School of Biosciences Presents

# **KYOTOS 2022**

January – December' 22

Breaking the Records

Innovations of new era

> If you look at history, innovation doesn't come just from giving people incentives; it comes from creating environments where their ideas can connect - STEVEN JOHNSON

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**KYOTOS - 2022** 

# EDITORIAL BOARD





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## EDITOR'S MESSAGE

"Indeed, learning to write may be part of learning to read. For all I know, writing comes out of a superior devotion to reading." — Eudora Welty

We can remake the universe when we have superiors' minds who are creative, coworkers who assist us in gathering data and reports, and tiny superstars like students who make sure you get what you want.

We are extremely delighted and ecstatic to announce the final debut of our very own e-magazine thanks to the efforts of our entire team.

The e-magazine focuses how technology efficiently delivers new stories to our desktops, laptops and mobile devices, magazines are all about context—how ideas and images are presented in relation to one another and within a larger point of view. It explores a range of biological sciences, from the disorderly laws of gene editing to the anarchy of the microbial world. Additionally, it includes a wide range of material, including articles, science trivia, quizzes, achievements, and school of biosciences activities. Magazines are about trust and partnership, we, the editors, will strive always to keep you engaged.

"Teamwork is the ability to work together toward a common vision. The ability to direct individual accomplishments toward organizational objectives. It is the fuel that allows common people to attain uncommon results." – Andrew Carnegie. To make this treasure trove excellent, we have worked nonstop. The editorial board members' honest assistance made it possible to complete the monumental undertaking of editing our school e-magazine.

Although having talent is admirable but the real test is the capacity to recognize talent in others. I'm incredibly grateful to our esteemed Director, (Dr.) Arun Kumar Singh, General Secretary and Treasurer, CA (Dr.) Rakesh Chharia and (CA) Vidur Chharia for giving us the duty of serving as and on the Editorial Board.

We send our warmest greetings to each and every reader, and we sincerely hope that this memento will win your praise for being an important contribution to the exploration of the mysterious realm of science.

# Science Records Broken in 2021

# MAN REACHES TO SUN



Parker solar probe launched by NASA became the first man-made satellite to enter the Sun's atmosphere. It briefly entered into the corona region of the Sun's atmosphere.

This historic moment was evident in the month of April but after thorough study by the space center, it was finally announced on 14<sup>th</sup> December 2021. It is for the first time in human history that a spacecraft approached sun's atmosphere. The satellite was specially made with materials that can withstand extreme temperatures of 100000 degrees. It is an astonishing moment for the human race.

### MAJOR DENISOVAN ANCESTORY

Denisovan is mysterious a distinct species of Homo sapiens known to be sister taxon of **Neanderthals** through DNA analysis. They died out long ago leaving a trace of their existence in the people of Philippines. The Indigenous Ayata Magbukon people of Philippines have about 5% similar DNA to Denisovan. This is the highest level of ancestry DNA of Denisovan found till date.





### MERGE OF BLACK HOLE

For the first time, a black hole has been observed to merge with a neutron star. The neutron star was formed from the collapsed remains of a dead supergiant star.

Astronomers discovered gravitational waves emitted by the collision that reached Earth in this phenomenal event. The gravitation rays so emitted were similar to waves emitted during collision of black hole and stars.

### Records' 21

## OLDEST OPPOSABLE

### THUMB

scientifically Monkeydactyl named Kunpengo antipolycatus is a 160 million years old pterosaur with having opposite thumb. It is oldest animal the with an opposable thumb and might have use it for climbing up tall trees through thumb and flexible joints. It is present in region which is now northern China. The digits were helpful in capturing prey and twigs of trees.





### OLDEST HUGE BLACK HOLE

A black hole with mass twice of as equal to 1.6 billion suns and 20 million year older, (as previous recorded), JO313-1860 is the oldest black hole recorded till now. As announced on January 12, 2021 by Keck Observatory and NSF's NOIR Lab it is the most distant supermassive black hole formed just 670 years after Big Bang and is more than 13 billion light years away.

# What's New In Science World ???



### Youngest Yoga Instructor

Reyansh Surani just being 9 years old became the youngest certified yoga instructor at such a tender age. He completed his 200-Hour Yoga Teacher's Training Course at the Anand Shekhar Yoga School on 27 July 2021 and became the youngest yoga instructor ever





#### Bíggest Solar tree ever ín World

World's largest & biggest solar tree is developed in Ludhiana by CSIR-CMERI (Council of Scientific & Industrial Research - Centre of Excellence for Farm Machinery). Officially certified as the world's largest Solar Tree by Guinness World Records (GWR). PV panel surface area is about 309.83 square meters.

### Díamond Planet – Mercury

Mercury famously the closest planet to the sun is also a planet with Diamonds. Unlike the gems, like diamonds on Earth, minute diamond dust was observed on the surface of Mercury, probably formed by the conversion of graphite from magma. The diamond reservoir of Mercury is 16 times larger than that of Earth.





#### UK melted

In the year 2022, a new highest record of hotness was set. In the past eight years, the summers of 2k22 were the hottest summer ever. Multiple intensive heatwaves had hit United Kingdom, where the heat bars were so high that the road, traffic lights, and even railways tracks sagged and buckled. This alarming situation caused great concern and havoc.









# mRNA Vaccine: New Era in Vaccine Technology

Tanya Bhagat School of Biosciences IMS Ghaziabad (University Courses Campus)

Every year, vaccines prevent millions of diseases and save thousands of lives. The smallpox virus has been totally eliminated, and the prevalence of polio, measles, and other paediatric illnesses has been significantly decreased worldwide as a result of extensive vaccination usage. Traditional vaccination techniques, such as live attenuated and inactivated pathogens and subunit immunizations, offer long-term protection against a wide range of illnesses. Despite this accomplishment, there are significant barriers to vaccine development against infectious diseases, particularly those that are better able to resist the adaptive immune response



Furthermore, the fundamental difficulty for most new viral vaccines is not the effectiveness of conventional procedures, but the necessity for more rapid growth and large-scale deployment. Finally, standard vaccination techniques may not be relevant to diseased state other than infectious ones, such as cancer. As a result, the development of more promising and adaptable vaccination platforms is in need and quite critical.

Over the last decade, significant technical advancement and research efforts have enabled mRNA to emerge as a viable therapeutic tool in vaccine development as well as protein replacement treatment. mRNA provides various advantages over subunit, dead, and live attenuated viral vaccines, along with DNA-based vaccinations. Firstly, because mRNA is a nonnon-integrating medium. there no risk of infectious. is infection or insertion/deletion mutagenesis. Moreover, mRNA is destroyed by regular physiological processes, and its in vivo half-life may be modulated by the use of different modifications and delivery mechanisms. To improve the safety profile, the intrinsic immunogenicity of the mRNA can be reduced. Secondly, in terms of effectiveness, certain modifications make mRNA more reliable as well as translatable. By forming mRNA in carrier molecules, which allow for fast absorption and translation in the cytoplasm, efficient in vivo administration may be achieved. Because mRNA is the smallest genetic vector, anti-vector immunity is eliminated, and mRNA vaccines can be given frequently. Thirdly, because to the high yields of in vitro transcription processes, mRNA vaccines have the potential for rapid, cost effective, and scalable manufacture advantages.

Because of their high potency, ability for quick development, and promise for low-cost production and safe delivery, mRNA vaccines are a viable alternative over conventional vaccination techniques. However, till recent times, their application was restricted due to the instability and inefficiency of mRNA transport in vivo. Improvised techniques have solved many of these short comings, and in this continuation numerous mRNA vaccination systems against infectious diseases and cancers are showing promising outcomes in both animal models as well as on human population.



Fig 1: Pipeline for vaccine development yearly on a global level

Several mRNA vaccination platforms have been created in recent years and confirmed in immunogenicity and efficacy against the infections. RNA sequence engineering has major contribution in synthesis of mRNA vaccines for more translatable than any time before. Highly effective and non-toxic RNA carriers have been developed, allowing for extended antigen expression in vivo in some instances. Several mRNA vaccination platforms have been created in recent years and confirmed in immunogenicity and efficacy against the infections. RNA sequence engineering has major contribution in synthesis of mRNA vaccines for more translatable than any time before. Highly effective and non-toxic RNA sequence engineering has major contribution in synthesis of mRNA vaccines for more translatable than any time before. Highly effective and non-toxic RNA carriers have been developed, allowing for extended antigen expression in vivo in some instances. Some vaccination formulations incorporate unique adjuvants, while others induce powerful reactions even when no recognised adjuvants are present.

Exogenous mRNA is immunostimulatory by nature because it is recognised by an extent of cell surface, endosomal, and cytosolic innate immune receptors. These characteristic features of mRNA might be advantageous depending on the therapeutic application. One of major benefits of this mRNA-based vaccine is that it may provide adjuvant action to stimulate dendritic cell (DC) maturation and so elicit powerful T and B cell immune responses in some situations. However, innate immune sensing of mRNA has been linked to antigen expression suppression and may have a deleterious impact on the immune response.

vaccines are still unknown, significant progress are in experimental phase in explaining these phenomena in recent years. While preclinical studies have raised hopes for the possibilities and implication of mRNA-based vaccinations, two recent clinical findings have dampened those hopes. In both studies, immunogenicity in humans was lower than predicted as compared to animal modelling, a phenomenon previously seen with DNA-based vaccinations, and the adverse effects were severe. More study is needed to establish how different species of animals respond to mRNA vaccine components and inflammatory signals, as well as which immune signalling pathways are involved or generation of immune response in humans are to be studied.





In upcoming advancements in mRNA research and decreasing innate immune system of mRNA system have shown its significance in many applications of passive immunization or therapies for cancer and infectious diseases other than active vaccination. Directly comparing mRNA vaccine system clarifies that it is quite suitable for both active and passive immunization. This research imply that mRNA provides a safe, easy, and effective alternative to therapeutic antibody protein delivery.

The commercialization of bespoke good manufacturing practice (GMP) products by businesses like as New England Biolabs and Aldevron also facilitates the conversion of fundamental research into clinical testing. This worldwide public-private partnership hopes to generate \$1 billion to create platform-based vaccinations, such as mRNA, to quickly address new epidemics before they become uncontrollable.

The future of mRNA vaccines is thus presumed to be exceedingly bright, and the clinical data and resources offered by these firms and other research laboratories are anticipated to significantly expand on and energise fundamental research into mRNA-based vaccinations as treatment regimens.

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# How Genomics Can Revolutionize Healthcare

Pratham Gulati Ramjas College, Delhi University

Genomics is the study of structure, mapping, function and evolution of genomes which is the complete set of DNA in an organism. A complete human genome is composed of three billion base pairs of DNA that are arranged in a unique fashion to give us our basic anatomy and morphology including individual characteristics such as hair and skin colouration, height etc. Genes with the help of messenger molecules and enzymes direct the production of proteins. The proteins which are formed make up body structures such as tissues and organs, carry signals between cells and control various chemical reactions occurring in the body.



After the successful revolutions like green and white revolutions that have taken place in the past, genomics revolution is currently spreading its wings not in India but all across the globe. The genomic tests are heading as a major tool in the healthcare technology by aiding in the prevention and diagnosis of serious health concerns for any nation including diabetes, cancer and cardiovascular diseases. It provides for early diagnosis of these diseases which helps to chart out treatment options at earliest.

The COVID-19 pandemic showed a light towards genome sequencing wherein with the help of this technique researchers isolated the COV-2 VIRUS and an mRNA vaccine was produced by Moderna just in 60 days after the sequence being known to them. The researchers are showing an increasing interest in this field.

In the upcoming years healthcare will shift towards prevention than cure and genomics will surely prove to be a vital enabler in doing so. The Human Genome Project had discovered nearly 2,000 disease genes that are proving to be highly effective at providing fast and accurate analysis. While talking about the benefits of genomics in healthcare it can be said that genomics has had the most impact on cancer wherein the genetic sequencing of cancer tumours has helped in identifying particular cancers and also to understand how they are caused and what would kill them. Genomics is driving one more subfield towards human betterment known as pharmacogenomics. Various drugs act differently on different individuals depending upon their genes that influence the production of crucial enzymes in the liver that metabolize medicines. The presence of a genetic variation inhibits the enzymes from working properly which can lead to drug showcasing serious side effects on the body.



Fig 1: Timeline of research in the MHC and human genome

There are more than 250 drugs and many more to come which are labelled with pharmacogenomic information, enabling them to be prescribed according to a patient's genetics. Thus genome sequencing will not only lead to personalised medicine both from the diagnosis, prognosis and treatment perspective but would also fasten up and improve the drug discovery process.

The genomics promises a bright future seeing a steady progress in the growing, spreading and advancement of new and modern sequencing technologies. With increasing scientific temper and interest of youth and researchers in this field, right investments and timely government support will encourage our country to set new benchmarks in the genomics space putting the patients rather than the disease at the core of healthcare.

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# Nanotechnology Is The Art And Science Of Manipulating Matter At Nanoscale

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New emerging field of Nanobiotechnology is proving to have a remarkable impact in science and technology by using structural properties of the DNA.

Nano biotechnology is a combined form of two words, 'Nano' and 'Technology'. Nano is a Greek word which means dwarf i.e. one billionth(10<sup>-9</sup>) of a meter, and Technology means change and manipulation of scientific knowledge.



Nano biotechnology refers to the branch of science and engineering, which is devoted to designing, producing, and using structures, devices and system by manipulating atoms and molecules at nanoscale, i.e. having one or more dimensions of the order of 100 meters.

#### **General Applications :**

1. DNA Nanotechnology has allowed the DNA strands to be synthesized reactively in almost any possible sequence and length.

2. It allows to take benefit of the certain specific feature of nucleic acid like programmability, malfunctionability, as well as low purification and preparation acts.

3. The properties of DNA nanomaterial have led to incorporation into wide range of applications which range from cellular probes, drug delivery and also molecular imaging agents to electrochemical sensors and bio-analytical devices.

DNA is preferred for nanoscale construction, as the bindings between the two nucleic acid strand depends on the base pairing rules. This forms the nanoscale structure of the nucleic acid double helix. Such property is not present in the protein, therefore they lack the capability of nanoparticles.



#### **Designing of DNA nanostructures**

A DNA nanostructure should be designed in a way so that the individual nucleic acid strands will get assembled into the desired structures.

This starts with the identification of a desired target structure or function. Afterwards, the overall secondary structure of the target complex is determined which specifies the arrangement of nucleic acid strands and also at which position of the strand should be bound with each other.

The final step includes the primary structure design i.e. the actual base sequences of each nucleic acid strand.

The DNA material have been developed with a wide variety of these structures, which includes the 2D and 3D constructions.

Moreover, as per the various molecular binding styles of the functional DNA material, the construction of artificially synthesized DNA nanostructures contains single and multi layer nanostructures, which can also be in linear, circular and branched form.

The DNA origami techniques makes it very convenient for development of structural DNA technology. The progressive development of the DNA technology then breeds various novel DNA nanomaterials which are used widely including tissue engineering, immune engineering, drug delivering, disease diagnosis and also as tools for molecular biology or as biosensors too.

#### **Biological applications :**

The biological applications of different DNA and DNA based materials :

- 1. **Tissue engineering :** It is a cutting-edge field which study seeded cells, suitable physical and biochemical factors and other biocompatible material, combinations of all a 50 ml to promote the creation of tissue like structures.
- 2. Bone tissue engineering : In the skeletal tissue, the DNA nanostructures are used mainly to provide the adhesive scaffolds or to deliver some biological agents like poor penetration level and low stability. The main application of DNA nanostructure in bone tissue was gene therapy using plasmid DNA (pDNA).
- 3. Neural tissue engineering : In the recent decades, the biocompatible material have been largely employed to attain the regeneration and functional recover of injured neural tissue. Some synthesized nanomaterials can give mechanical support for the growing neurite and also inhibits the formation of scar tissue.
- 4. Skeletal muscle engineering : DNA based nanomaterials in some recent studies have been used for regenerating skeletal muscles and exerting protective effects from hypoxia injury of the cardiac muscles.
- 5. Skin tissue engineering : Some biomaterials when combined with DNA nanomaterials, they overcome shortcoming and enhance positive effects for the skin regeneration in different skin diseases.

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# Use Of Drone Technology In Healthcare

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#### **An Introduction to Drones**

Drones are small rotary winged aircrafts programmed to fly routes or can be controlled remotely. They consist of GPS sensors, are powered by lithium batteries and contain brushless motors that prolong the life of the aircraft. They can also be designed to carry small packages, which include communication devices and cameras.



They have a maximum range of 60 miles and can fly uninterrupted for an hour which enables them to reach isolated areas quickly. Drones, also called Unmanned Aerial vehicles (UAVs) have helped retailers around the world, who aim to use the technology for delivering packages at record speeds. These are now not only used for delivering goods and packages, but they are providing solutions in the medical world as well. As they can easily reach remote places with supplies that can save lives, medical drones are thought to be the disaster relief technology of the future.

They have made it possible for healthcare professionals and blood bank workers to save lives and enhance their medical services as well.

How can drones be helpful in healthcare?

Using drones, remote patients can receive more effective medical care.

In the coming future, small indoor drones would be able deliver to medicine to the bedside of a patient from the pharmacy. Medication administration would become faster and less prone to mistakes as a result. As supplies can be called to the patient's bedside rather than the time-consuming job of obtaining necessary materials, nurses and pharmacists can function more effectively.

To treat patients who are being cared for at home rather than in a hospital, drones could transport drugs and supplies. More hospital-based care will soon be replaced by outpatient and perhaps home-based care in the future. Drone technology may make it simpler and safer to deliver this at-home care for a variety of diseases. When a healthcare professional visits a patient at home, blood samples can be collected and sent right away by a drone to the lab for testing. Medications, antibiotics and treatments ordered by the provider may be delivered to the home using them. Dr Jeremy Tucker, vice president patient safety and regional medical director at MEP Health stated that human beings are going to rely on drone technology to give aid to health care and become cost efficient to people. Further he continued, covering longer paths at high speed for the transportation of blood and lab samples could be at advantage. For Example, Drones can prevent delay caused by the road accidents which gives an edge over road transportation. This technology might make it possible for more nursing home residents to get care at home for extended periods of time, increasing the independence of the ageing baby boomer generation. A drone might carry food to a person who is unable to cook their own meals or monitor a dementia sufferer who lives at home. We can envision drone Automated External Defibrillators (AED) that would fly to the patient in a public space to provide rapid defibrillation for ventricular fibrillation. It would no longer be necessary to quickly locate a specific site where AEDs might be purchased. People would be able to summon the AED with a smartphone app or the push of a button.

#### Use of drones for healthcare in other countries

- To reach rural hospitals and villages in countries like Taiwan and Nepal drones are used.
- Healthcare products such as condoms and birth control are delivered to women in Ghana using Drones.
- For transportation of sputum samples for diagnosis and testing of Tuberculosis in Papua New Guinea which is demonstrated by Medicines Sans Frontieres in 2014.
- Drones have proved to provide fast, cost effective access to important diagnostic laboratory tests as well.
- In most centres in the continent of Africa, it takes about 11 days to transport dried blood samples of babies to a lab from a healthcare facility for HIV testing and takes up to eight weeks to get the results. A project coordinated by UNICEF utilised helicopter-style drones created and programmed by Matternet in an effort to expedite HIV testing of infants.
- Zipline is able to sustain a "cold chain" in Rwanda by sending blood and medications to



far-flung places in a matter of hours. The drones deliver small supplies to hospitals by dropping them at extremely low altitudes. The supplies are dropped using simple paper parachutes. The drones return to a home base. They install a new battery and a new flight plan that is kept on a SIM card in order to get ready for the upcoming mission. Zipline has flown more than 300,000 km in Rwanda delivering 7000 units of blood in over 4000 flights not wasting a single unit of blood.

- After the 2012 Haitian earthquake, unmanned vehicles effectively distributed small relief supplies. They also assisted in humanitarian operations for gathering data and images where infrastructure was already missing or damaged, as in the Philippines following a storm in 2013.
- Tanzania declared in 2017 that it would modify the Zipline drone transportation system to increase access to basic medical goods and critical medications. More than 1,000 healthcare institutions and 10 million people are to be reached by up to 2,000 parcels per day flying across the nation.
- In Malawi in 2016, UNICEF and Matternet tried to employ drones to speed up HIV testing procedures.

#### The Indian scenario

In states that are extremely tough to go through geographically, drones could change the game. A pilot project is expected to commence in Pune and Nandurbar. The largest vaccine manufacturer in the world, Serum Institute of India will support the launch through a grant. A six-month trial programme called "Medicines from the Sky" that will begin in 2020 has been formalised by the Telangana government in conjunction with Apollo Hospitals and the World Economic Forum. The initiative seeks to investigate the use of drones to improve community access to healthcare throughout Telangana state.

Stated by Jyotiraditya Scindia, India's Minister for Civil Aviation that The nation can effectively use cutting-edge drone technology, as the Medicines from the Sky initiative has shown, to make sure that everyone has access to basic healthcare. We are optimistic that this initiative's later stages will normalise the use of drones in healthcare.

The Indian project, which drew inspiration from comparable efforts in Rwanda and Ghana, conducted more than 300 vaccine delivery experiments in very distant areas of Telangana, making it the first time ever in Asia that vaccinations were administered using drones outside of the optical spectrum. The trials served as the conclusion of efforts begun by India's Minister of Civil Aviation, Jyotiraditya Scindia.

Today healthcare organizations already are deploying mobile technology to solve industrial problems. Healthcare is changing as a result of the use of mobile devices, wearable technology, remote monitoring, telemedicine, and information sharing platforms to reduce variability, cost and error. In addition to being able to reach patients who need immediate medical attention within minutes, drones also make it possible to deliver blood, vaccines, birth control, snake bite serum, and other medical supplies to remote areas. In some cases, this could mean the difference between life and death for patients. They might transport medications inside hospital walls as well as blood between hospital structures. They can also provide elderly people with equipment to help them age in place. Hence , we can thus say that drones definitely prove to be a big help in healthcare.

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# Nanotechnology And Food Industry

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Nanotechnology is a field of science that deals with atoms, molecules, or macromolecules with the size of approximately 1–100 nm to create and use materials that have new and different characteristics. It is observed that these materials have unique properties unlike their macro-scale counterparts due to the high surface to volume



ratio and other novel physiochemical properties like color, solubility, strength, diffusivity, toxicity, magnetic, optical, thermodynamic, etc. Nanotechnology has brought new industrial revolution and both developed and developing countries are interested in investing more in this technology. Therefore, Nanotechnology offers a wide range of opportunities for the development and application of structures, materials, or system with new properties in various areas like agriculture, food, and medicine, etc.

The rising need for good health and good food quality are compelling researchers to look for new ways for enhancing food quality without compensating its nutritional values. The growing industry of nanotechnology has led to discovery of many nanoparticle based materials of essential elements that are non-toxic and are stable at high temperatures and pressures. The use of these particles provides a complete solution for food industry; from food processing to food packaging, ensuring safety and quality at every level. The applications of nanotechnology in food sector can be summarized in two main groups that are food nanostructured ingredients and food nano-sensing. The food ingredients with nanostructures are being created with the promise of better consistency, taste, and texture. The shelf-life of various food products is being extended through nanotechnology, and it has also helped reduce the amount of food that is wasted because of microbial contamination. Currently, food additives are delivered in food using nano-carriers without affecting their fundamental products morphology. Many solutions for boosting food quality and flavour are made available by nanotechnology. For the extremely reactive and unstable plant pigment anthocyanin's, which have a variety of biological activities, nanoencapsulation techniques have been widely employed to optimize and release retention and offer culinary balance. taste to By slowing down the processes of degradation or stopping degradation until the product is delivered at the target site, nanoencapsulation of these bioactive components extends the

shelf-life of functional foods where bioactive components frequently get degraded and ultimately led to inactivation due to the hostile environment. Additionally, the edible nanocoatings on different food components may operate as a barrier to moisture and gas exchange, transmit tastes, colors, enzymes, antioxidants, and anti-browning agents, and extend the shelfmanufactured meals after packaging life of even the has been opened. An ideal packing material must be strong, biodegradable, and gas and moisture permeable. Better packaging materials with improved mechanical strength, barrier properties, antimicrobial films, and nano-sensing for pathogen detection and alerting consumers to the safety status of food are just a few of the advantages that nano-based "smart" and "active" food packaging have over conventional packaging methods.

Nano-materials for use in biosensor construction offer a high level of sensitivity and other cutting-edge characteristics. Nano-sensors or nano-biosensors are used in food microbiology to quantify the components of food that are currently available, identify pathogens in food or processing plants, and notify distributors and consumers of the safety status of the food. The nano-sensor functions as an indicator that reacts to changes in environmental factors like humidity or temperature in storage rooms, microbial contamination, or the deterioration of items.

Although nanotechnology is opening up new doors on a daily basis, there are still many obstacles to overcome, chances to advance the state of the art, and concerns from consumers that must be addressed in order to allay their worries. The growth of nanotechnology in food systems should prioritize the transparency of safety concerns and environmental impact, therefore mandatory testing of nanofoods is necessary before they are put on the market.

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# GENESIS 2022

"Without change there is no innovation, creativity, or incentive for improvement. Those who initiate change will have a better opportunity to manage the change that is inevitable."

- William Pollard

# GENESIS - 2022

IMS School of biosciences conducted its 14<sup>th</sup> GENESIS Festival on 21<sup>st</sup> February, 2022. GENESIS 2022 was a virtual celebration of science and was open to all. The festival aimed to celebrate and explore science in every way possible by bringing together a diverse array of students to engage and inspire a wide-ranging audience.

The fest was inaugurated by our respected Director Sir Prof (Dr.) Ajay Kumar who lauded the collaborative effort of teachers, mentors and students.

Dr. Meenakshi Munshi Former Scientist G of Department of Biotechnology addressed the young minds on how to welcome success by maintaining certain protocols in life. The event concluded with vote of thanks by Dr. Surabhi Johari followed by opening ceremony by Dr. Umesh Kumar.

There was variety of competitions and contests for young students and science enthusiasts alike, such as Sciquest (for School XI and XII, Undergraduates), Instathink (science thinkers) with scientoon and Vblogs. The students from different regions of the country participated enthusiastically.







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Kyotos - 2022

# <u>Achievers</u>



Creative



"When the winds of change blow, some people build walls and others build windmills."

# Achievers



Inspire



"Innovation survives only when people believe in their own ideas."



# NATIONAL SCIENCE DAY 22

IMS Ghaziabad (University Courses Campus) https://www.imsuc.ac.in/



28<sup>TH</sup> FEBRUARY 2022

Kyotos - 2022

# NATIONAL SCIENCE DAY

### Discovery of Raman Effect:

National Science Day is celebrated to spread the message about the importance of science in the daily life of the people and how it is contributing to the society at large. Science is critical to tackle complex challenges for humanity such as climate change, biodiversity loss, pollution and poverty reduction, as it lays the foundation for new approaches and solutions. How can science best fulfill this commitment to society? Energy, medicine and health, clean air and water, transportation, sanitation, management use and conservation of natural resources -- all are based ultimately on science and technology. So, it is obvious that to be a part of that world, there must be science and technology elements in the development process.

School of Biosciences, IMS Ghaziabad (University Courses Campus) celebrated National Science day to commemorate the discovery of the 'Raman Effect' by the great Indian physicist Sir C V Raman on February 28, 1928.

In a world of unprecedented complexity, interdependence and opportunity to talk across boundaries, the discourse for the future will have to be led by the world's brightest minds in dialogue with youth. With this motivation School of Biosciences invited Dr. Suresh Kumar, **Professor**, **Department of Botany**, **Ramjas College**, **University of Delhi, to** address the students on the occasion of National Science Day as Chief guest.



# INSIGHT OF EVENT



# Women's Day Celebration - 2022

"Every man needs a woman when his life is a mess because just like the game of chess-the queen protects the king".

To celebrate International Women's Day, the Bionics Club in association with the School of Biosciences is organizing an activity – "BRILLIANT BRUSHES" with a theme – "Women of Substance".



# **DECODE THE PATHWAY**

"Life is a treasure hunt game, you have to solve the clues from the incidents that happened and move further to find the ultimate fortune"

Bionics Club, School of Biosciences arduously organized the activity 'DECODE THE PATHWAY' on 11 March 2022 from 2:30 pm onwards in the IMSUC Ground whose motive was to sharpen the mind of the students and to bring out the hidden detective inside them.





# National Water Day

"Nothing is softer or more flexible than water, yet nothing can resist it."

## NATIONAL WATER DAY - 2022

#### Groundwater – Making Invisible Visible

School of Biosciences, in association with IMS Greens Cell Organized a Small act for bigger impact on 30th March 2022 on the occasion of "World Water Day", where in the students from Biosciences participated in the act on the topic related to "Groundwater – Making Invisible Visible". It is celebrated to the highlight the importance of freshwater and to spread awareness about water conservation. Students from the School of Biosciences departments run a campaign, which aims to conserve rainwater and trigger the sense of how close scarcity of freshwater is soon. The event was concluded with a water pledge promising to conserve the water by the faculties and students.

Learning Outcome: The idea behind organizing this exciting event was to create social and environmental awareness among students. The event created the awareness among the students about the importance of groundwater for the healthy functioning of ecosystems and sustainable groundwater use, particularly in irrigation systems serviced from non-renewable aquifers.



Students ACT at World Water Day March, 2022



World Water Day Students Act March, 2022

Pledge to Save Water by faculties





Pledge to Save Water by students.

World Water Day campaign by students March 2022.



# Foundation Day & Induction Program

"If at first the idea is not absurd, then there is no hope for it."

- Albert Einstein

### PRE-INDUCTION PROGRAM

### Phoeníx ~ 2022

School of Biosciences of IMS Ghaziabad (University Courses Campus) organized a Pre-induction program "Phoenix 2022" for new entrants, B.Sc. (H) Biotechnology (batch 2022– 2025), B.Sc. (H) Microbiology (batch 2022– 2025) and M.Sc. Biotechnology (batch 2022– 2024) on 16<sup>th</sup>September, 2022 in the college. In this series a foundation week was also conducted and students are invited to take part in it, a new, specially-designed program of academic skill development activities and introduced them college level activities.

Different sessions were conducted like CRC, CDC, E CELL, ERP etc. The students were briefed regarding to the importance and role of bioscience in various fields and aware how the resources are helpful to build up our society. Students were also guided about team work in organization by sharing the practical examples. The sessions dealt with personality development, self-development, time management, mind control and focus attributes that are essential in every profession. The talk by eminent faculty members laid parallels on how such factors go hand in hand in shaping the lives of individuals captivated and inspired the students. The need to stay focused to channel a broader thought process while working hard and learning simultaneously was a definite take away from the new comers.



# Montreal Quiz 2022

220

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### MONTREAL QUIZ - 2022

### Global Cooperation Protecting Life on Earth:

School of Biosciences, in association with IMS Greens Cell, of IMS Ghaziabad (University Courses Campus) on 22nd September 2022 Thursday organized "Montreal-Quiz" on topics related to "Global Cooperation Protecting life on Earth!". The main objective of this event was to familiarize the students with the latest on-going threats ever to face humanity as a whole the depletion of the ozone layer. Students across all the courses participated in Montreal quiz with different QA and Audio visual rounds. It was fun-filled and exciting experience which acknowledged with emerging trends, innovative solution and many more global concerns to the environment. It was fun-filled and exciting experience, acknowledged with emerging trends, innovative solution and many more global concerns to the environment. Barsh and Nikita Arora students of Biosciences bagged winning position, Danish Vijj and Gunjan were first runner up and Prachi Shrivastav and Payal Sharma was the second runner up.

Learning Outcome: The idea behind organizing this exciting event was to sharpen student knowledge reading environment and to raise awareness about the Ozone depletion in our atmosphere. This will help them to articulate their thoughts in a better way.



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1<sup>sT</sup> Position Team receiving the trophy



Dasna, Uttar Pradesh, India Delhi, Hapur Rd, Dasna, Uttar Pradesh 201009, India Lat 28.680082° Long 77.50549° 22/09/22 03:14 PM

CPS Ma

### 2<sup>nd</sup> Position Team receiving the trophy





3<sup>rd</sup> Posítíon Team receíving the trophy

# **BIOTECHNOLOGY AND THE BIOTECH INDUSTRY**

Industrial Fisits



"What good is an idea if it remains an idea? Try. Experiment. Fail. Try again. Change the world." –Simon Sinek



## Yakult Danone India Pvt. Ltd, Sonipat

## Indian Pharmacopoeia Commission, Ghaziabad





## Melaground, IARI Campus, New Dehli

Indian Totash Ltd., Sakhoti Tanda, Meerut





Kyotos'22

# Amazing Scientific Facts

Today a Reader, Tomorrow a Leader



### Earth Is A Huge Magnet

The core of earth is filled with solid iron over which liquid iron is present. Temperature and density creates electric current which due to earths spin produce magnetic field, this field is used in compass needles worldwide

### Hawaii is Moving Toward Alaska

The tectonic plates in our earth's crust are in constant motion due to the currents in earth's upper mantel. The Pacific plates are slowly drifting towards North American plates with same pace as our or growing fingernail.





### Apples all around

There are so many varieties of apple that if you eat one each day then it will take 20 years to try them all.

Kyotos - 2022



The Eiffel Tower Size Change Every Season

When a metal is exposed to higher temperature shows **thermal expansion** leading to expansion and covers a larger volume. Eiffel tower also shows expansion by around 15~17 cm during summers and decrease in size during winter. For this purpose these large structure are made with joint expansion so that during summer they can expand without causing any damage to the structure.

In 2.3 billion years life will vanish on earth



According to some scientist our sun is becoming hotter day by day and with this pace in billions of years it will become so hot that our entire ocean will dry up and life will perish on earth and slowly our earth will become a dessert like Mars and after few more years sun will become so giant that it will engulf earth.









#### Across

4. - Submicroscopic infectious agents that replicate only inside living cells 9. - Bt seeds are associated with which variety **10.** - Centrifugation is a technique based on different 12. - Production of gametes by parents i.e. F1 and F2 can be understood using \_\_\_\_\_ square 13. - The first transgenic plant to be produced is 16. - The study of the emission spectrum or absorption spectrum is known as 17. - Glycerol and fatty acids together make up **19.** - The first hormone to be produced by genetic engineering was **20.** - Change in DNA is known as 21. - Basic physical and functional unit of heredity 22. - Plant Species with a wide range of genetic distribution evolve into a local population known as **23.** - Organic carbon compound in living call/tissue are 24. - Many levels of clone redundancy may be required to build a consensus map because individual clones can

have

### Down

 Which enzyme is used to join nicks in the DNA strand?
- a chronic condition where the body does not produce enough insulin
- The cell from which all other

cells which specialized function can be generated

5. - What is a Carbohydrate

**6.** - Protein, polysaccharides and nucleic acid are

7. - Feathery stigma occurs in

**8.** - What is a bioreactor do in a beverage industry

- **11.** DNA is packed into what
- **14.** Making multiple copies of the desired DNA templet is called
- 15. Insulin is made in which organ
- **18.** Genetic recombination causes