Roles in The Untold Mapping Of Working Dynamics Structures Of Our Brain by Using Glycine Bio-Marking Ability To Monitors The Ionotropic States That Causes Influx and Membrane Depolarization in Various of its Regions.

Whilst Samsung Biologics has withstands its Hallmark positions with the Inventions of S-DUAL™ Bispecific Anti Bodies to combat Cancers and Auto Immune Diseases. There are also inovation of Terahertz Spectroscopy usage to Monitor Proton Flux from Electromagnetic Reflexion that can be use in various field from Medical to Military.

Moving further to prolonging our civilize societies on Earth, Scientists has found how Autophagy phase can be induced in our body to increase our health and immune system. Brazil Sao Paulo University has also found simple ways to filtrate microplastics that has daily intoxicating us.

Whilst in the field of Military we found how AI needing more Variabilites in Primary Data Sources because of its proneness to simple manipulations. Lets Welcoming Various New Journey with The Inventions of Archer EV Jet Aircraft that has been Worldwidely Introduced.

Gina Al Ilmi

Editor-in-Chief

INDONESIA

Cancer Country Profile 2020

BURDEN OF CANCER

Total population (2019)

270,625,567

Total # cancer cases (2018)	Total # cancer deaths (2018)
348,809	207,210

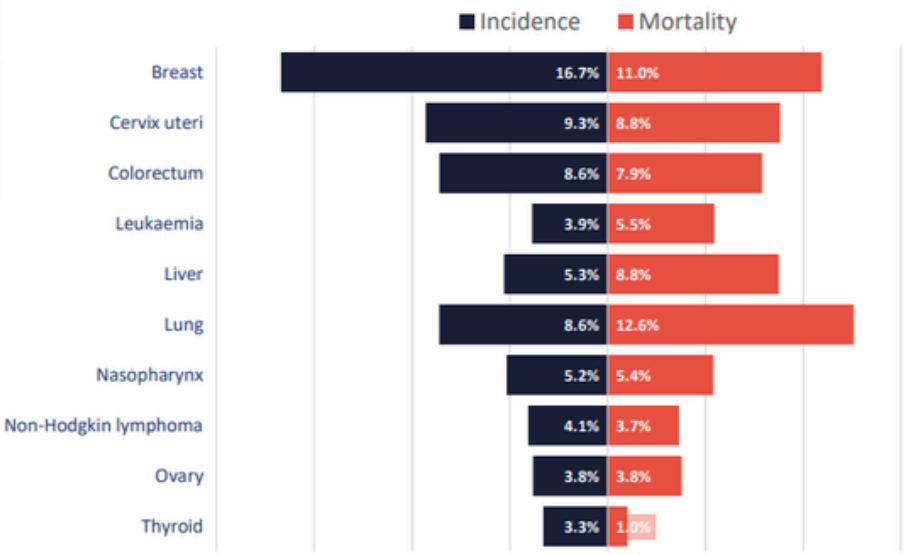
Premature deaths from NCDs (2016)

686,532

Cancer as % of NCD premature deaths (2016)

18.6%

Most common cancer cases (2018)



PAFs (population attributable fractions)

22.5%	1.7%	18.6%	1.3%	5.0%	2.4%
Tobacco (2017)[a]	Alcohol (2016)[a]	Infections (2012)[b]	Obesity (2012)[b]	UV (2012)[c]	Occupational risk (2017)[a]

[a] PAF, cancer deaths [b] PAF, cancer cases [c] PAF, melanoma cases

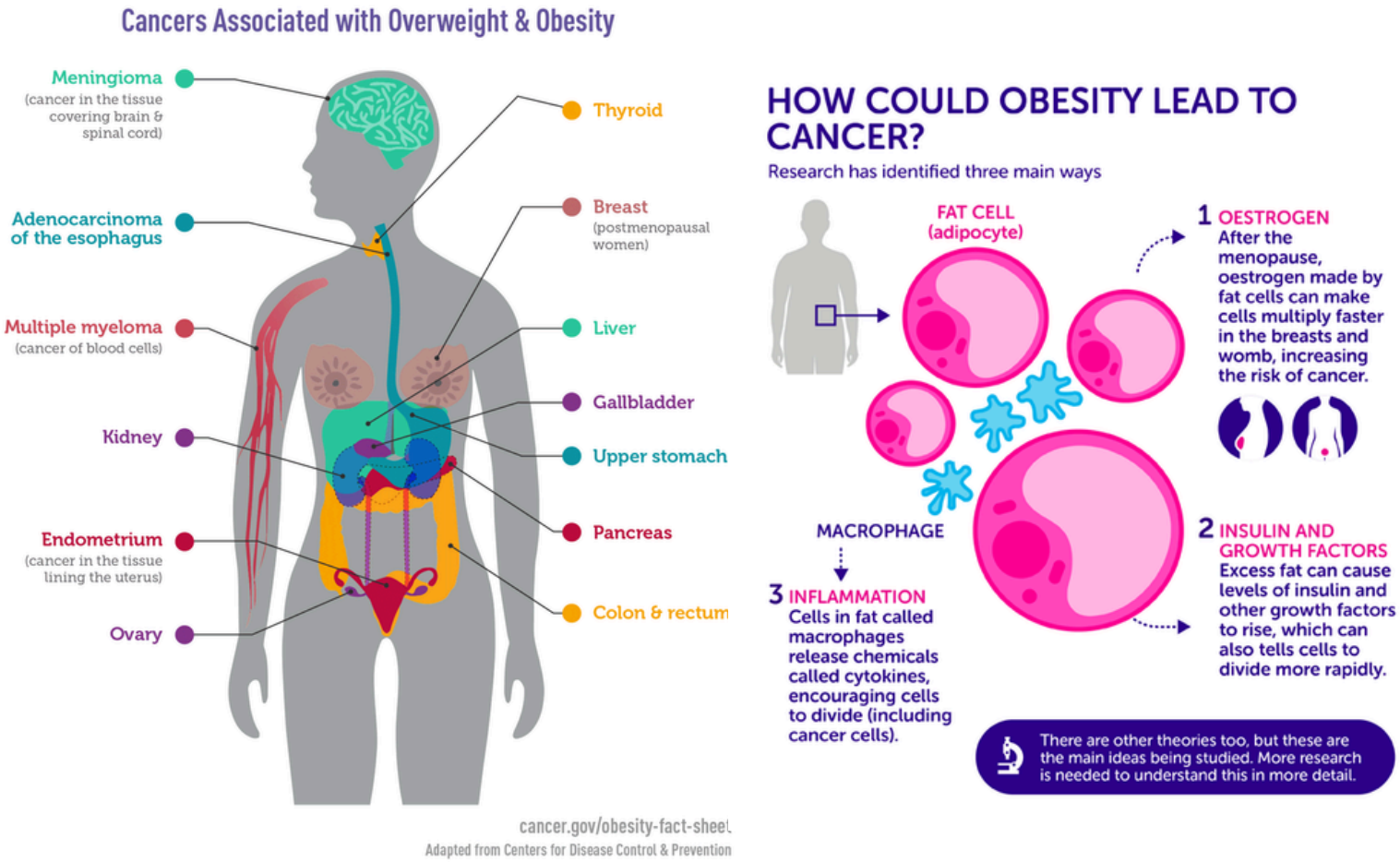
World Cancer Profile 2020

According to a publication on the World Health Organization's (WHO) international cancer research website at www.iarc.who.int, up to one in five people worldwide is estimated to develop cancer during their lifetime.

Therefore, cancer prevention has become one of the most significant public health challenges of the 21st century. Prevention plays a crucial role in combating cancer. Based on current scientific evidence, at least 40% of all cancer cases can be prevented with effective primary prevention measures, and mortality can be further reduced through early tumor detection.

However, despite these advances in prevention efforts, global predictions predict that the percentage of cancer sufferers will increase by up to 77% from 2022, reaching up to 35 million cancer sufferers worldwide by 2050, according to estimates from the International Agency for Research on Cancer (IARC). Therefore, various global health institutions are developing methods for developing this disease, the second most deadly after heart attacks.

The diagram above shows that the most common cancer is breast cancer, with a mortality rate of up to 11% of all sufferers. However, from the statistics above, we can also see that lung cancer is the most dangerous, with a mortality rate of up to 12.6% of all sufferers.
The most distressing data is that the total number of deaths from cancer reached 207,210 in 2018. How can this death toll be reduced?



Recent research data cited by the World Health Organization (WHO) International Institute for Research on Cancer (IARC), a part of the WHO, indicates that an increasing number of cancers are caused by obesity. Obesity has been linked to the risk of various comorbid conditions, including type II diabetes, cardiovascular disease, and cancer.

The US National Cancer Institute and the International Agency for Research on Cancer have categorized the following 13 cancers as having a causal link to obesity: breast (postmenopausal), colorectal, uterine, ovarian, pancreatic, liver, gallbladder, kidney (renal cell), thyroid, multiple myeloma, meningioma, esophageal adenocarcinoma, and gastric cardia cancer. The incidence of these obesity-associated cancers (ORCs) has increased with obesity.

Women, Obesity and Cancer

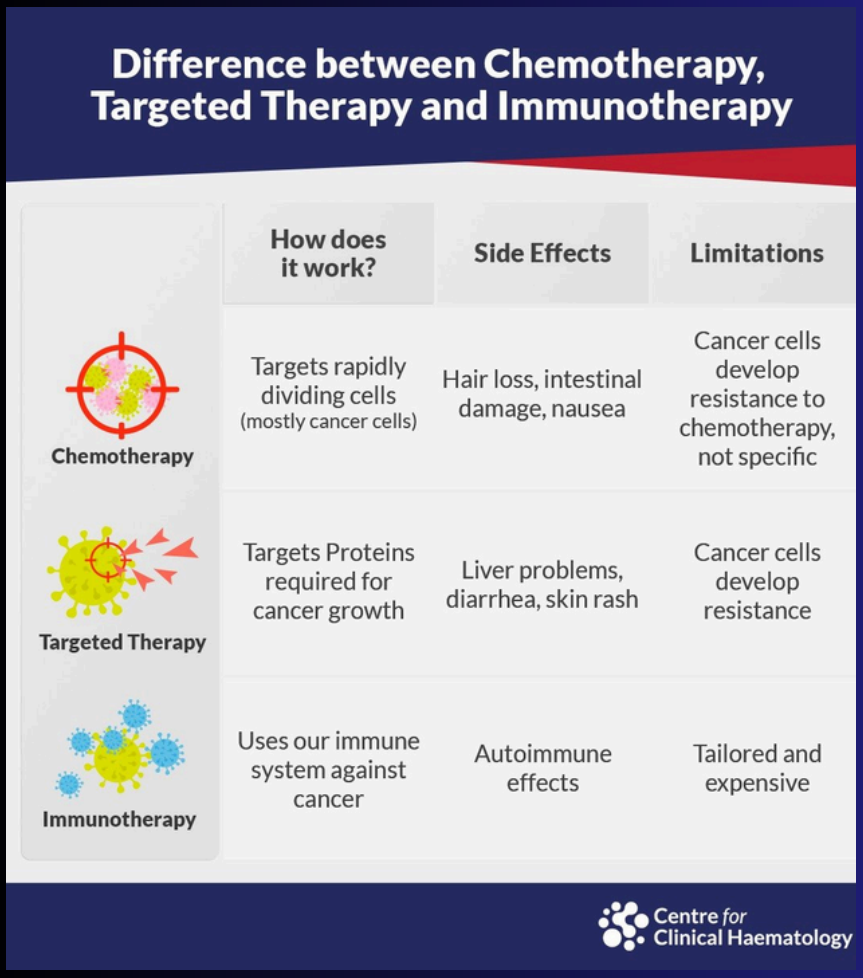
In a United States health survey conducted from 1999 to 2018, 19,500 participants were included in the analysis. Of these, 18,972 were cancer-free, while 528 (2.7%) reported a prior history of obesity-related cancer. Participants with obesity-related cancer were older (16.5% vs. 3.0% aged ⩾80 years), female (90.4% vs. 50.0%), and non-Hispanic white (78.9% vs. 67.1%).

Female participants with obesity-related cancer were more likely to be postmenopausal (87.0% vs. 45.1%) and more likely to use hormone-related therapy (HRT) (39.7% vs. 20.5%), compared with cancer-free participants. Metabolically unhealthy participants tended to be older, postmenopausal, use HRT, and have lower levels of physical activity compared with metabolically healthy participants.

Current Efforts in the Treatment of Cancer and Autoimmune Diseases

Various cancer treatments includes:

- Surgery: Removing the tumor and surrounding tissue that may be affected by cancer.
- Chemotherapy: Using drugs to kill cancer cells or stop their growth.
- Radiation: Using radiation to kill cancer cells.
- Immunotherapy: Using the body's immune system to fight cancer.
- Hormone therapy and targeted therapy.



The government suffers significant financial losses from cancer treatment. Most of them are covered by the national health insurance program, BPJS Kesehatan (Social Security Agency). Meanwhile, many cancer patients worldwide seek treatment independently or use insurance from their local private employers.

Target cell-based cancer treatments have been developed to replace the various methods that previously subjected cancer patients to painful treatments with uncertain outcomes. Directly targeting the most malignant cancer cells in the body, and even targeting two different types of cancer cells simultaneously, Dual Bispecific Antibodies increase the chances of recovery for patients with cancer, tumors, and various other dangerous and life-threatening diseases.

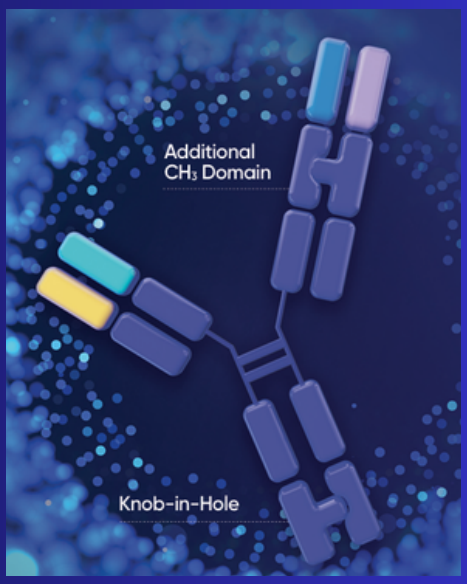
Indonesia Social Security Agency for Health recorded eight diseases that absorbed health insurance costs reaching IDR 34.7 trillion in 2023. These diseases include heart disease, cancer, stroke, kidney failure, hemophilia, thalassemia, leukemia, and liver cirrhosis. The cancer types with the highest treatment and procedure costs are cervical cancer at IDR 393 million (27.03%), colorectal cancer at IDR 335 million (23.07%), and ovarian cancer at IDR 168 million (11.57%).

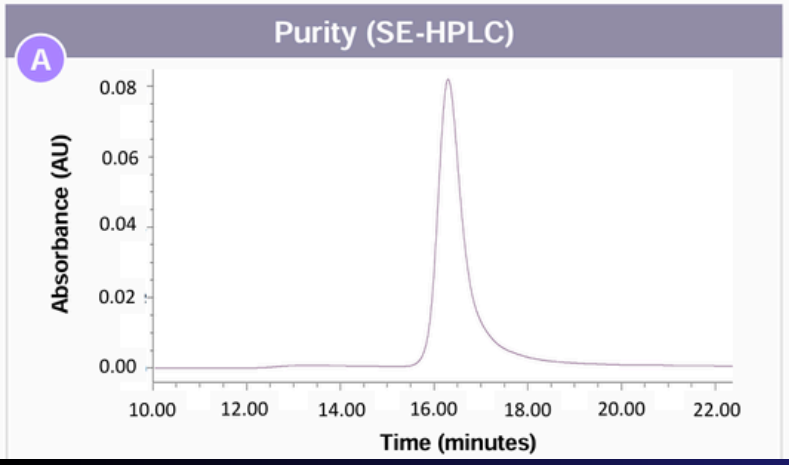
In 2020, Indonesia recorded 396,914 cancer cases with a total of 234,511 deaths. The most common type of cancer in Indonesia is breast cancer, accounting for 16.6 percent of the total 396,914 cases, followed by cervical cancer, lung cancer, colon cancer, and liver cancer. The total direct medical costs for each of the 14 types of cancer in Indonesia, based on BPJS claims data in 2018, averaged IDR 1.4 billion.

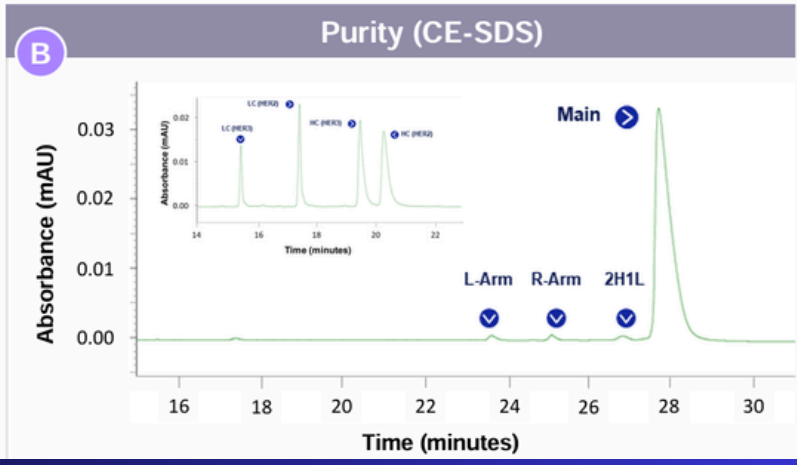
S-DUAL™ Bispecific Antibodies Specific Targeted Cells Treatment

TARGET-LEVEL CANCER TREATMENT HAS NOW BEEN DEVELOPED TO REPLACE VARIOUS METHODS THAT PREVIOUSLY SUBJECTED CANCER PATIENTS TO PAINFUL AND INEFFECTIVE INVASIVE TREATMENTS.

With this targeted treatment method, which precisely targets the most malignant cancer cells in the body and can even target two different types of cancer cells simultaneously, Dual Bispecific Antibodies increase the chances of recovery for patients with cancer, tumors, and various other dangerous and life-threatening diseases.







Size Exclusion-High Performance Liquid Chromatography (SE-HPLC) is an analytical method for high-quality target cell adhesion under isocratic conditions.

This isocratic condition considers the composition of the solvent mobile phase according to the fragment constant (F-Rc) of the antibody injected into the tumor/cancer target cells, thereby directly targeting the disease.

This S-Dual cell dissolution method is performed by injecting it directly into the target cells. The graph above shows that it takes only 16-18 minutes for the S-Dual antibody cells to begin working to address the target disease.

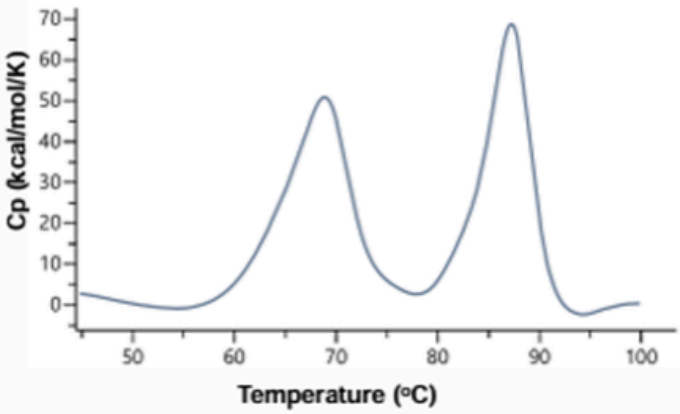
Capillary Electrophoresis with Sodium Dodecyl Sulfate (CE-SDS) is a method of protein migration, DNA, RNA, to overcome malignant cells and break down malignant cancer cells through electrophoresis. This process are enabled by the surface entry of the capillary tube on malignant cells. The S-Dual cells pushing the charges through the surface by SDS binding.

CE-SDS separate various monomeric fragments of AntiBodies with extraordinary resolution. In non-reducing conditions (nrCE-SDS) is used to monitor the purity of denatured intact antibodies. Required only 28-30 minutes for this method to begin overcoming the targeted disease cells.

C Fc function (Octet® BLI)

Antibody	FcγRIIa-167H KD (μM)	FcγRIIIa-176F KD (μM)	C1q KD (μM)	FcRn KD (μM)
Trastuzumab	1.45±0.11	0.22±0.00	0.06±0.00	0.58±0.01
Ref. BsAb	1.51±0.05	0.29±0.00	0.02±0.00	0.04±0.00
S-DUAL™	1.77±0.02	0.25±0.00	0.02±0.00	0.68±0.00

D Thermal stability (DSC)



The Constanta Receptor Fragment (FcγRIIa, FcγRIIIa, FcRn) indicates the number of blood cells (platelets) in our body accepting the injected S-Dual antibody. The role of S-Dual on platelets in our body is to improve the condition of the sick body to recover by maintaining body temperature balance (homeostasis) and for the process of thrombosis (formation of red blood cells). In white blood cells (leukocytes) is to increase immunity, overcome inflammation, release cytokine hormones to overcome diseases in the body, as well as kill pathogenic bacteria, and recognize antibody cells that can increase immunity. The graph above shows that S-Dual has the highest FcγRIIa-167H results and FcγRIIIa-176F in the middle, and C1q shows a low crystallization rate.

E Physicochemical properties

	S-DUAL™		
SEC-HPLC (%)	HMW	Main	LMW
	-	99.07	0.93
CE-SDS (%)	1H1L	2H1L	Main
	2.07	1.13	96.80
DSC (°C)	T_{onset}	T_m1	T_m2
	53.20	68.14	86.73

Thermal Stability Differential Scanning Calorimetry (DSC) results on Thermal Stability show that S-DUAL™ has stability comparable to conventional antibodies.

PERS RELEASE S-DUAL™ BISPECIFIC ANTIBODIES FROM SAMSUNG BIOLOGICS

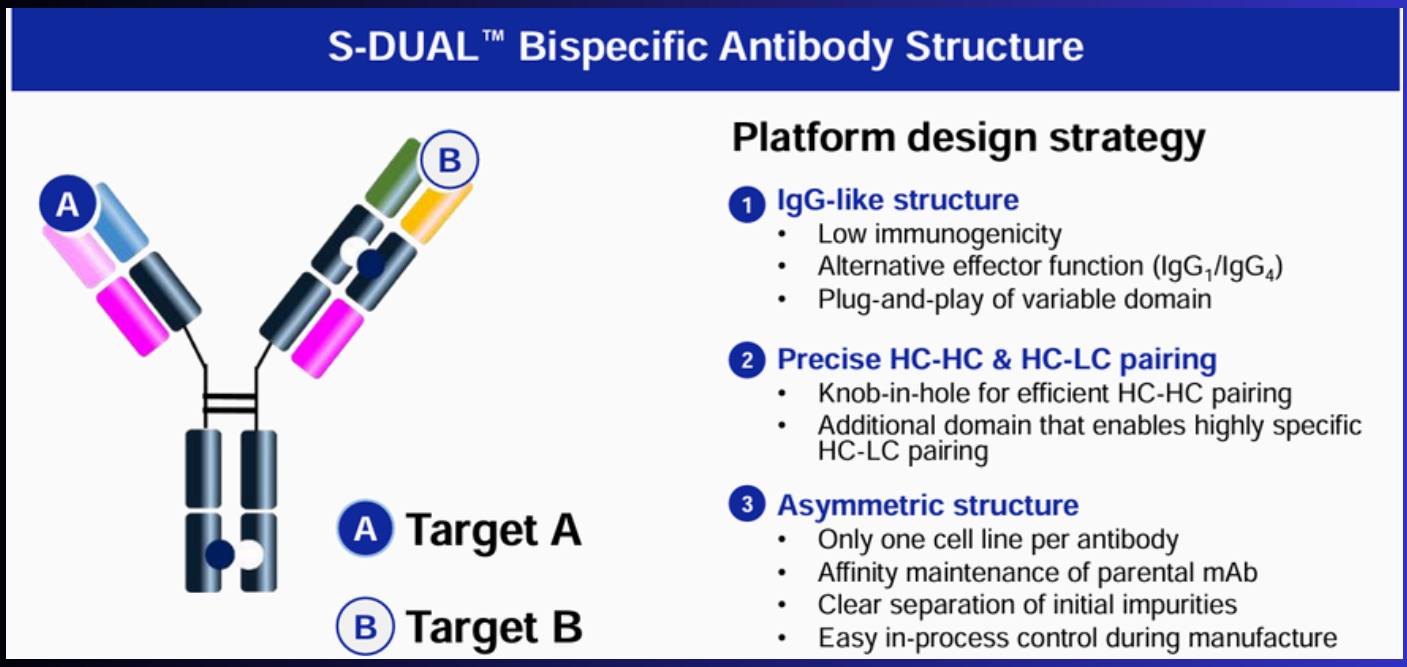
Bispecific antibodies (BsAbs)—antibodies that bind to two different antigens—have gained momentum in recent decades for diseases with diverse mechanisms of action, such as cancer and autoimmune diseases. A challenge in these targeted cell therapies is the body's cellular receptivity to the injected antibody. However, the Samsung Biologics team has successfully addressed this challenge through numerous clinical trials in the treatment of several cancer types. Samsung Biologics even openly shares data from various competitors in the Nano-Biochemistry field.

Similar to the challenges associated with maintaining the affinity of the parental monoclonal antibody (mAb), correct heavy-light chain pairing (HC-LC pairing) determines the success of these Y-shaped antibodies in targeting cancer cells or tumors, ultimately destroying malignant cells. S-DUAL™, Samsung Biologics' BsAb platform introduces a new asymmetric structure that delivers a 99% HC-LC pairing success rate.

The platform's unique asymmetric design allows the addition of desired complementarity-determining regions (CDRs) without additional engineering processes, while maintaining high binding affinity and productivity. Samsung Biologics then compared the S-DUAL™ BsAb targeting HER2 and HER3 antigens with another BsAb scaffold with the same CDRs (Ref. BsAb) and Trastuzumab (HER2mAb) in a number of biophysical, biochemical, and cell-based functional assessments.

In addition to optimal physiochemical properties, the S-DUAL™ BsAb demonstrated high binding affinity and efficient heterodimer formation. This study established S-DUAL™ as a reliable bispecific antibody platform offering optimal production capabilities.

Biological Dynamics of The Physico Chemical Design Structure of S-DUAL™ Bispecific AntiBodies



Targeted Cells Cancer Treatment utilizing the development of DNA/RNA proteins, focuses on pairing bispecific antibody cells (S-Dual BiSpecific Antibodies) with a left (L) and right (R) branch, which can be attached to two different types of adjacent tumor cells simultaneously.

Using electrophoresis, the DNA/RNA containing two specific antibodies, each with varying protein content and receptor constant fragment levels, can enter and destroy macrophage bonds (cell growth that becomes macrophage and abnormal), thus causing malignancy or malignant and unnatural growth in previously normal cells. The various harmful bonds within these cells, which previously acted as parasites that harm and disrupt various vital organs in the body, regardless of their location, can be broken.

The injection of these S-DUAL™ BsAb cells into the body can be performed with a seemingly normal and routine procedure, without causing the body to lose some of its functions as occurs with traditional cancer treatments such as radiation or chemotherapy, which can trigger various other high-risk conditions or even be dangerous and Life-threatening.

If impurities or rejection by the body occur to the injected S-DUAL™ BsAb, this condition can be immediately addressed using crystallization, lyophilization, or cryodessication. This allows the cells to immediately transform from a solid into an air-sublimated form, which can be quickly removed from the body without harming other cells or disrupting blood flow.

This method is also non invasive and relatively quick. Harmful cancer cells can be immediately destroyed and removed from the body using the same treatment methods as for impurities mentioned above: lyophilization or cryodessication. The protein bonds of metastatic cancer cells are broken down one by one, allowing the malignant cancer cells, which had previously embedded themselves in the body's organs and disrupted various bodily functions, to resume their normal function.

ARCHER EV JET

Vertical Hybrid Electric Take Off & Landing Vehicle

Archer Aviation has made significant strides in its eVTOL aircraft development, with the Midnight eVTOL achieving a major milestone in FAA certification. The company has successfully completed Phase 3 of the FAA's Type Certification process, unlocking Type Inspection Authorization (TIA) for testing flights. This transition marks a shift from private developmental testing to formal testing, which is crucial for FAA airworthiness compliance.

Archer is also preparing for piloted transition flight testing, with the aircraft moving between vertical and forward-flight modes under FAA observation. The Midnight is designed for city hops at speeds above 150 mph, with recent test flights logging 55-mile legs and speeds exceeding 150 mph at 10,000 feet. Archer's flight test fleet is operating nearly every day, with test pilots conducting multiple sorties daily.

The company has also been selected for the White House eVTOL Integration Pilot Program, which creates a pre-certification operating framework across eight states. Archer's CEO, Adam Goldstein, has expressed confidence in the company's future, stating that the Executive Order from President Trump is a seminal moment for Archer and the eVTOL industry

Archer's Midnight aircraft during a recent flight test

- US operations expected to begin this year under the White House's eVTOL Integration Pilot Program (eIPP) and in preparation for LA28 Olympic Games
- Advanced commercial readiness with expanded piloted flight test program and operations of Hawthorne Airport in LA
- Record FAA certification progress as the first to close Phase 3 of the FAA's 4-phase Type Certification process for eVTOL aircraft*
- Significant progress on dual-use, hybrid, autonomous aircraft with phased program awards expected later this year
- Rapidly advancing AI stack through partnerships with NVIDIA, Palantir, and Starlink amid the DOT's ~$20B ATC modernization effort
- Ended Q1 2026 with strong liquidity of ~$1.8B and spending in line with guidance

SANTA CLARA, CA, May 11, 2026 - Archer Aviation Inc. ("Archer" or the "Company") (NYSE: ACHR) today announced operating and financial results for the first quarter ended March 31, 2026. The Company issued a shareholder letter from founder and CEO, Adam Goldstein, discussing highlights from the quarter.

Commenting on first quarter 2026 results, Adam Goldstein said:

"This was another banner quarter for Archer. We made tremendous progress towards beginning operations in the US later this year, with record FAA certification progress and our most expansive flight testing to date. But what is clear to me is that Archer is far more than an air taxi company. Our defense and AI software efforts are advancing quickly, and they're opening up an even bigger future for us. We're investing and building accordingly."

Advanced Commercial Readiness
Archer's flight test program continued to expand this quarter, with piloted VTOL and CTOL flights across its expanded fleet occurring nearly every day, often multiple times a day.
Archer also took over operations of Hawthorne Airport in LA, marking a key step in its plan to develop the site into the airport of the future. Located near LAX and several major LA sports and entertainment venues, Hawthorne Airport is expected to anchor Archer's planned LA air taxi operations while also serving as an innovation hub for next-generation aviation technologies.

Significant Progress on Dual-Use, Hybrid, Autonomous Aircraft
Archer's work continues alongside Anduril on its dual-use, hybrid, autonomous aircraft, with the goal of delivering one of the most sophisticated vertical lift platforms ever developed in this category. As part of this program, Archer anticipates beginning to win phased government awards this year.

Rapidly Advancing AI Stack
Archer continued to advance its AI stack this quarter through partnerships with three category-defining technology leaders. NVIDIA is integrating its IGX Thor platform to power safety-capable onboard compute and autonomy-ready flight systems. Starlink will deliver high-speed, low-latency LEO satellite connectivity for Midnight aircraft. And our partner Palantir was recently downselected as a finalist for the FAA's SMART AI project, instrumental to DOT's ~$20B air traffic control modernization effort.

Ended Quarter With ~$1.8 Billion in Liquidity
Archer continues to maintain a strong balance sheet with ~$1.8B in liquidity and limited debt exposure. Q1 2026 marks another quarter of demonstrating consistent financial execution, with Archer meeting its Adjusted EBITDA loss guidance for the quarter.

GLYCINE

Galaxy Components Found in Our Bodies

An international team of scientists has shown that glycine can form under the harsh conditions that govern the dynamics of chemical elements in space.

Glycine is the simplest amino acid. It also contains proteins, making it a proteinogenic amino acid, making it an essential building block for life.

The results, published in Nature Astronomy, indicate that glycine, and likely other amino acids, formed in dense interstellar clouds long before they transformed into new stars and planets.

Comets are the most pristine material in our Solar System and reflect the molecular composition that existed when our Sun and planets were just beginning to form. The detection of glycine in comet 67P/Churyumov-Gerasimenko and in samples returned to Earth from the Stardust mission suggests that amino acids, like glycine, formed long before the formation of diverse stars.

However, until now, the formation of glycine was thought to require energy, which places clear constraints on the environment in which it could form.

In a new study, an international team of astrophysicists and astrochemical modelers, mostly based at the Laboratory for Astrophysics at Leiden Observatory in the Netherlands, has shown that glycine can form on the surface of icy dust grains, in the absence of energy, through 'dark chemistry'. This finding contradicts previous studies that suggested UV radiation was necessary to produce this molecule.

SATELITE ROSETTA ON COMET 67P CHURYUMOV GERASIMENKO

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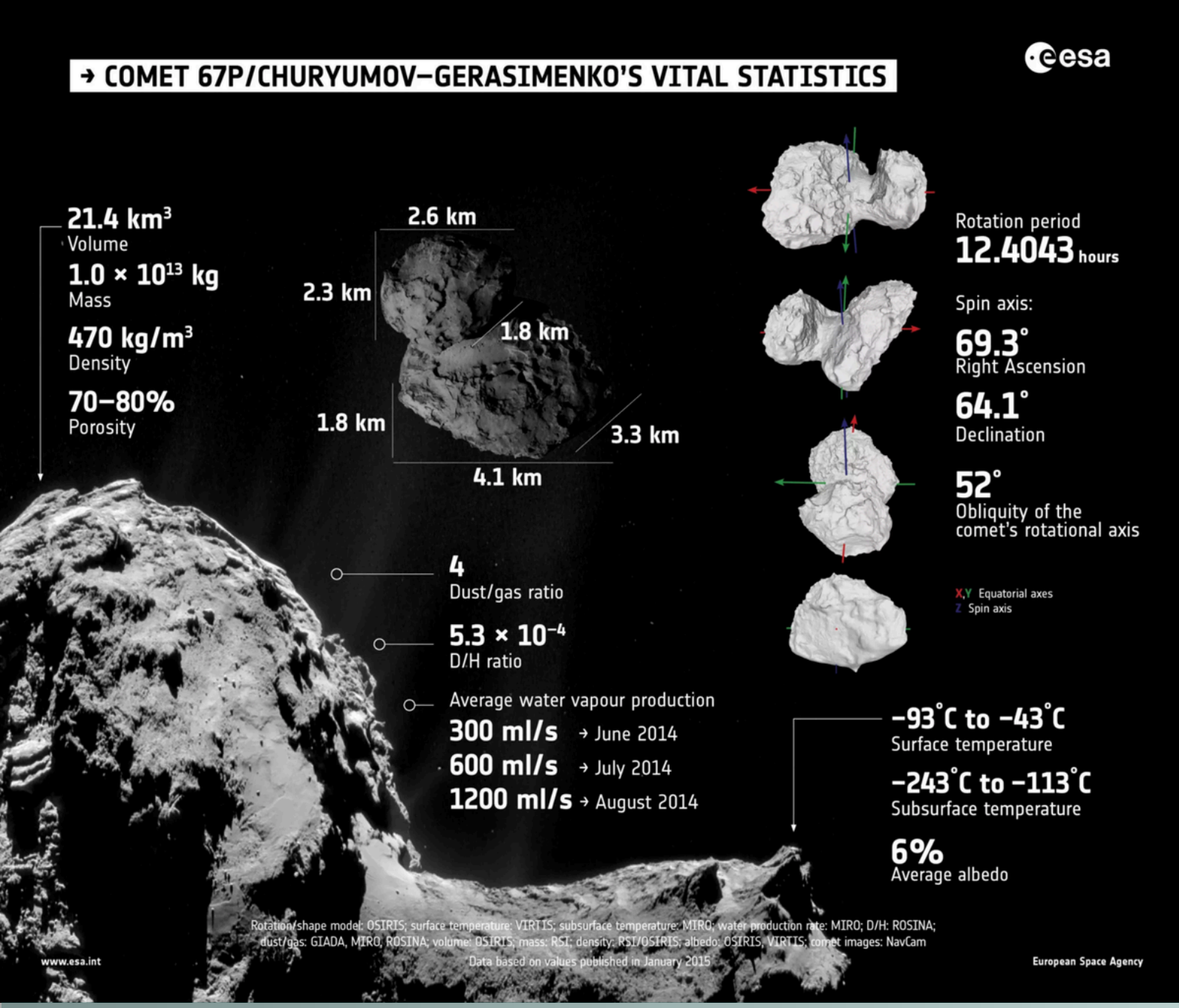


67P/Churyumov–Gerasimenko (abbreviated as 67P or 67P/C–G) is a Jupiter-like comet. It originates from the Kuiper belt and has an orbital period of 6.45 years. As of 2012, it has a rotation period of about 12.4 hours and a maximum speed of 135,000 km/h (38 km/s; 84,000 mph).

Churyumov–Gerasimenko measures approximately 4.3 x 4.1 km (2.7 x 2.5 mi) at its longest and widest dimensions. It was first observed on photographic plates in 1969 by Soviet astronomers Klim Ivanovych Churyumov and Svetlana Ivanovna Gerasimenko, after whom the comet is named. The comet last reached perihelion (closest approach to the Sun) on November 2, 2021, and will next reach perihelion on April 9, 2028.

Churyumov–Gerasimenko was the target of the European Space Agency's Rosetta mission, launched on March 2, 2004. Rosetta rendezvoused with Churyumov–Gerasimenko on August 6, 2014, and entered orbit on September 10, 2014. Rosetta's Philae lander touched down on the comet's surface on November 12, 2014, becoming the first spacecraft to land on a comet's nucleus. On September 30, 2016, the Rosetta spacecraft concluded its mission by landing on the comet in the Ma'at region of the Cometary Area 67P.

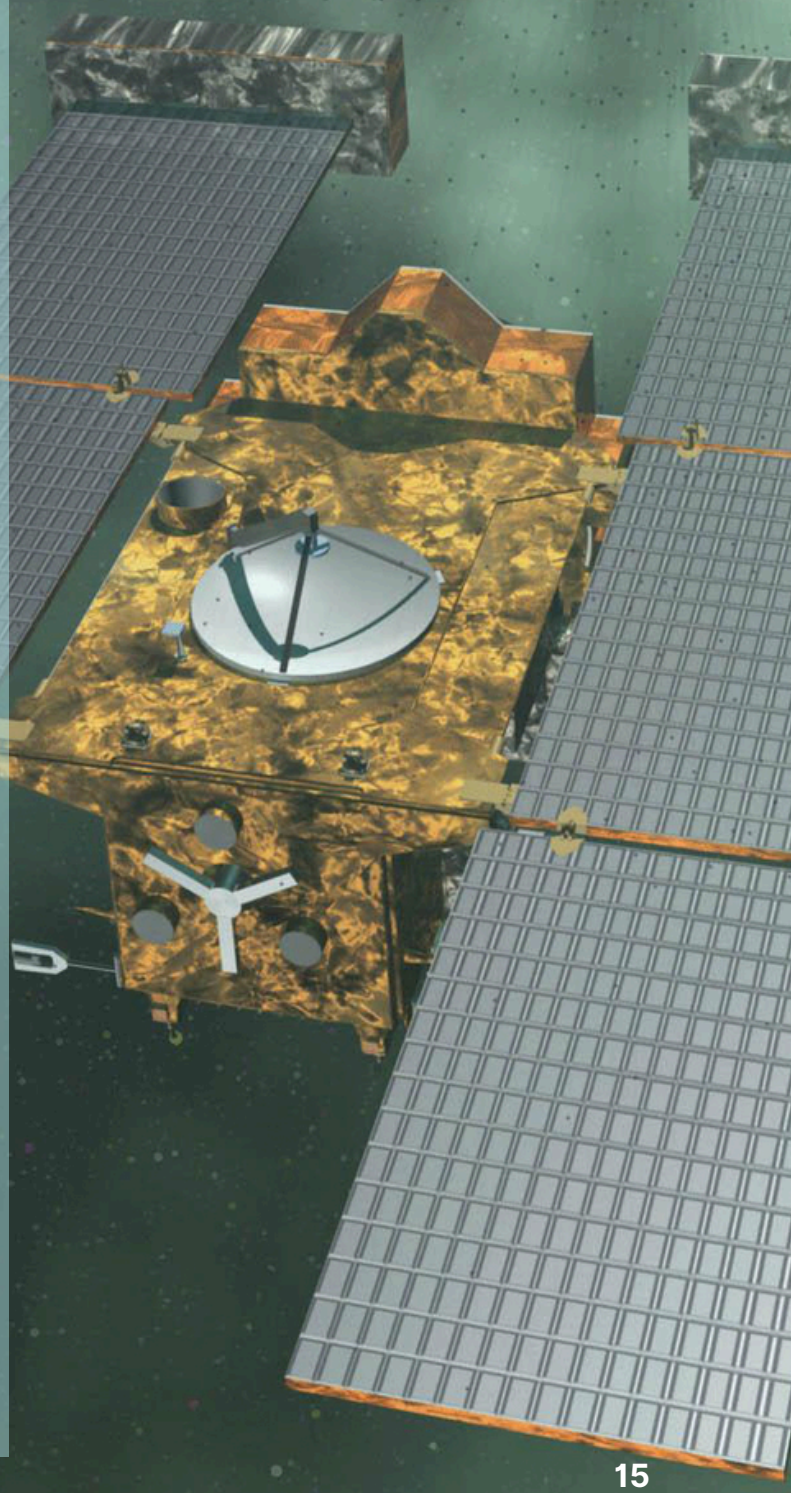
NASA - STARDUST

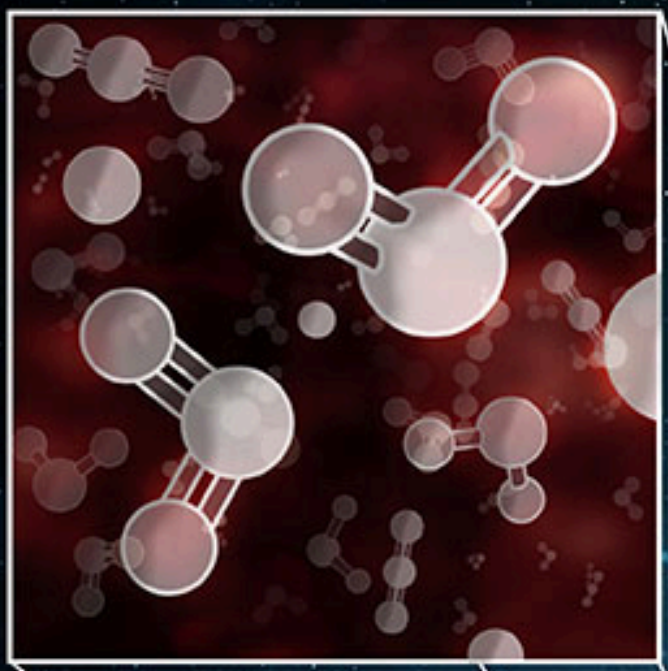
The existence of glycine outside Earth was confirmed in 2009, based on the analysis of samples taken in 2004 by NASA's Stardust spacecraft from comet Wild 2 and later returned to Earth. Glycine had previously been identified in the Murchison meteorite in 1970. The discovery of glycine in space strengthened the hypothesis called soft panspermia, which states that the "building blocks" of life are widespread throughout the universe. In 2016, the Rosetta spacecraft announced the detection of glycine inside Comet 67P/Churyumov–Gerasimenko.

Scientists led by Dr. Sergio Ioppolo of Queen Mary University of London first demonstrated that methylamine, a precursor species of glycine detected in the coma of Comet 67P, can form. Then, using a unique ultra-high vacuum setup, equipped with a series of atomic beamlines and precise diagnostic tools, they were able to confirm that glycine can also form, and that the presence of water ice is crucial in this process.

Further investigations using astrochemical models confirmed the experimental results and allowed the researchers to extrapolate the data obtained on a typical laboratory timescale of just one day to interstellar conditions, spanning millions of years. "From this we see that small but substantial amounts of glycine can form in space over time," says Professor Herma Cuppen of Radboud University, Nijmegen, who was responsible for some of the modeling studies in the paper.

Stardust is a 385-kilogram robotic spacecraft launched by NASA on February 7, 1999. Its primary mission was to collect dust samples from the tail of comet Wild 2, as well as cosmic dust samples, and return them to Earth for analysis. This was the first sample return mission of its kind.





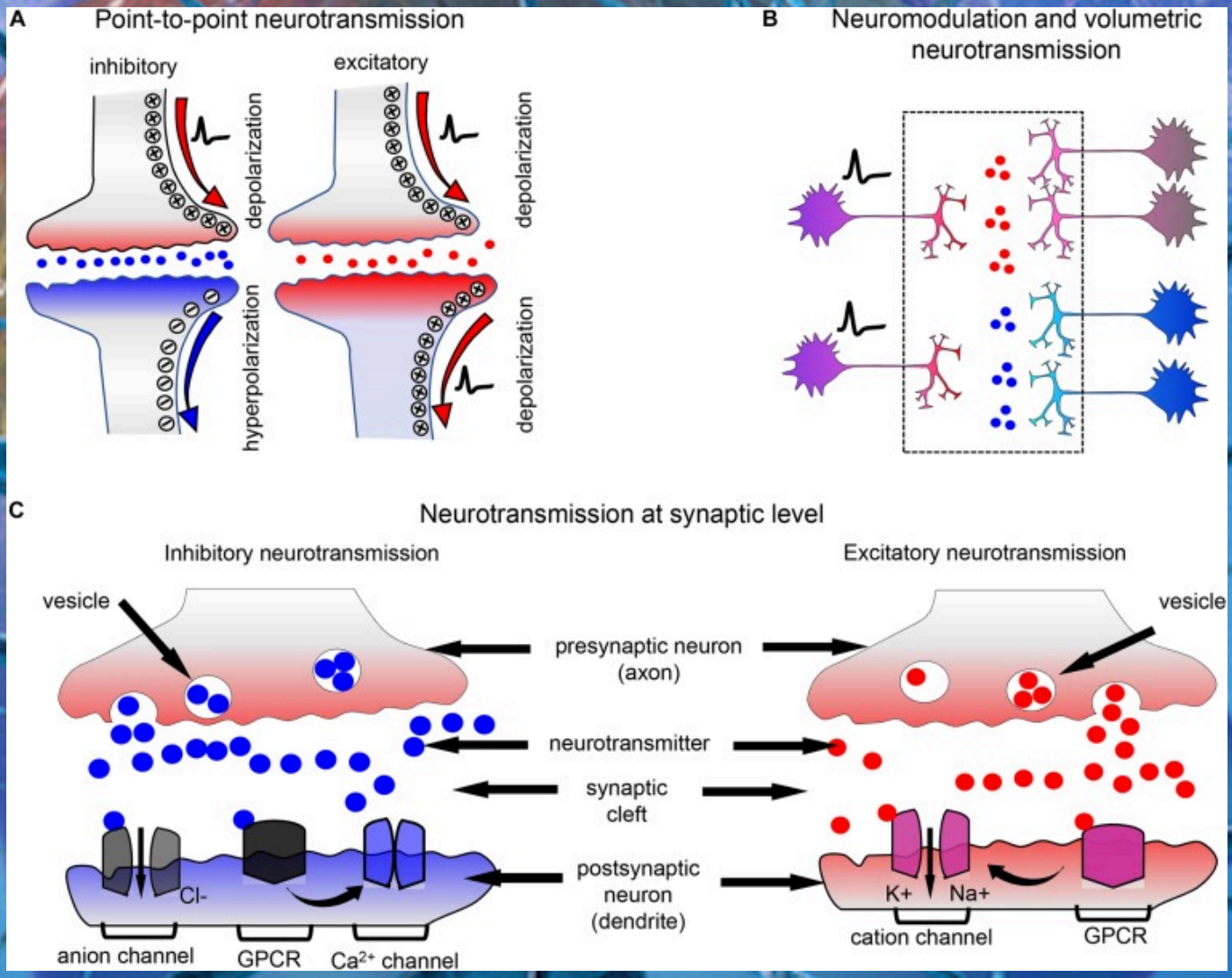
Basic Astrophysic of Glycine Formations

"The important conclusion of this study is that the molecules thought to be the building blocks of life were formed long before the formation of stars and planets," said Harold Linnartz, Director of the Astrophysics Laboratory at Leiden Observatory.

"The formation of glycine so early in the evolution of star-forming regions implies that this amino acid could have formed more widely in space and been preserved in the bulk of ices before being incorporated into the comets and planetesimals that formed the material that ultimately formed the planets."

"Once formed, glycine could also have served as a precursor for other complex organic molecules," concluded Dr. Ioppolo. "By the same mechanism, in principle, other functional groups could have been added to the glycine backbone, leading to the formation of other amino acids, such as alanine and serine, in dark clouds in space. Ultimately, this enriched supply of organic molecules was incorporated into celestial bodies, such as comets, and delivered to young planets, as happened with our Earth and many other planets."

Biosensoric Function of Glycine to Monitor Neurotransmitter Activation in Our Brain



Glycine is a neurotransmitter in the brain that acts as an inhibitor through ionotropic glycine receptors and as a coagonist at excited glutamate receptors. Two types of membrane-bound receptors (ionotropic and metabotropic) are activated by neurotransmitter binding. Ionotropic receptors, such as nicotinic acetylcholine, are a group of transmembrane ion channels that open or close in response to the binding of chemical messengers.

Fluorescence imaging techniques are also used to investigate neurotransmission, including the role of amino acids such as GABA (gamma-aminobutyric acid) and β-alanine (beta-alanine). The research team designed and engineered a protein to bind glycine and combined it with two other fluorescent proteins.

""When the protein binds to glycine, the fluorescent protein changes its relative position and we see a change in the fluorescence that we can monitor with a special microscope," Associate Professor Jackson said.

Neurotransmitters are too small to be seen directly, so researchers created a new biosensor to monitor their condition. Glycine functions as a neurotransmitter in the central nervous system, including the cortex, spinal cord, brainstem, and retina.

The resulting GlyFS biosensor was applied to detect glycine in acute hippocampal slices. It is possible that the use of alternative membrane-targeting peptides could facilitate GlyFS delivery to the cell surface.

Glysine plays a role in neuronal communication and learning, as well as in processing motor and sensory information that enables movement, vision, and hearing.

"Previously, there was no way to visualize glycine activity in brain tissue—we can do it now, which is very exciting.

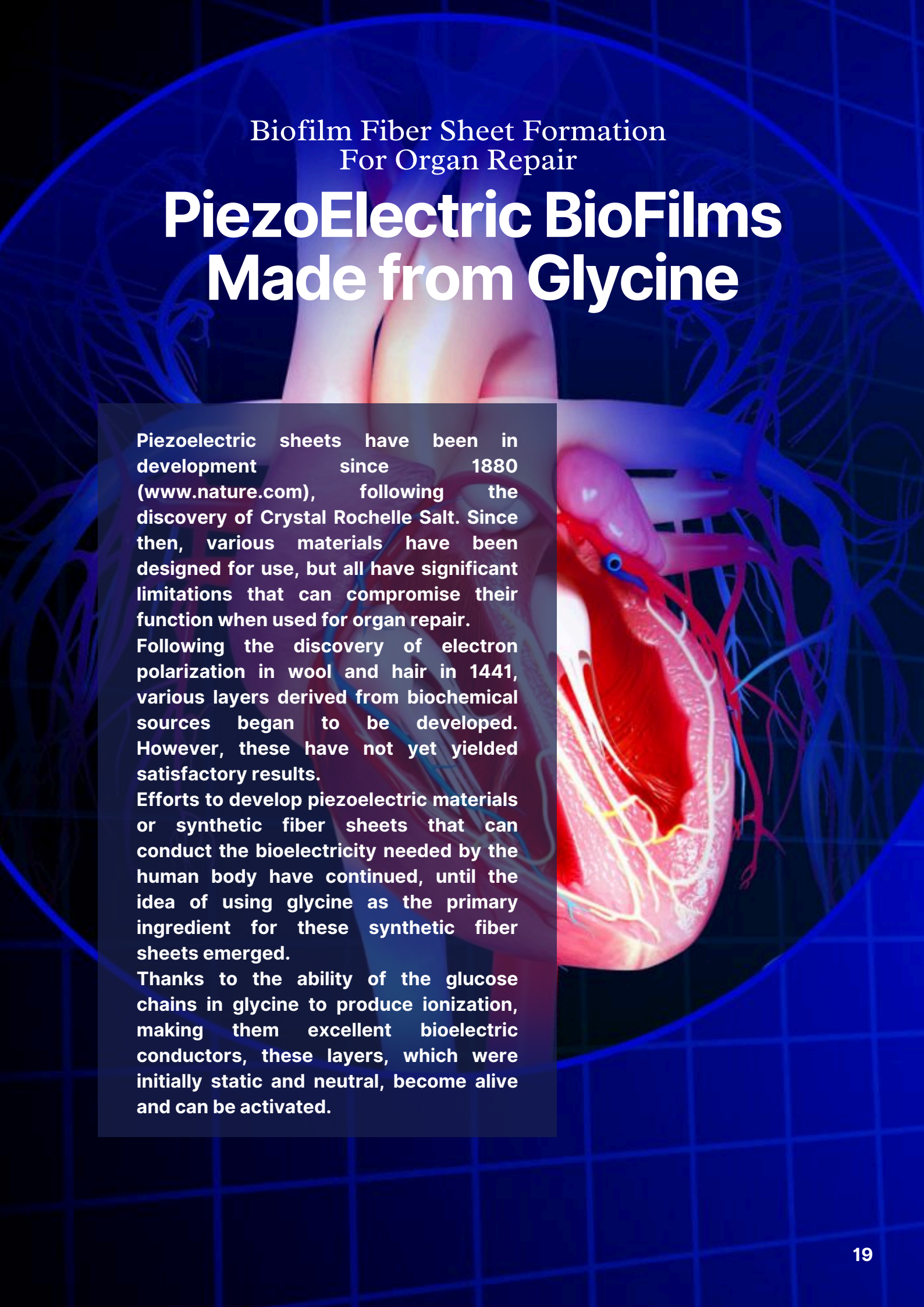
"In the future, we want to create sensors for other neurotransmitters and use our sensors to investigate the molecular basis of certain neurological disorders."

Professor Christian Henneberger's team at the University of Bonn in Germany helped design the sensors and develop techniques for using the new biosensors in living brain tissue. This allowed them to observe how glycine levels change in real time in response to neuronal activity and how glycine is distributed in living brain tissue.

"This sensor allows us to directly test important hypotheses about glycine signaling. We also discovered that, unexpectedly, glycine levels change during neuronal activity, triggering synaptic changes related to learning," said Professor Henneberger.

Biofilm Fiber Sheet Formation
For Organ Repair

PiezoElectric BioFilms Made from Glycine



Piezoelectric sheets have been in development since 1880 (www.nature.com), following the discovery of Crystal Rochelle Salt. Since then, various materials have been designed for use, but all have significant limitations that can compromise their function when used for organ repair.

Following the discovery of electron polarization in wool and hair in 1441, various layers derived from biochemical sources began to be developed. However, these have not yet yielded satisfactory results.

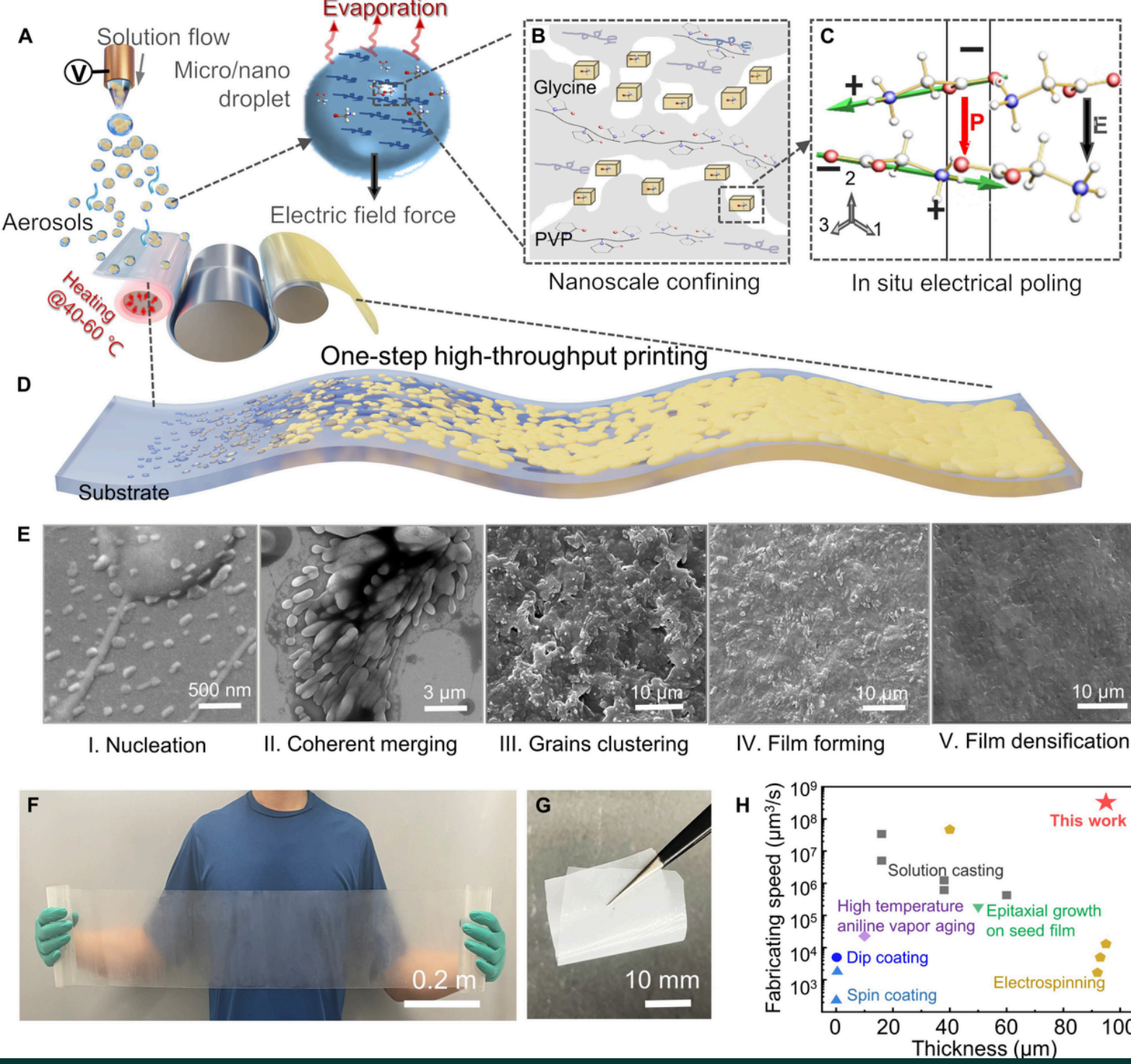
Efforts to develop piezoelectric materials or synthetic fiber sheets that can conduct the bioelectricity needed by the human body have continued, until the idea of using glycine as the primary ingredient for these synthetic fiber sheets emerged.

Thanks to the ability of the glucose chains in glycine to produce ionization, making them excellent bioelectric conductors, these layers, which were initially static and neutral, become alive and can be activated.

Furthermore, due to its excellent ability to create an even membrane layer, this glycine-based piezoelectric sheet can be fabricated into a wide layer, functioning like the skin covering various organs. Biofilms made from glycine can also conduct electrons.

Any number of bioelectric dots or points can be attached to create a layer resembling a repaired organ, such as the skin covering vital organs like heart tissue.

The next step is to develop piezoelectric biomaterial sheets that are more flexible bioelectronically while simultaneously actively functioning as a biological layer, potentially playing a role in disease therapy and healing various chronic and acute conditions that compromise health, or serving as biotissue therapeutics.

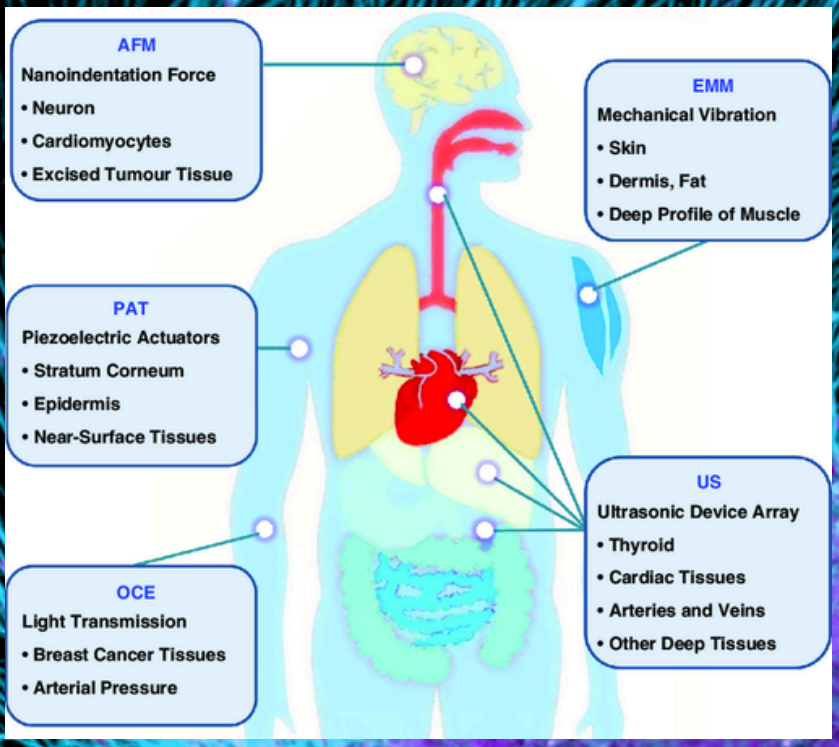


In an effort to reconstruct diseased or damaged organ tissue, the creation of biofilm-like membrane fiber sheets with life-like functions, including ionization between cells and tissues, or piezoelectric properties, has been successfully achieved using glycine as the primary material.

To create living tissue conditions capable of conducting electrical ions, a thermal-electric aerosol printer was developed capable of one-step, high-speed printing with a five-stage production process, from nucleation to coherent coalescence, granular cluster formation, biofilm membrane formation, and roll-to-roll biofilm fiber compaction.

This piezoelectric biofilm is designed to meet the manufacturing targets of bioelectronics, from flexible, miniaturized devices to the creation of a variety of wearable/implantable microdevices and biotissue culture therapies, offering the possibility of mass-scale industrial production of piezoelectric biofilms.

Piezoelectric BioFilms Tissues For Organ Therapeutics Medicine



Tissue therapeutics, a method for healing diseased organs by repairing their lining tissue, is a type of regenerative medicine that involves reprogramming damaged cells or tissues and reassembling them to support their original function. This method is known as implantation, or the installation of a satellite unit within the body, which can be implanted in patients to restore, repair, or replace damaged or diseased organs or tissues.

In bioelectronic medicine, the resulting piezoelectric layer must possess electromechanical properties, be biocompatible with other organ tissues, and possess absorption and secretion capabilities similar to the original organ. However, its potential technical development still faces several challenges, such as the requirement that the piezoelectric biomaterial network possess nanobiomolecule functions identical to the original tissue.

Furthermore, there is a demand that this network be able to live and grow, both at the nanobiological scale and the macrobiological scale, similar to other living organ tissues, which have the ability to move and perform the functions of the mimicked organ.

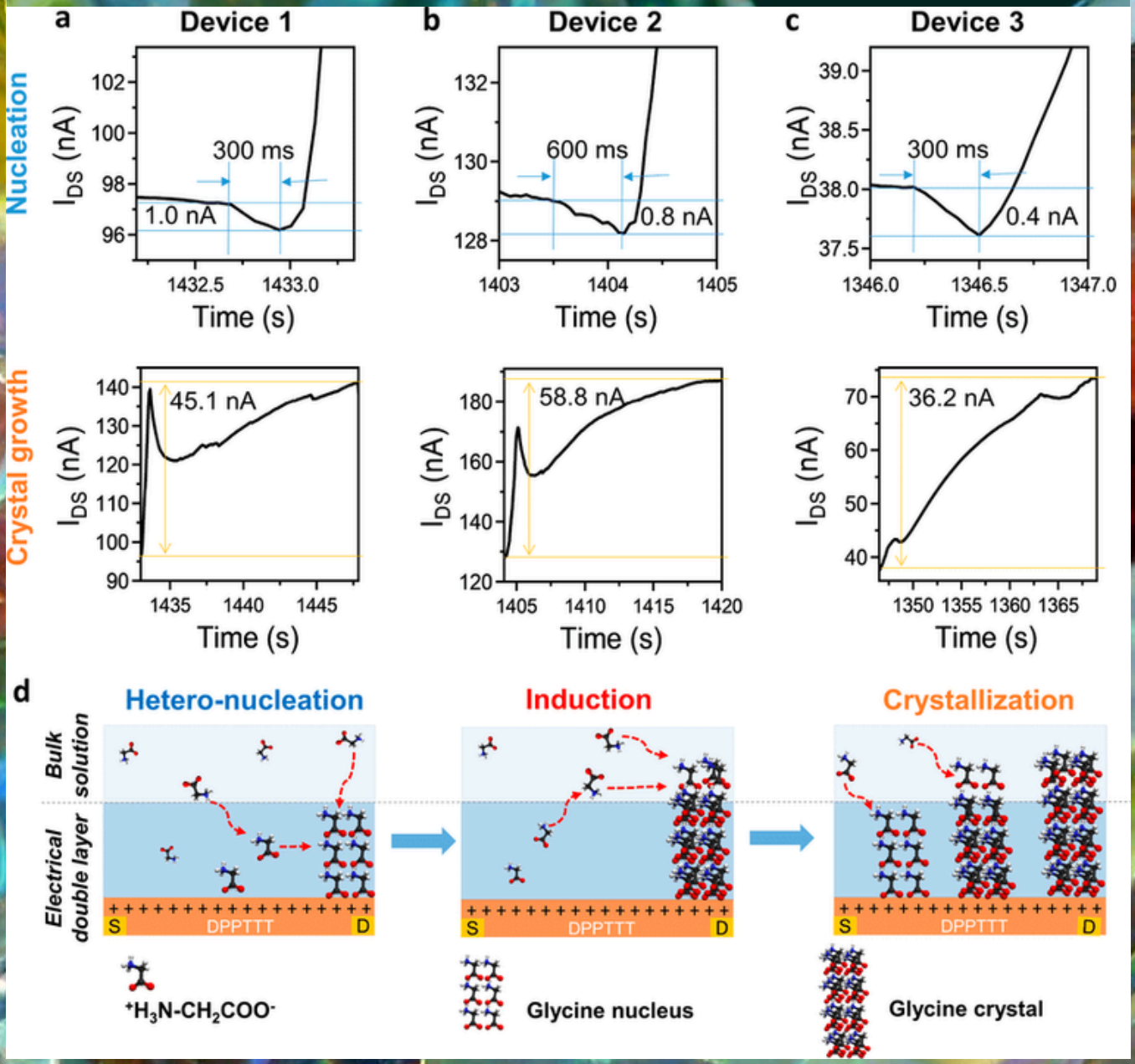
The Thermal Electro Aerosol (TEA) printing method has been able to assemble biofilm sheets that have piezoelectric capabilities in a single step. It can also function electro-hydro-dynamically aerosolizing (can conduct ions, liquids, air, and have dynamics similar to the mimicked tissue), and can move with a direct electrical race (in situ electrical polling allows instantaneous tuning) because it has the right arrangement of biomolecular point placement locations (spatial organization of biomolecular inks). This supports the piezoelectric function of these biofilms so that they can generate their own ultrasonic energy so that they do not require cables or separate bioelectronic power sources.

Glycine Nucleation in Crystalization Processes

Initially, the process of crystal formation in nature was unknown or even stochastic (unpredictable and unpredictable). However, with in situ spectroscopy at terahertz wavelengths, we can begin to observe how nature naturally produces and forms a variety of precious crystals in locations around the globe where there is little or no light.

It turns out that even on a laboratory scale, all it takes is a weak infrared laser beam from a short distance focused on a single point in a saturated glycine solution.

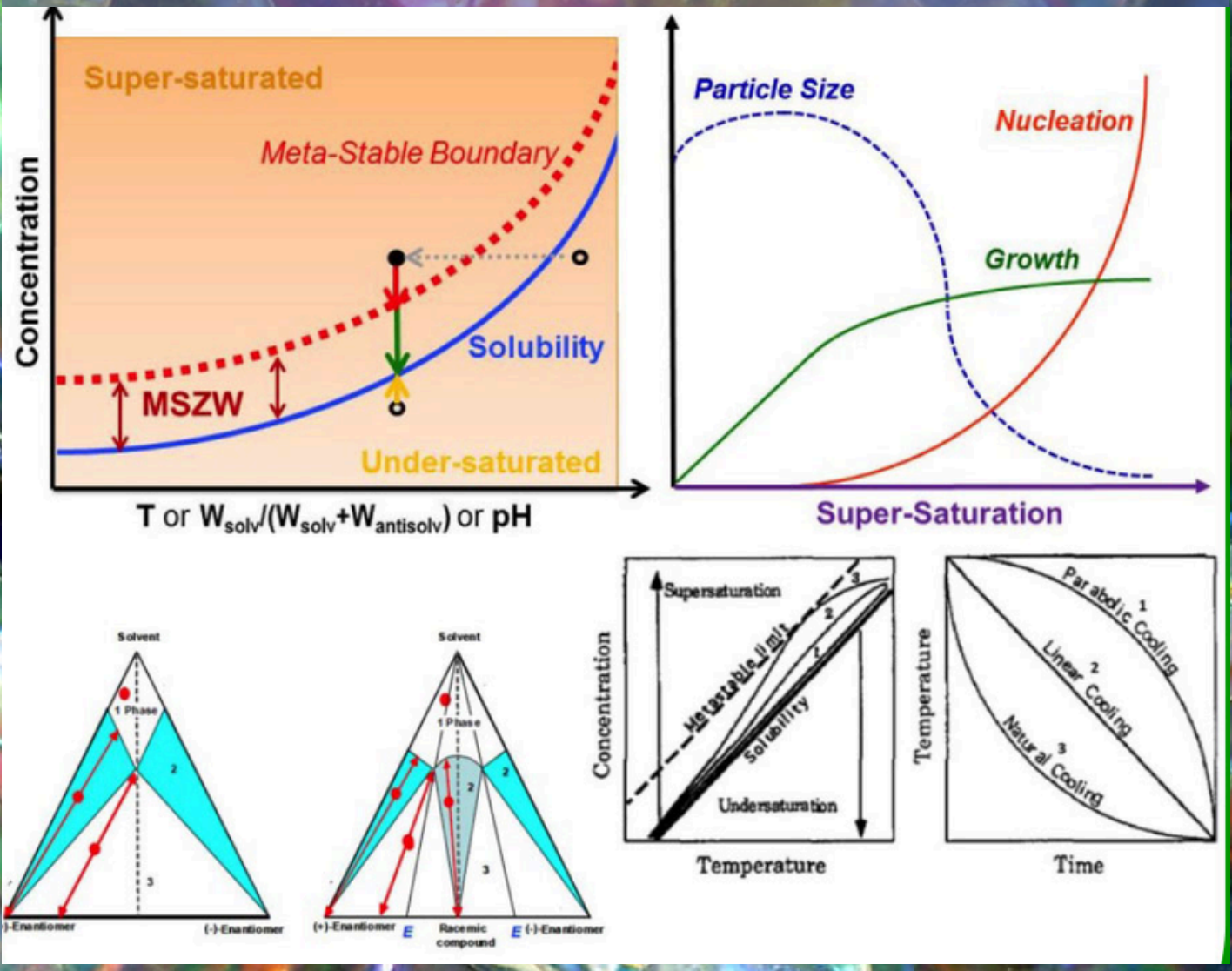
It's no wonder that many mining locations for crystals and other precious stones can only be reached by traveling deep underground or into dark, light-drenched mountains and caves. But now this process can be carried out on a laboratory scale.

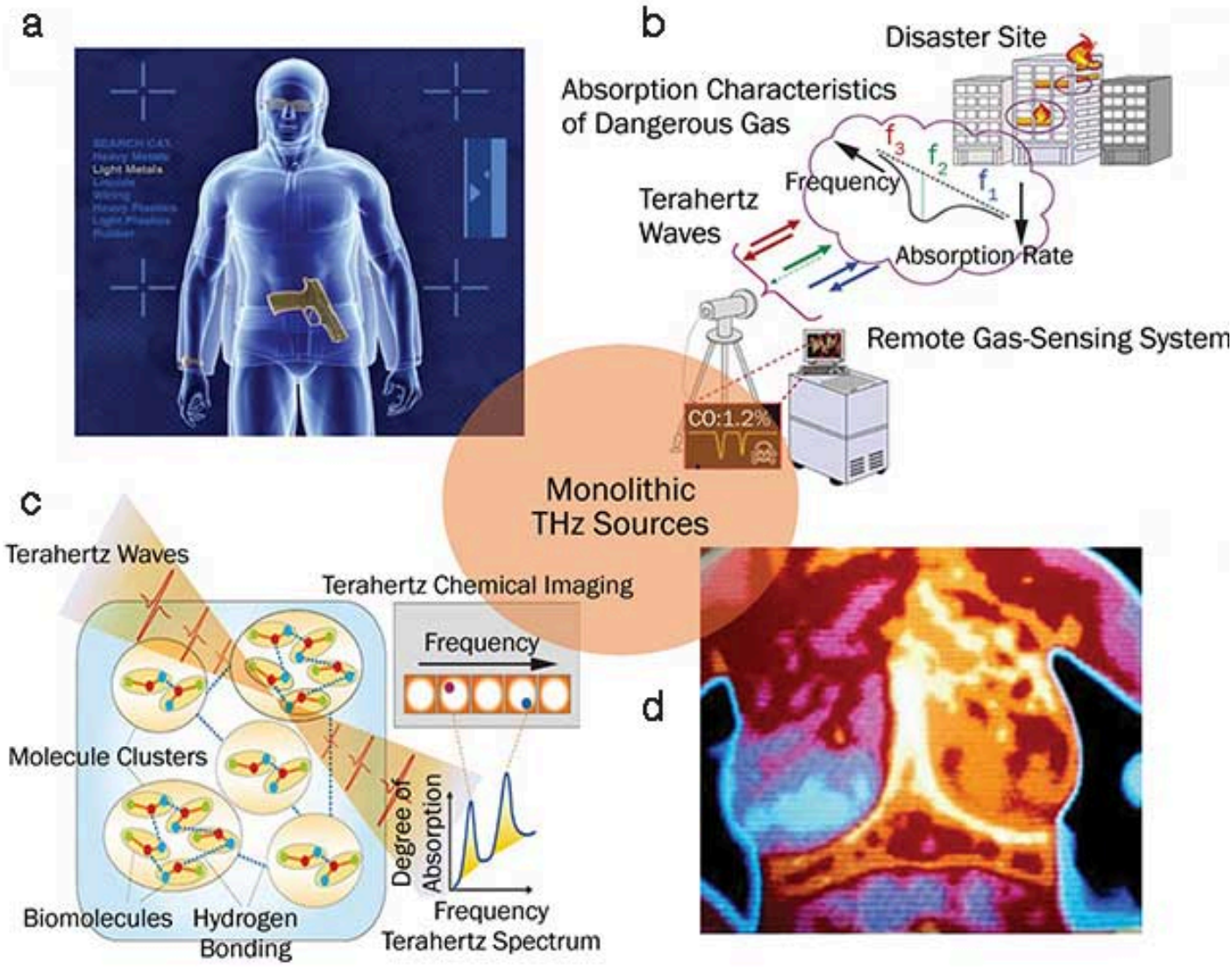


Glycine Nucleation in Crystalization Processes

First, the dynamic formation of a linear hydrogen bond network begins during the pre-nucleation stage.
Second, optical light capture occurs to restrict crystal nucleation within the laser focal point, a process known as optical capture-induced crystallization (OTIC). Sugiyama (2007) demonstrated this by focusing a near-infrared laser in a saturated glycine/D2O solution.
When the laser beam is tightly focused in the solution, optical gradient forces attract particles toward the focal point. Crystallization is generally assumed to occur as a result of the increased concentration of the infrared light focused at the nucleus, forming localized molecules by trapping aggregates in the saturated glycine solution, resulting in the formation of a clear glycine nucleus solid with light reflectance at the optical spectral level.

- **This results in the formation of high-quality single crystals. Polymorphisms, or shape changes, can be selected by polarization, or by changing the polar distribution of the focal point/target direction of the infrared laser beam to multiple points or angles.**





TERAHERTZ SPECTROSCOPY

The Latest Fashion in Technology

SO FAR, SCIENTISTS HAVE FOCUSED MUCH OF THEIR RESEARCH ON ELECTRON HOPPING IN VARIOUS MATERIALS. HOWEVER, IT TURNS OUT WE CAN UNCOVER MORE BY MONITORING PROTON HOPPING

Laser-based research typically uses X-rays, but these radiations carry significant risks. However, to conduct research to monitor proton hopping, a Femtosecond Laser Pulse is needed.

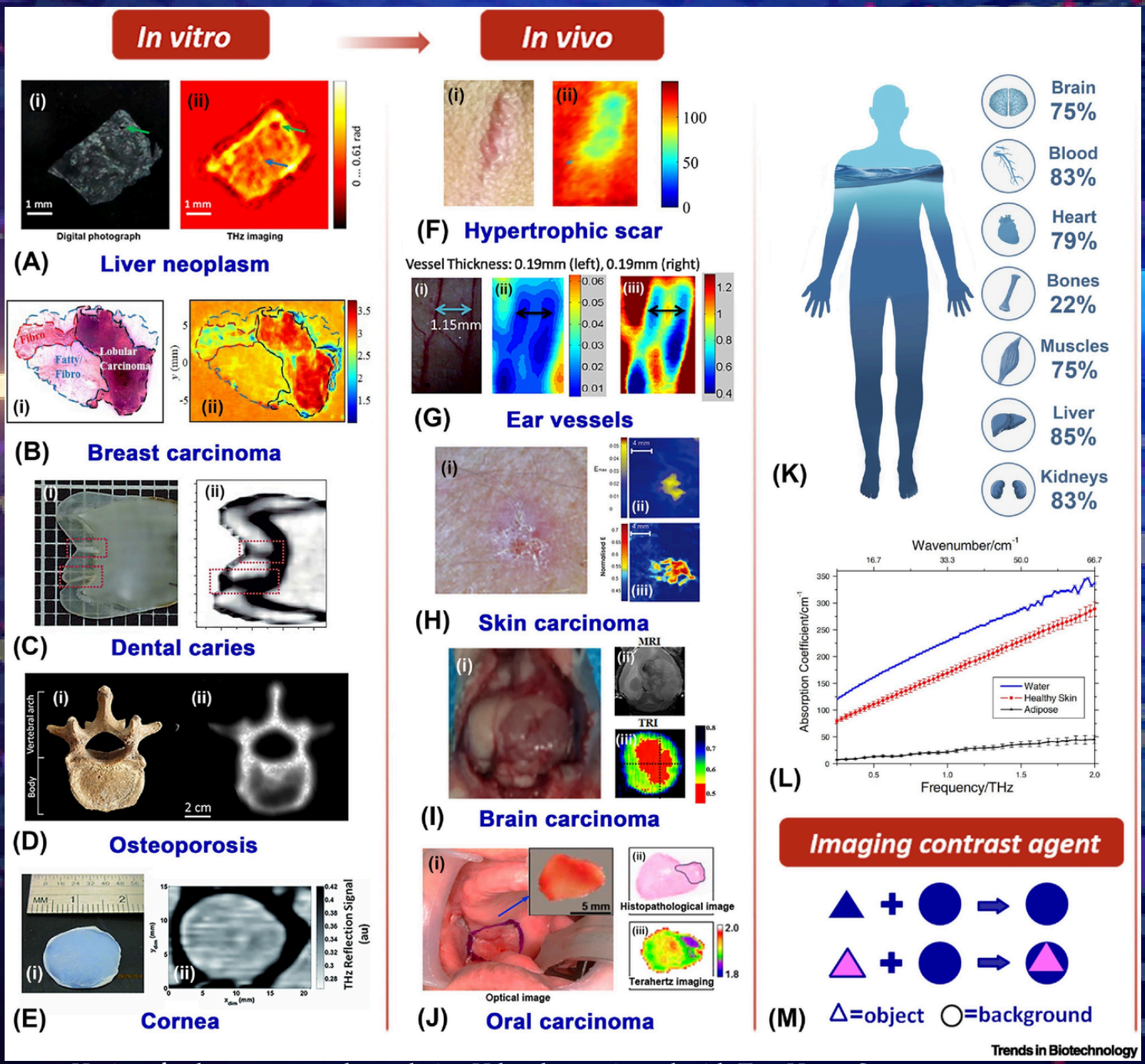
This Femtosecond laser pulse has a very high frequency, at the terahertz level, but a very short duration, below a picosecond (10−12 s). Using the Mode Locking method, the phase synchronization of the various frequencies of the laser components can be shortened, extended, or made more complex.

This Femtosecond Laser is shorter and thinner than a nanosecond laser. It is effective because it does not ionize the hopping electrons but focuses only on the hopping protons, thus avoiding changes in the shape or structure of non-conductive materials such as plastic, leather, or fabric that are exposed to the pulse.

TeraHertz Spectroscopy in Medicine

Calculating pH (the point of hydrogen), or the number that indicates the acid-base level in our bodies, has so far only been possible using a very simple method, namely litmus paper. However, many medical procedures require data on the acid-base levels of body fluids in specific organs. For this purpose, invasive procedures (removal of tissue/fluid from the tissue through instrument intrusion or surgery) are often performed.

Now, a spectroscopy method using terahertz waves has been developed to determine the acid-base levels of these body fluids. The method measures the level of protonation in our body fluids. High acidity (ketoacidosis) in the blood, for example, can be measured by monitoring high levels of deprotonation (the release of protons), while alkalosis or high base levels in the body are indicated by protonation (the increase of protons in the body fluids).



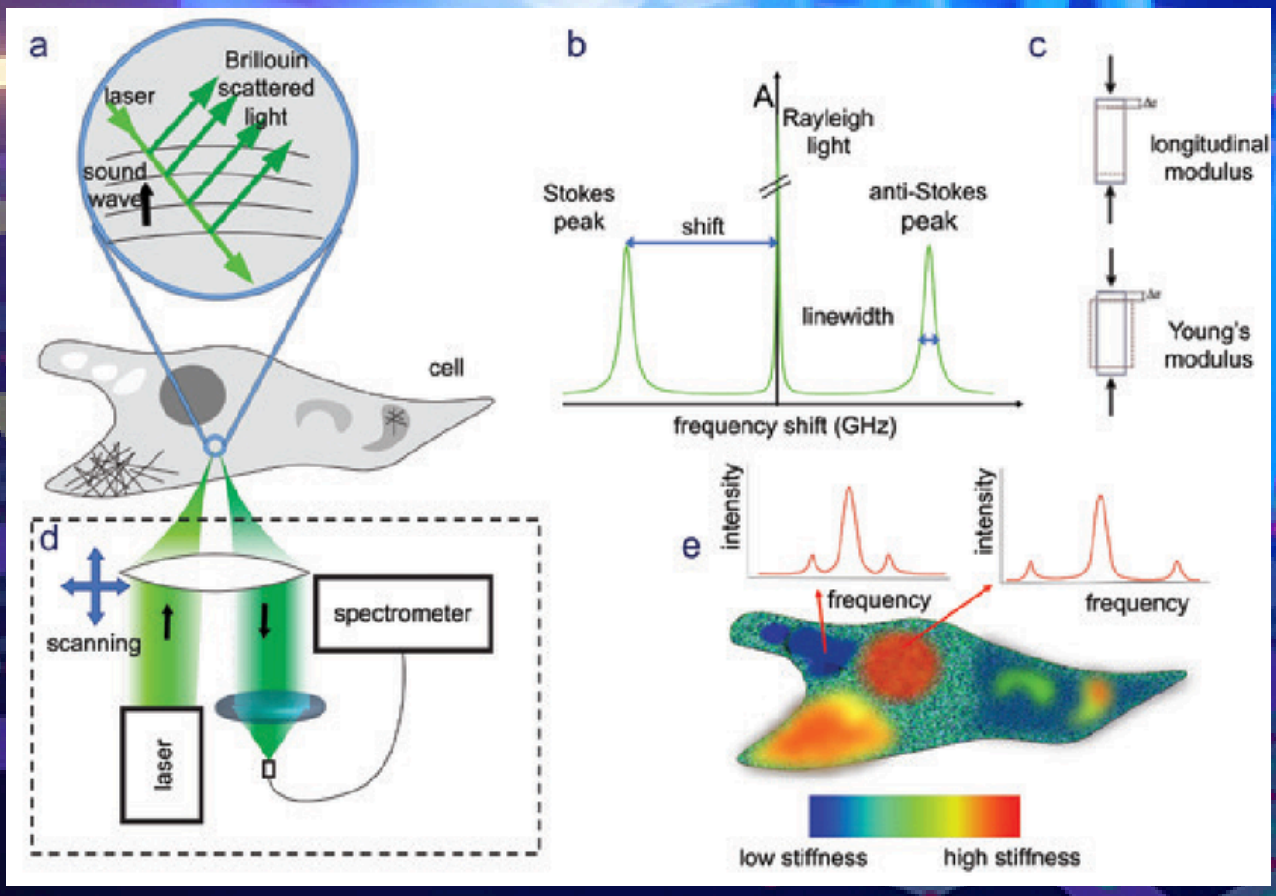
Various body organs can have their pH levels monitored with TeraHertz Spectroscopy

How TeraHertz Spectroscopy Works For Various Medical Needs

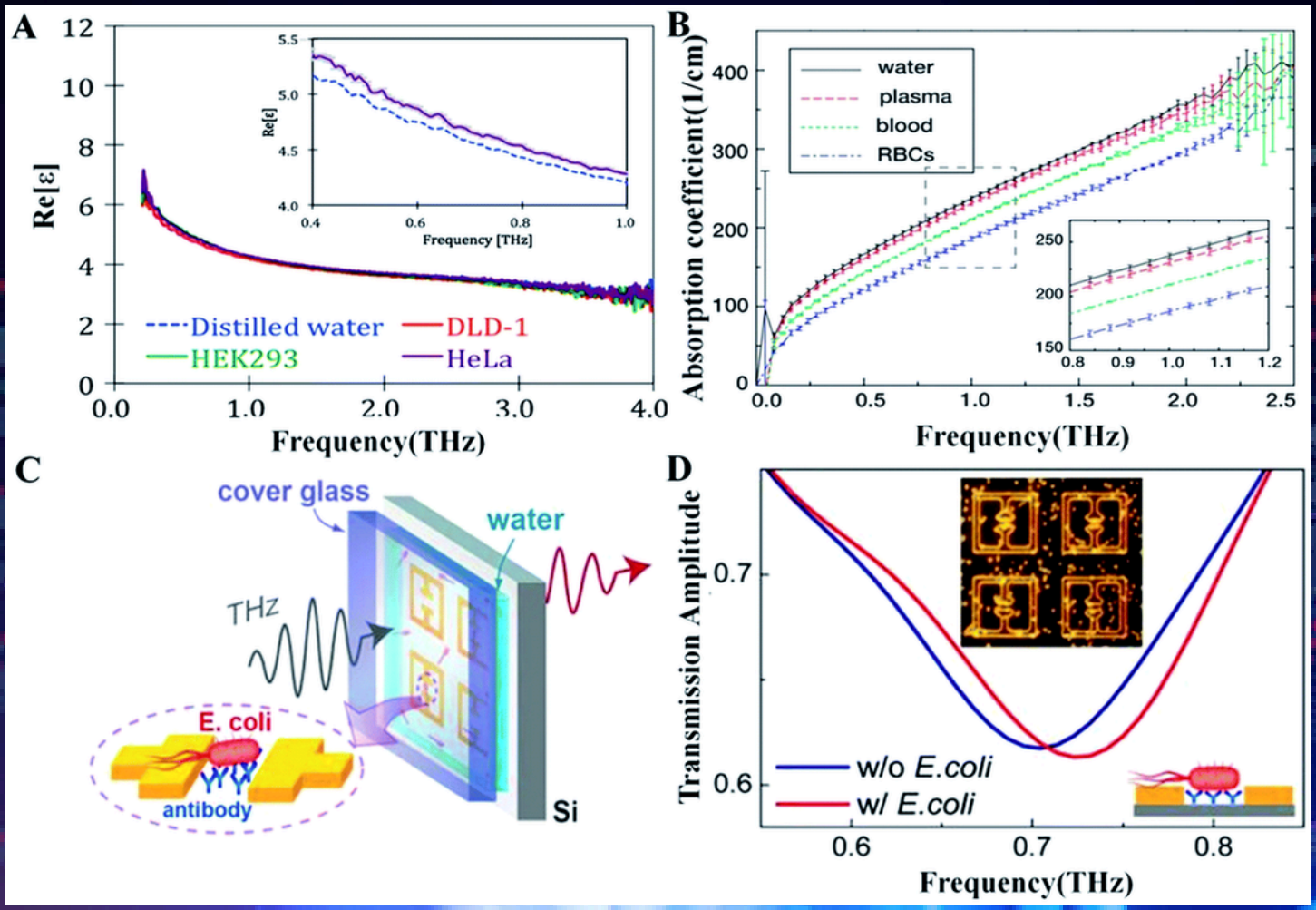
Terahertz spectroscopy works by using a femtosecond laser pulse to generate radiation with terahertz frequency waves. The laser beam produced by this femtosecond device is split into two distinct laser beams: one to generate terahertz radiation, while the other is emitted to monitor its reflection.

This very short-time-scale calculation of the reflected frequency of terahertz light (Thz time-domain spectroscopy) is a highly effective method for obtaining detailed and specific information about a material under study. This same method is also extremely useful for monitoring and controlling how a process is running (process control). Thz time-domain spectroscopy works by monitoring how this short electromagnetic pulse is absorbed by a material (by observing the absorption coefficient) or measuring the material's refractive index.

The radiation from a terahertz spectroscope is harmless and can detect living tissue and molecules, making it invaluable for biological research, chemical analysis, and pharmaceutical quality control. In the field of science, terahertz radiation does not cause ionization, making it useful for obtaining high-resolution imaging of tissues, which can help in obtaining medical diagnoses without the high risks associated with X-rays.



How TeraHertz Spectroscopy Works on Body Fluids



Various experiments have yielded results in detecting skin cancer and monitoring scar development. Furthermore, terahertz laser spectroscopy can detect fungi, yeast, bacteria, and viruses by evaluating metamaterial structures in terahertz (THz) frequencies.

The terahertz (THz) frequency range has attracted significant attention for its innovative applications in biology due to its non-ionizing properties and ability to penetrate a wide range of materials. Terahertz radiation interacts with biological tissue in unusual ways, enabling non-destructive imaging and assessment.

THz imaging reveals the distinct absorption characteristics of malignant and healthy tissue, providing a non-invasive approach for early cancer detection. Skin imaging provides information about subsurface characteristics, such as sweat ducts and skin lesions.

Terahertz sensors play a crucial role in pharmaceutical analysis, molecular sensing, and water content monitoring in various tissues and organs. Challenges include the resulting images, the recording of the resulting waves, and the complexity of the equipment required.

Further development of terahertz technology will focus on AI efforts for tissue tomography, the development of healing monitoring applications, disease detection, and the development of simpler devices. Terahertz technology will revolutionize healthcare diagnostics, providing innovative solutions to improve disease detection, treatment, and overall patient care.

Measurement Classifications of PARTICLE PLASTICS

PLASTIC WASTE HAS BECOME A MAJOR PROBLEM IN MANY COUNTRIES WORLDWIDE DUE TO ITS WIDESPREAD USE AND ITS INHERENT DIFFICULTY IN DECOMPOSING.

HOWEVER, EFFORTS TO REPLACE SYNTHETIC PLASTICS WITH BIOPLASTICS REMAIN CONTROVERSIAL.

AS THE DECOMPOSITION OF THESE BIOPLASTIC PARTICLES RAISES QUESTIONS ABOUT THEIR SAFETY FOR OTHER ORGANISMS IN THE ENVIRONMENT WHERE THEY DECOMPOSE, DUE TO THEIR BIOCOMPATIBILITY.

1 Plastics

The term "plastic" refers to a wide variety of synthetic or semi-synthetic polymers, most of which are derived from fossil fuels. Their malleability, flexibility, light weight, durability, and low cost have ensured their ubiquity in a wide variety of products used in everyday life. Concerns about the residues and waste generated by this highly intensive use have led to the search for alternatives, such as bioplastics. Instead of non-renewable petrochemicals, bioplastics are derived from renewable and biodegradable sources.

2 Micro Plastics

Defined as fragments up to 1 millimeter in size, microplastics are a well-identified and visible problem. However, nanoplastics are thousands of times smaller and have proven to be an even more dangerous threat, as they can cross major biological barriers and reach vital organs. A recent study, for example, detected the presence of nanoplastics in the human brain.

3 Nano Plastics

Microplastics are a type of microplastic distinguished by their extremely small size. Microplastics are typically less than 5 millimeters in size; nanoplastics are between 1 and 1,000 nanometers. For comparison, the average human hair measures approximately 80,000–100,000 nanometers.

Filtration Methods

PARTICLES NANOPLASTIC

Nanoplastics are tiny plastic particles invisible to the naked eye that can penetrate cells and tissues.

Nanoplastics are widely found in the environment and can pose risks to human health and ecosystems.

1 Addition of Elements Fe3O4 - Polidopamin

To perform filtration, black iron oxide (Fe3O4) is added to water exposed to nanoplastic particles with a polydopamine bond. The polydopamine binds the nanoplastic particles and binds them to the black iron oxide (Fe3O4) particles.

2 Binding Iron to Magnets

The second filtration stage is after the nanoplastic particles are bound by polydopamine to the iron particles, a magnet is used to separate the plastic particles that have been bound to the iron from all the water.

3 Nanoparticle Deposition

The third filtration stage involves the precipitation of various harmful nanoparticles, including black rust iron particles, polydopamine, and nanoplastic particles bound to these two elements. This results in water that is clean, clear, and free of harmful particles.

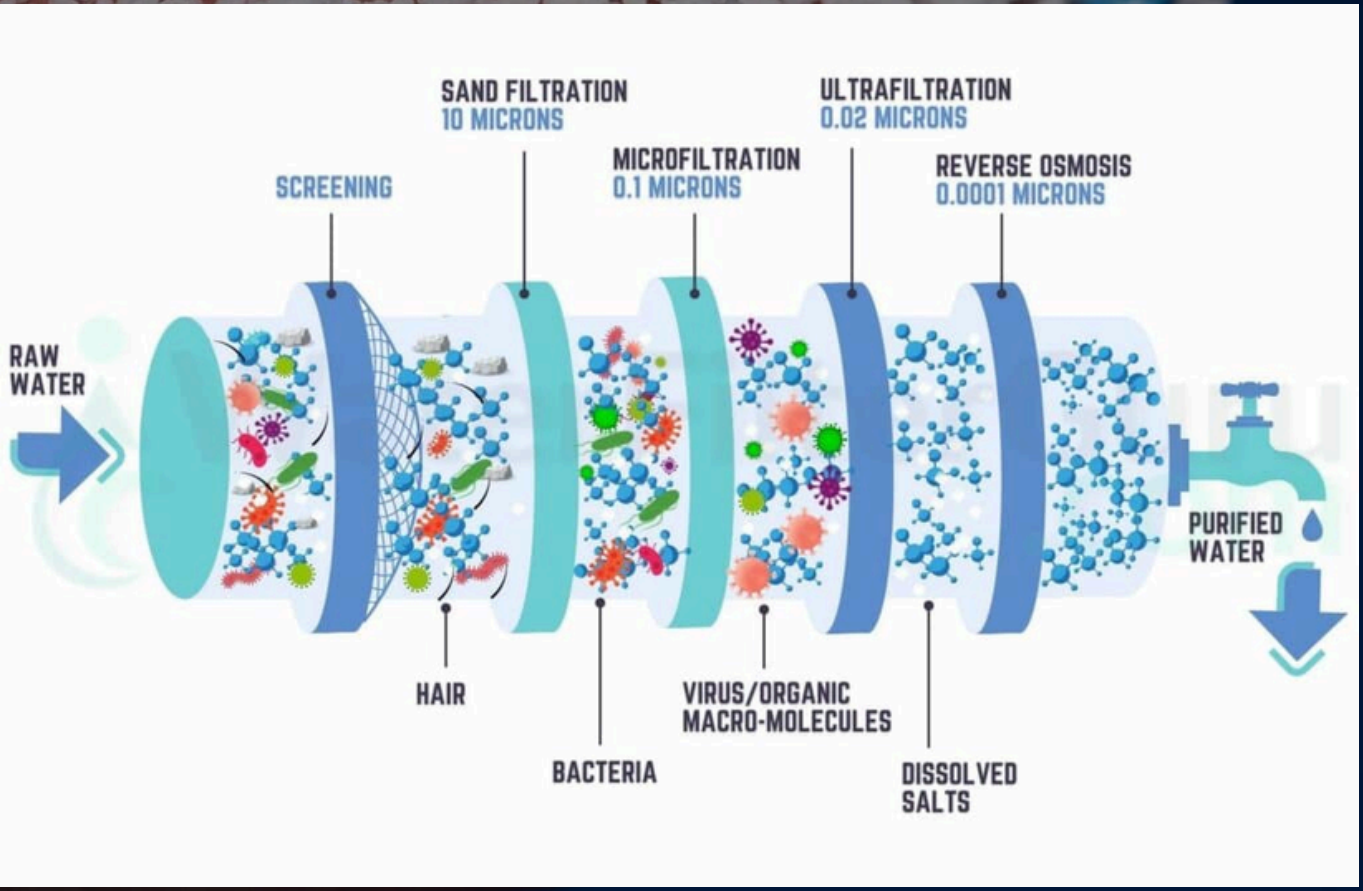
Hidden Danger of Nanoplastics Particles

Tiny plastic particles are ubiquitous in today's world and are perhaps one of the most significant environmental concerns. Microplastics are present in soil, water, and air, as well as in the bodies of animals and humans. They originate from everyday consumer goods and from the wear and tear of larger materials.

Microplastics are found everywhere and in every type of environment. The primary source is water used to wash clothes made from synthetic fibers. Microplastics cannot currently be filtered from wastewater and eventually penetrate the soil, groundwater tables, rivers, oceans, and the atmosphere.

Another disturbing piece of information provided by Toma is that bottled mineral water may be more contaminated with bioplastics than the treated drinking water we consume at home.

"Treated drinking water undergoes processes such as filtration, coagulation, and flotation to remove most residues, while mineral water, which is better in some ways (it is lighter, contains more salt, and tastes better, for example), is not treated in any way because it would damage its properties. If the environment where the water is collected is contaminated by bioplastics, these particles will reach consumers," he said.



The idea of doing filtration on every water tap in our house

Filtration of Nanoplastics with Fe3O4-Polidopamin

The procedure developed at USP uses magnetic nanoparticles functionalized with polydopamine, a polymer derived from dopamine, a neurotransmitter present in the human body.

These nanoparticles can bind to micro- and nanoplastic waste, and the combined particles can then be removed from water by applying a magnetic field.

"Polydopamine is a substance that resembles the adhesive properties of mussels, which adhere very strongly to many surfaces. It adheres strongly to plastic fragments in water and allows the magnetic nanoparticles to capture them.

These unwanted materials can then be removed from the water with a magnet," Toma said. This process has proven effective in removing micro- and nanoplastics from water, making it particularly useful in water treatment.

Biodegradation Efforts for PolyEthylene (PET) Plastics

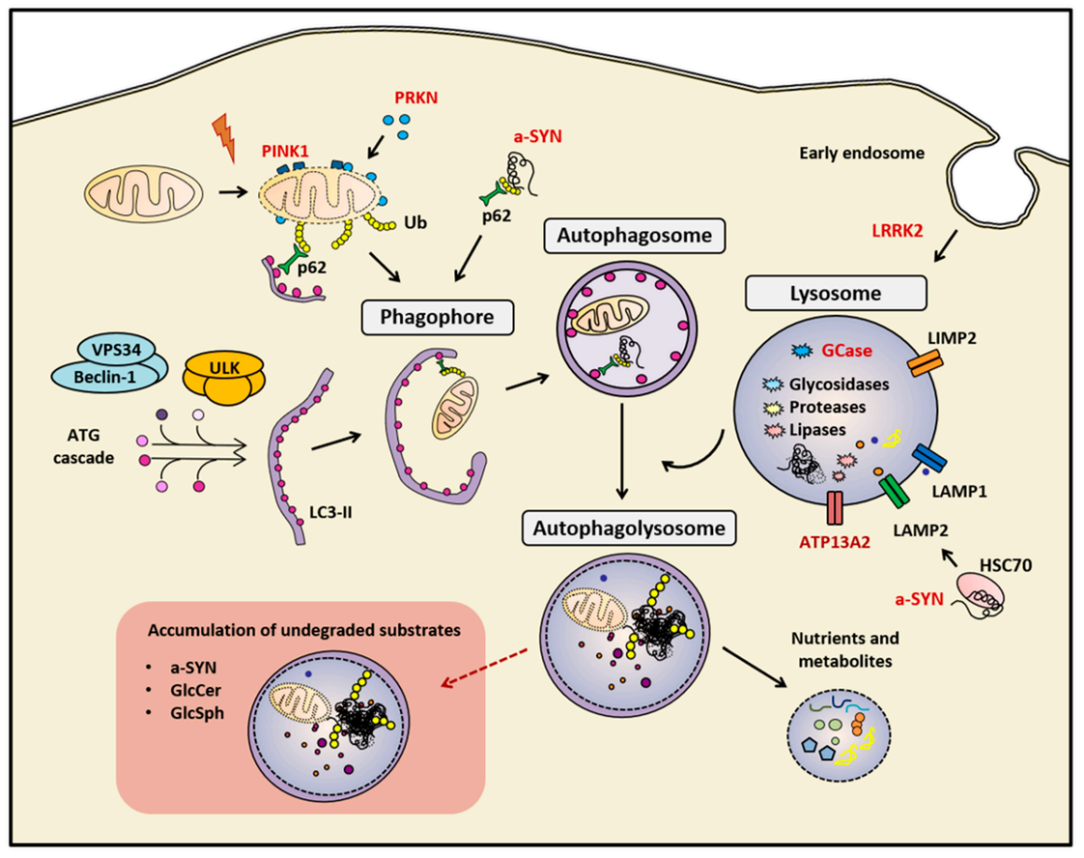
Lipase enzymes can break down polyethylene terephthalate (PET) into its basic components. Lipase breaks down PET and other plastics into smaller molecules, which can be reused to produce plastic materials. "Our goal is not only to remove plastic from water but also to contribute to its sustainable recycling,"

PET is the raw material for plastic bottles and other items. It is a major pollutant, primarily because its degradation produces terephthalic acid and ethylene glycol, both of which are toxic.

"Lipases break down PET into these initial monomeric forms, which can be reused to synthesize new PET. Our study focused on PET, but other researchers could incorporate other specific enzymes to process different plastics, such as polyamide or nylon, for example," he said.

The Benefits of Fasting for
INDUCING AUTOPHAGY

Autophagy is a Detoxification Phase or Reset Phase where our body is in a stressed condition that triggers an automatic process to carry out a self-defense mechanism by digesting a large number of damaged cells and secreting them from the body and then forming new cells automatically without the help of additional drugs/enzymes/vitamins.



Lysosome role for Inducing Autophagy on Parkinson Cells

Our bodies don't spontaneously form new cells as we reach adulthood. What typically occurs is fat gain when we don't exercise enough and consume too many oily foods.

Alternatively, if we exercise frequently and consume a high-protein diet, muscle cells are formed in the desired body tissues. However, certain processes can trigger or induce the autophagy phase in our bodies.

Autophagy occurs when the body's metabolic processes experience a shortage of input materials, while life processes must continue. To keep the heart beating, the lungs can still process air and pump it throughout the body.

And to maintain proper body movement, homeostasis, or the body's efforts to maintain a stable body temperature through cellular combustion from digestion and secretion, must continue.

Health Benefits of
AUTOPHAGY INDUCTION

How to Induct Autophagy

Fasting: Fasting means you stop eating for a certain period of time. Fasting deprives your body of nutrients, forcing it to reuse the components of dead cells to keep it functioning.

Calorie Diet: Calorie restriction means reducing the number of units of energy, or calories, your body consumes. Instead of eliminating calories from your body completely (as with fasting), you restrict them. This forces your cells to engage in autophagy to compensate for the lost nutrients.

Keto Diet: This high-fat, carbohydrate-free diet changes the way your body burns energy, so that instead of burning carbohydrates or sugars for energy, it burns fat. This change can trigger autophagy.

Exercise: Exercise stimulates processes that increase ATG activity, such as stressing your skeletal muscles. Exercise can trigger autophagy, depending on the type of exercise you do and its intensity.

However, starting autophagy should always be done under the supervision of a doctor or healthcare professional.

Cell regeneration thanks to autophagy can provide various health benefits:

- Reducing the risk of cancer and type 2 diabetes
- Helps improve brain function in memory, information processing, and decision-making
- Prevents the severity of neurodegenerative diseases, such as Alzheimer's
- Helps with weight loss
- Helps improve heart health
- Improves energy production

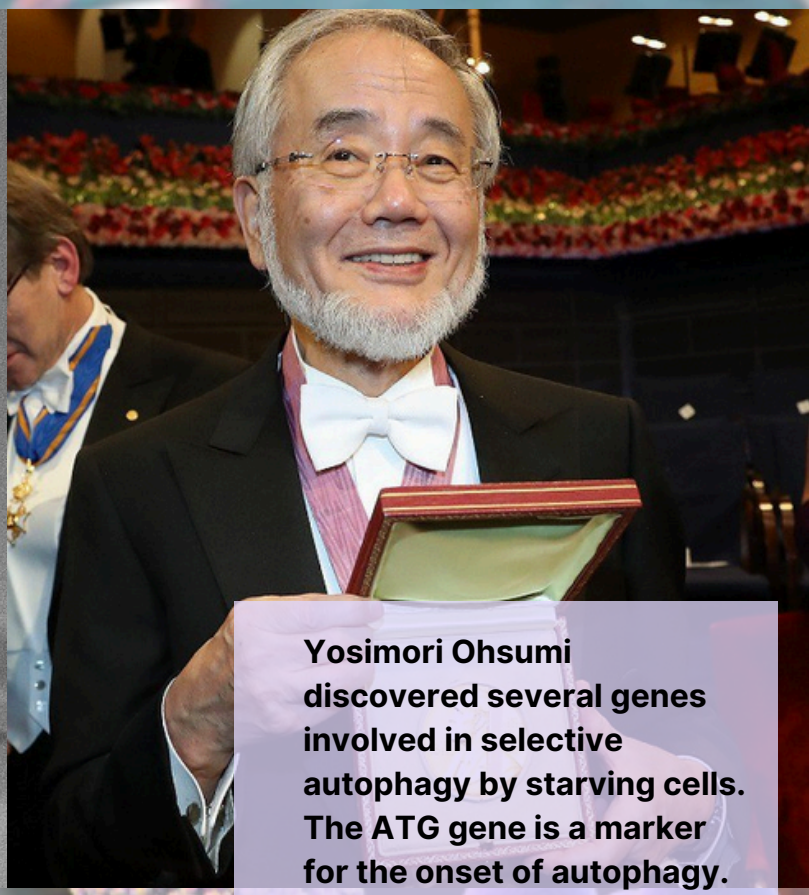
(www.alodokter.com)

Two Nobel Prizes in the Medical Field Regarding AUTOPHAGY

Fifty years ago, French biochemist Christian de Duve and other researchers discovered a process of cell degradation triggered by and occurring in lysosomes, which occurs after the autophagosome phase. He named this phase of cell degradation autophagy. At the time, this discovery was considered advanced.

Discovery of Lysosomes as Triggers of Degenerative Processes in Cells

1974



Yosimori Ohsumi discovered several genes involved in selective autophagy by starving cells. The ATG gene is a marker for the onset of autophagy. Seven other genes were also identified: APG, AUT, CVT, GSA, PAG, PAZ, and PDD.

Discovering Cytoplasm to Valluocule (CTV) pathway in Starvation Induced Non Selective Autophagy

2016

MILITARY AI

Why Artificial Intelligence Prone to Backfire?

Israel's Iron Dome, however, turns out not to be a truly formidable protective dome. In fact, other radar-based systems owned by developed nations like the United States have now surpassed its sophistication.

A number of smaller, more sophisticated nations have developed a wealth of undetected technologies that have matched the military capabilities of these two countries.

In fact, the level of military strategic intelligence of these small nations has turned the tide in the Middle East.

Their above-average fleet size, the latest technological sophistication, and the high destructive power of various weapons systems, with the risk of what was perceived on paper as an invincible ultimate force, can in reality be defeated by a small force aboard small, modest-tech ships.

How can a small Houthi force from a small, unsophisticated, sparsely populated country defeat hundreds of men on a high-tech floating fortress, similar to a Western naval warship?

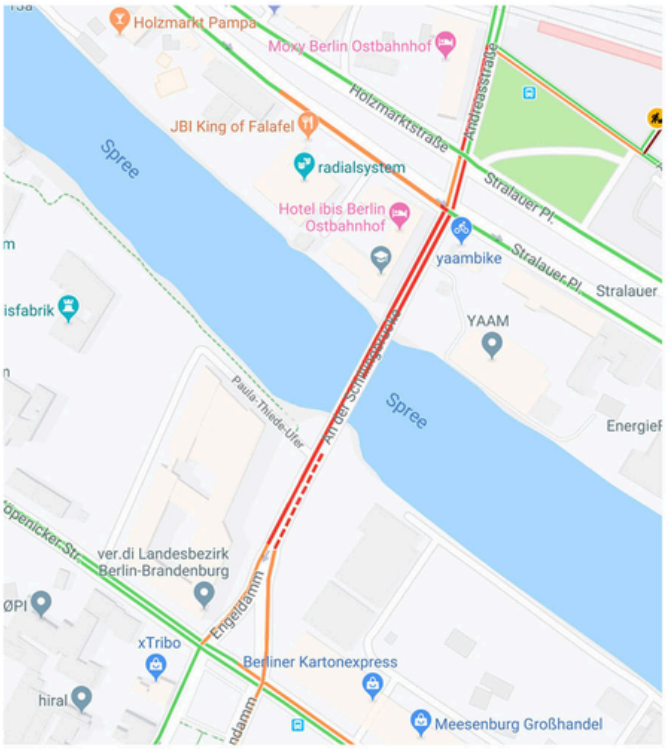
How can Israel's military system, which claims to possess the most advanced technology in the world, now be matched by the power of another small Middle Eastern nation?

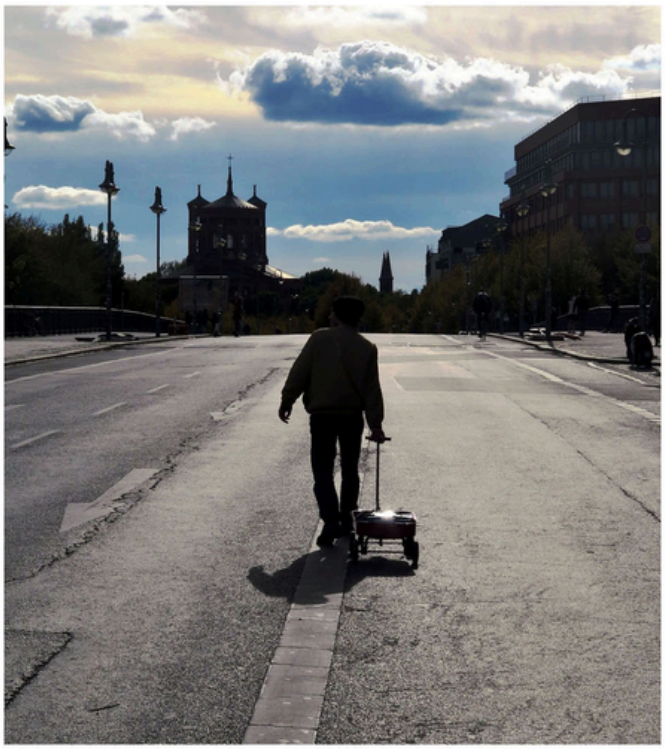
Could this be the result of manipulation of artificial intelligence (AI) systems, fooled by simple methods that can penetrate vulnerabilities in the data processing of these advanced thinking machines?

Is the global military constellation truly undergoing a shift in power? Or is this merely a drama intended to create a dramatic situation that ultimately poses a greater danger to the safety of the world's population? Who can answer this?

AI - SPATIAL PRONENESS

Examples of Artificial Intelligence System Vulnerabilities in Mapping





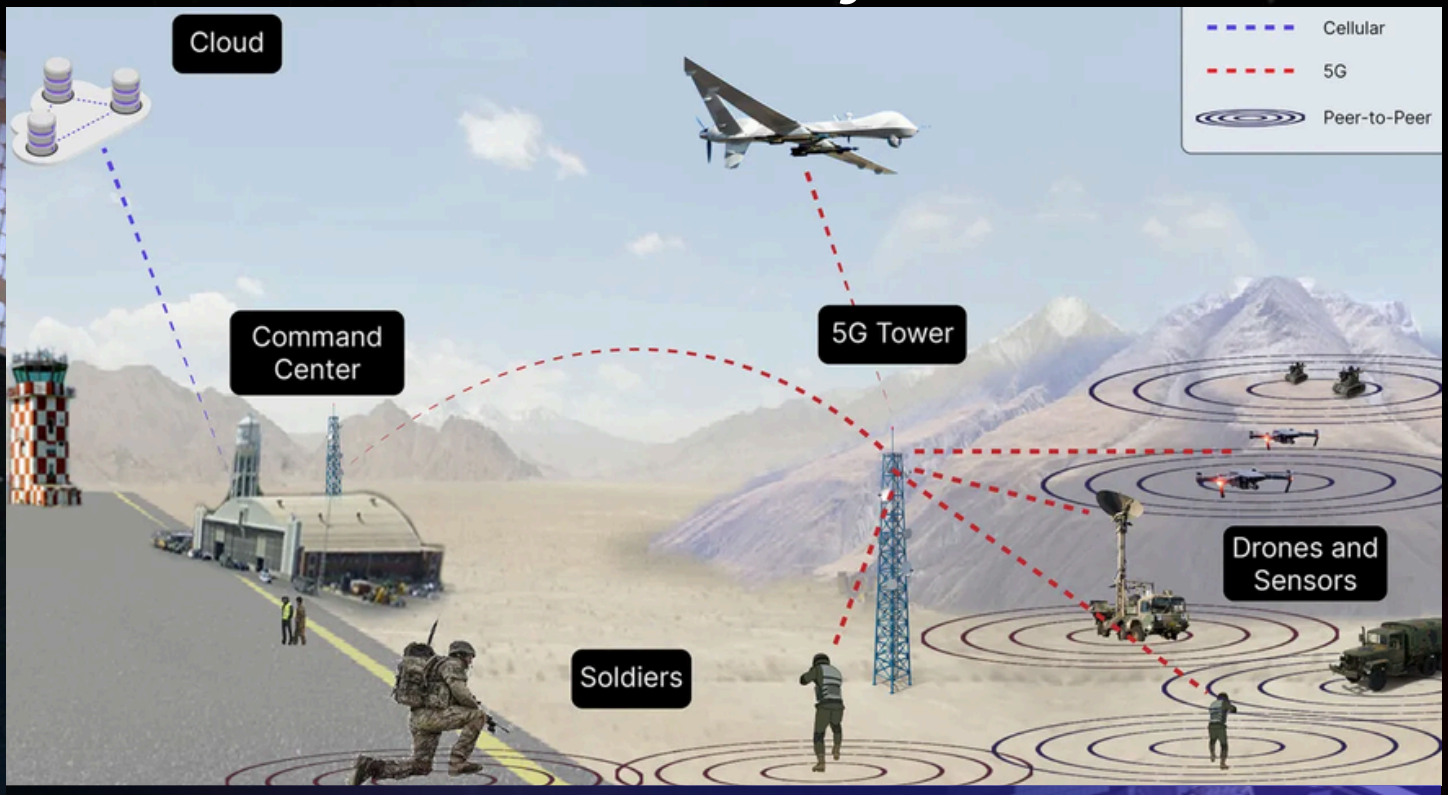
One afternoon in Berlin, Simon Weckert collected 99 smartphones, which he carried through the city streets using a children's toy cart. All 99 smartphones were connected to Google Maps. Simon slowly and leisurely strolled without encountering a single vehicle nearby. Berlin's streets are typically very busy during the day, especially during lunchtime. At a time when traffic should have been expected, Simon trudged along without encountering a single vehicle either in front of or behind him.

However, at that moment, Google Maps showed a very heavy traffic jam. Consequently, several vehicles needing to traverse Simon Weckert's street were directed by Google Maps to take alternative routes. Important vehicles such as ambulances, police cars, and foreign government processions were also diverted to streets that Google Maps analyzed as being less congested or uncongested.
From this one experiment alone, we can see how easily Google Maps' traffic monitoring system has been manipulated, using only a child's toy and nearly 100 smartphones.

Imagine if the same thing were done in the military. Would our country have a number of detection and countermeasure strategies in place if a similar act were carried out by an adversary to create a situation that seems dangerous and threatening?
A situation that should be perceived as a joke, a game, or just a casual joke is instead perceived as a critical situation by an artificial intelligence system, in this case, a thinking machine or machine learning system on Google Maps. Here, we learn that spatial sensory systems are still very easily manipulated, even by very simple means.

Primary Concern Of Geo Spatial Information

Variabilities of Primary Data Source



In fact, Google's technology for generating automatic conclusions in its machine learning system is derived from triangulated position data from at least three different devices or satellites. It seems time to process this spatial information with more precise methods or to add other elements to the machine learning considerations in mapping systems, beyond just location detection on chips in smartphones that transmit real-time, reciprocal data. This allows for the provision of positional information on mapping controlled by Artificial Intelligence.

We know that several global mapping systems are currently operating in simultaneous collaboration with several allied nations. However, no condition can guarantee that one country will remain free from threats from other countries, especially if there is a history of unrest between them. In an effort to maintain security, developed countries have developed their own satellite-based mapping systems. Russia developed Glonass. The United States developed GPS (Global Positioning Systems). The European Union developed Galileo. Meanwhile, China developed Beidou, and India developed NavIC (Navigation in the Indian Constellation).

Independence in processing spatial information data will create a more robust security sovereignty effect than if all countries relied solely on a single source of information. This is especially true when the decisions to be made will impact strategic decisions that affect the lives of many people.
Military data analysis is a crucial matter, requiring the supervision and wisdom of a number of leaders who collectively make decisions with significant influence. This humanitarian and compassionate policy will be further developed if balanced by more accurate and reliable data sources than simply the accumulation of electronic communication devices at a slowly moving point, which is then perceived as congestion. This is despite the fact that numerous city surveillance cameras already transmit more accurate visual data in real time to the command center in downtown Berlin.

Primary Concerns

Half of the World's Population Now

What most of the world's population fears most today is a nuclear attack that would trigger a Third World War. Although artificial intelligence now possesses extremely fast computing and data processing capabilities, the decision to advance or withdraw from the battlefield is still not entirely in the hands of leaders with actual battlefield experience.

The president or defense minister of a country serves as the ultimate control center. Yet, several developed nations are currently led by individuals with psychological vulnerabilities and no background in actual combat. Will the peace and safety of many people around the world now be reduced solely to a matter of prestige in the hands of a few world leaders with this ego complex?
Whether it's Kim Jong Un, Trump, Netanyahu, or Putin, they are known for lacking compassion for others. Putin abruptly decided to invade Ukraine, and the war has been going on for over a year. Netanyahu has inhumanely committed genocide in the holy land of Palestine.

Kim Jong Un unexpectedly announced he had produced hundreds of nuclear warheads and was building uranium enrichment facilities to double that number. Meanwhile, Trump, eager to secure his victory, had no specific goal on paper to achieve any particular humanitarian success, except to become the greatest in no particular field.
These four world figures, instead of benefiting others, have actually triggered more humanitarian dangers. And the rest of the world is waiting: what will the coming 2025 be like? Will it be a cheerful parade or a series of alarm sirens that will echo across the world's skies on New Year's Eve?

The Urgency to Develop
Humanity Based Artificial Intelligence

The American invasion of Iraq occurred because, at the time, there was little data available regarding Iraq's weapons stockpiles and military strength. Bush felt psychological pressure as the public demanded revenge for the attacks on the Twin Towers of the World Trade Center on 9/11.

President Bush made the decision to invade without conducting a thorough analysis and immediately assumed that Iraq possessed nuclear weapons based solely on satellite data, based on suspicions that Iraq possessed nuclear weapons, based on photographs and infrared sensor analysis of the electrical power consumed at certain suspected facilities.

There was no data on uranium supplies from any mining sites. There was no data on warhead manufacturing, or even any information about Iraq's actual nuclear arsenal.

In psychology, this immature decision-making, trapped within a group system that feels collective pressure to take a particular action, is known as groupthink.

The vulnerability of human groups to making decisions without accurate and precise analysis and without data-based analysis is what has led many global thinkers to develop artificial intelligence. This is to prevent dangerous decisions like those made by George Bush in the future.

Although still imperfect, the reality that humans are increasingly dependent on and in dire need of higher-order thinking continues to drive the advancement of AI technology.

Many existing weapons systems are developed solely with an eye to their destructive power, specifically to eliminate life as widely and as widely as possible.

However, this intelligence should be centered on strategic calculations based on concern for children and women, and a greater concern for humanity and the goal of minimizing casualties. The development of military AI capabilities must be more data-driven, with considerations that are humane, economical, and defensive, rather than destructive.

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