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Make Nature Beautiful Again.

School of Biosciences

Institute of Management Studies, Ghaziabad
University Course Campus

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Editor's Message

"The art of writing is the art of discovering what you believe...."

Gautave Flaubert

Dear Readers,

When we have superior to think out the box, colleagues who help us to find facts and reports and little stars like students who make sure you have what you want, we can recreate the world.

With the efforts of our whole team, We are really proud and exuberant to acclaim that we are ready to finally introduce our very own e-magazine....

The magazine delves into various branches of Biological Sciences from chaos of microbe world to orderly laws of gene editing. It also consists of horizon of information like Articles, Science facts, Quizzard, Achievements and events at School of Biosciences. We have put in relentless efforts to bring excellence to this treasure trove.

Helen Keller rightly said that the "World is moved along not only by the mighty shoves of its heroes, but also by the aggregate of the tiny pushes of each honest worker". This herculean task of editing this school magazine would not have been possible without the sincere support of the members of the Editorial Board.

It is a fine thing to have ability, but the ability to discover ability in others is the true test. I am really thankful to our respected Director ma'am for entrusting me with the responsibility of being a part of the Editorial Board.

I heartily endow all the readers my best wishes and hope this souvenir will enjoy your critical acclaim and prove itself as a vital role in exploring magical world of science.

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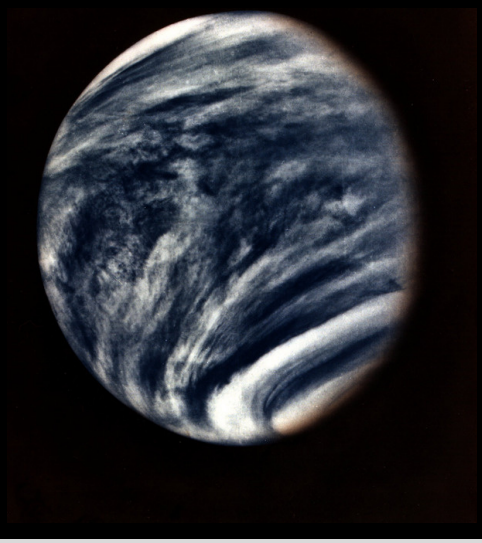
NATURE

CONTENT

AMAZING FACTS OF SCIENTIFIC WORLD



01 Venus is the solely planet to spin in clockwise direction

Our solar system started off as a whirling cloud of dirt and gas which eventually folded into a spinning disc with the Sun at its center. Due to this common origin, all the planets move round the Sun in the same direction and on roughly a similar plane. They conjointly all spin in the same direction (counterclockwise if observed from 'above') – except Uranus and Venus. Uranus spins on its side, whereasVenus spins in the exact opposite direction.

02 Some metals when exposed to airget oxidized instantly

Metals like Sodium, Potassium, Lithium, Rubidium and Caesium are terribly reactive and might even produce explosions when they get incontact with water.

03 Benefits of Rose

Rose helps in relieving abdomen pain, diarrhea and is also used in cancer treatment in folk medication. Rose hips are the fruits of roses (the berry-like fruit structure of rose) which are the richest source of Vitamin C, used for creating jams, jellies and also brewed for tea.

AMAZING FACTS OF SCIENTIFIC WORLD

04 *Bolitoglossa dofleini*

The Central American salamander Bolitoglossa dofleini can extend its tongue over more than half its body length in 7 milliseconds, 50 times faster than you can blink an eye.

05 Uses of Orchids

Substances isolated from orchids are utilizedin making perfumes, spices and in traditional Asian medication. Even Vanilla flavor is extracted from the pods of Vanila planifolia, which is a species of Orchid. A unique feature of Orchids is that they resemble with various recognizable figures, plants or animals.

06 At over 2,000 kilometers long, the Great Barrier Reef is the largest living structure on Earth

Coral reefs encompass huge numbers of individual coral polyps (soft-bodied, invertebrate animals) that are linked together by tissues. The Great Barrier Reef is an interlinked system of about 3,000 reefs and 900 coral islands divided by narrow passages, located just beneath the surface of the Coral Sea. Spanning over more than 2,000 km and covering an area of some 350,000 sq km, it is the largest living structure on Earth and the only one visible from space. However, this fragile coral colony is beginning to crumble, battered by the results of climate change, pollution, and manmade disasters.

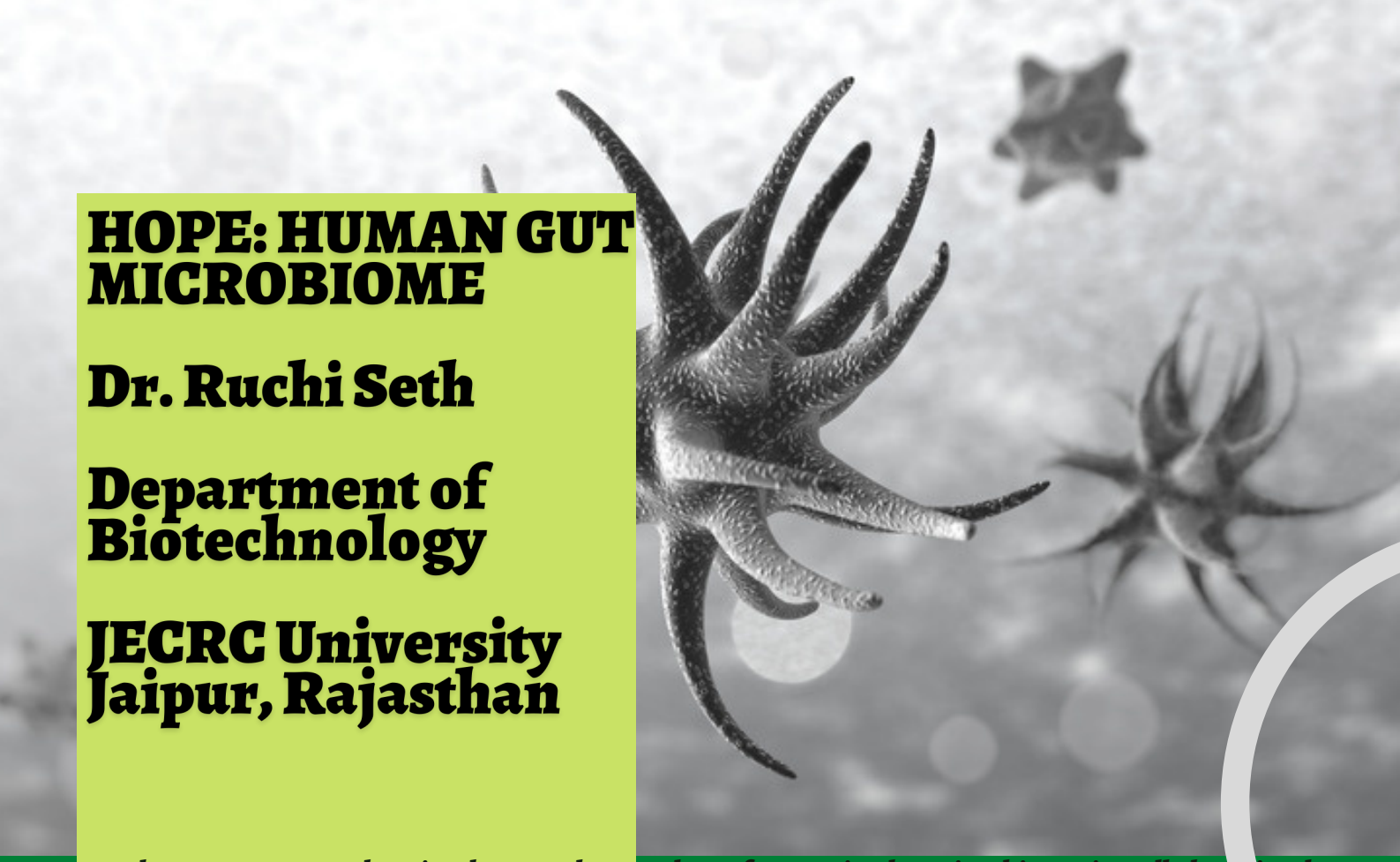
AMAZING FACTS OF SCIENTIFIC WORLD

BABY FACTS

When a baby is born, he or she has only one cup of blood in his/her body and one in every 2000 babies is born with a tooth or teeth.

Madonna Lily

Madonna lily was used in 17th century for treatment of snake bites and sore muscles. Its leaves and flowers used to make useful liniments to heal woundsand bruises. It helps in the treatment of depression and removing toxicity.



HOPE: HUMAN GUT MICROBIOME

Dr. Ruchi Seth

Department of Biotechnology

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We humans are mostly microbes, as the number of genes in the microbiome i.e. all the microbes - bacteria, fungi, protozoa and viruses - that live on and inside the human body is 200 times the number of genes in the human genome. The intestinal microbiota contributes to multiple physiological processes of the host, including metabolic and nutritional homeostasis, immunity, and neuronal activity (Lynch and Pederson, 2016).

The bacteria in the microbiome help digest our food, regulate our immune system, protect against other bacteria that cause disease, and produce vitamins including B vitamins B12, thiamine and riboflavin, and Vitamin K, which is needed for blood coagulation. In turn, the host provides a stable colonization niche for commensal microorganisms and ensures continuous influx of dietary nutrients. Technological advances in genome sequencing (metagenomics) and gnotobiotics (including the use of germ-free mice), have expanded the understanding of the interactions between the host and the microbiome over the last decade and have made the contribution of the microbiome to human health more apparent.

Microbiome plays an important role in the development and maintenance of local (Hooper et al., 2001; Levy et al., 2015) and systemic innate and adaptive immune function (Schirmer et al., 2016), enhancing metabolism, cancer resistance, endocrine signaling, and brain function. For instance, a variety of gut bacteria, including Bifidobacterium adolescentis and segmented filamentous bacteria, have been identified as key modulators of GI T helper 17 (Th17) cells (Ivanov et al., 2009; Tan et al., 2016; Geva-Zatorsky et al., 2017), instrumental in the maintenance of barrier function and protection against pathogenic microbes (Pandiyan et al., 2011; Wang et al., 2014). Clostridium species, including those belonging to clusters IV, XIVa, and XVIII, induce CD4+Foxp3+ T reg cells, via production of SCFAs (Atarashi et al., 2013; Sefik et al., 2015; Geva-Zatorsky et al., 2017). Surface polysaccharide A of Bacteroides fragilis has been shown to bind to Toll-like receptor 2 on dendritic cells (DCs), which then induce the production of the anti-inflammatory cytokine IL-10 by T reg cells (Dasgupta et al., 2014) and promote immune tolerance (An et al., 2014).

Aberrations in the composition and function of the intestinal microbiome are associated with the molecular etiology of multiple diseases. Perturbations of the gut microbiome such as loss of microbial diversity, particularly, depletion of specific bacteria, including Akkermansia and Faecalibacterium, responsible to promote immune tolerance (Sokol et al., 2008; Schneeberger et al., 2015; Rossi et al., 2016; Ottman et al., 2017) results in immune dysfunction. Accumulation of disease-causing microbes over time, change in gene activity and metabolic processes results in an abnormal immune response against substances and tissues normally present in the body.

A number of factors are responsible for loss of microbial diversity and homeostatic function, such as infection, inflammation, diet, xenobiotics, hygiene, and altered host genetics (Levy et al., 2017). As microbiome plays a crucial role in maintaining host immune system, various strategies can be formulated which target the gut microbiota to manage or prevent chronic diseases. The approaches to modify gut microbiota generally focus on depleting overabundant members or overall microbial load using antibiotics or antifungal agents, modulation through diet manipulation, or supplementation with live microbes (single or mixed species).
In recent times one of the strategy, fecal microbial transplantation (FMT) has been used in a range of infectious, neurological, and GI conditions, with promising outcomes..

In this technique a solution of fecal matter from a donor is administered into the intestinal tract of a recipient in order to directly change the recipient's microbial composition and confer a health benefit (Bakken et al. 2011; Smits et al. 2013). The process usually involves first selecting a donor without a family history of autoimmune, metabolic, and malignant diseases and screening for any potential pathogens. The feces are then prepared by mixing with water or normal saline, followed by a filtration step to remove any particulate matter.

The mixture can be administered through a nasogastric tube, nasojejunal tube, esophagogastroduodenoscopy, colonoscopy, or retention enema. Although antimicrobial drugs are not generally considered appropriate for long-term management of chronic conditions, given the need for repeat dosing and concerns about emergence of antimicrobial resistance, early data indicate that administration of antimicrobial drugs, as a means to perturb pathogenic microbiomes before FMT or microbial supplementation, enhances engraftment of beneficial species and improves treatment efficacy (Keshteli et al., 2017). Although the field is still nascent, it is already clear that a broad range of microbial species and their associated products modulate discrete features of host defense, which offers a novel opportunity for microbial-based approaches for prevention or treatment of diseases.

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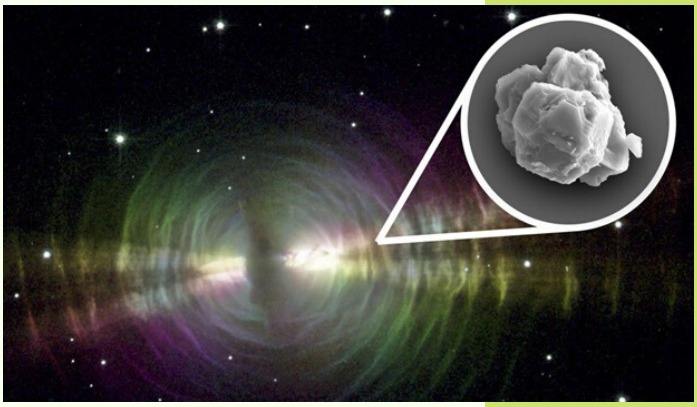
SCIENCE RECORDS BROKEN IN 2020



Oldest material on Earth

The Stardust that hit earth 7 billion years ago, became one of the oldest material found on the planet. The ancient dust , made up of grains that are older than the sun, was sent out into the universe by dying stars.
This stardust eventually arrived on our planet by riding on the Murchison meteorite, which fell in Australia in 1969.
This is the first time that researchers have discovered grains that predate the sun in earth's rocks.
In the new study, researchers analyzed grains from Murchison, grinding up small bits of the meteorite and adding acid, a method that dissolves minerals and silicates, leaving behind the presolar grains. The findings were published on Jan 13in the journal Proceedings of the National Academy of Sciences.

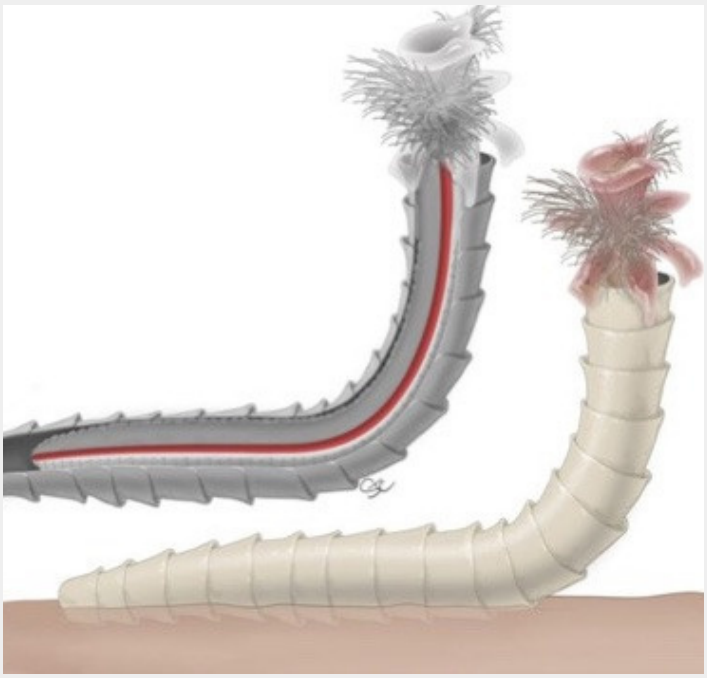
Oldest sperm

Scientists discovered the world's oldest known sperminside a disc of amber found in a mine in northern Myanmar.

The amber held 39 tiny ostracods, a type of crustacean; of which 31 belonged to a newly discovered speciesknown as Myanmarcypris hui.Researchers discovered four eggs and a spaghetti-like mass that turned out to be a 100 million-year-oldsperm, inside one of the adult females of M. hui.

Prior to this discovery, the oldest sperm was 50 million years old and was discovered from a worm cocoon in Antarctica. The findings were published on Sept 16 in the journal Proceedings of the Royal Academy B.

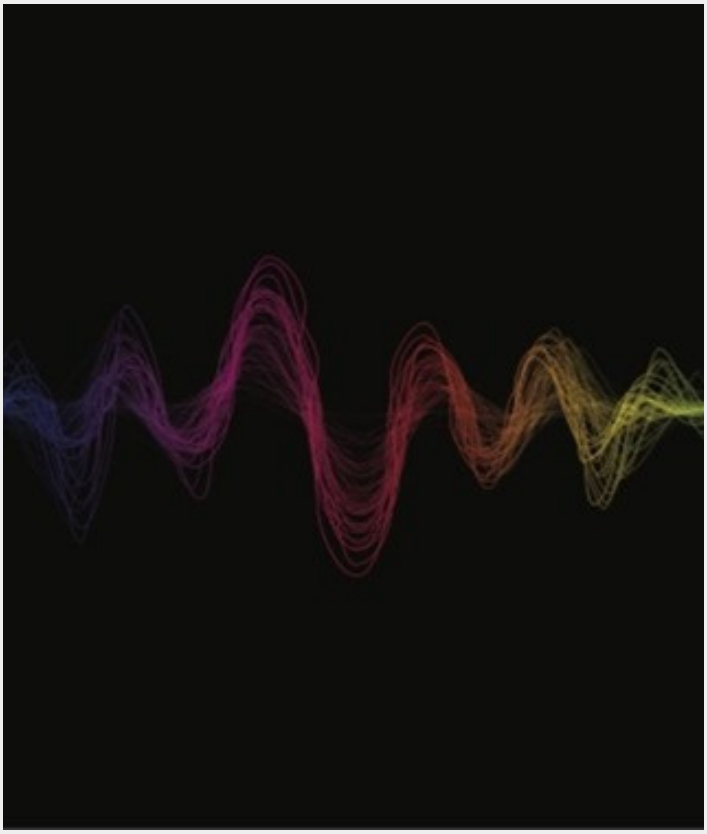
SCIENCE RECORDS BROKEN IN 2020



OLDEST GUTS EVER FOUND

Scientists haveidentified guts, which are about 30 million years older than previous record. They were found in fossilizedform in Nye County, Nevada, that are between 550 million and 539 million years old. Theybelong to little tube like living things called cloudinomorphs.

Through this gut, the scientists tried to analyze the hypotheses of cloudinomorphs, in which it was discussed that they wereeither cnidarians (coral) or annelids (tube worm). According to scientists, the shape and tissuesof this organism look like a tube hence it is following the worm hypothesis. The findings were published Jan 10 in the journal Nature Communications.



FASTEST SPEED OF SOUND

Ever wondered how fast can sound travel? Scientists have finally figured out the fastest possible speed of sound in any medium that is 22 miles per second (36 km/s). Sound can travel at different speeds depending on whatever material it istraveling through; for example, sound travels faster in warmer liquids compared to cooler ones. It also travels at different speeds in solids ,liquids and gases.

Calculationshave suggested that sound travels the fastest in the lowest-mass atoms. So to find out the maximum speed that sound can travel, a group of researchers calculated the speed of sound using a solid atom of hydrogen. Hydrogen is the lowest-mass atom but isn't solid, unless it is under immense pressure which is a million times stronger than Earth's atmosphere. In this condition, the researchers found that sound can travel close to its theoretical limit of 79,200 mph (127,460 km/h). The findings were published on Oct 9 in the journal Science Advances.

NEXT GENERATION COMPUTING (NGC)

NEXT GENERATION COMPUTING IN BIOTECH AND HEALTHCARE

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Next Generation computing is the integration of machine learning (ML), Artificial Intelligence (AI) and robotic technologies in developing tools for solving real world problems. This new wave of advanced computing is already here and is actively empowering decision making in business forecast, diagnosing diseases, developing driver less cars and making smart homes or offices etc. Artificial intelligence in computer science is termed as a technology which provides intelligence to computer system to make decisions like human brain. Machine learning is a mode through which computer systems are trained to gain artificial intelligence by learning and adapting from multiple scenarios. On acquiring AI computers will be able to solve real life problem “Smartly”.

ROLE IN BIOTECH AND HEALTHCARE INDUSTRIES

Biotech and Healthcare industries are the producers of high volume of data since the inception of molecular biology in 1970s. The power of sequencing whole genomes of the organisms since 1990s further rocketed the production of data or Biological Big Data. In order to analyze biological big data in the form of DNA sequences, protein sequences or protein structure in such a way that it can provide a faster and accurate answers AI and ML are the technologies preferred by developers and innovators. The demand of faster results out of the complex systems can be better understood by the example of ongoing corona pandemic, since January 2020 all eyes were on Molecular Biologists or on Biotech sector to provide faster vaccines or drugs to world’s population. The next generation computing empowered with AI, ML and Robotic is catering such current requirement of researchers for in their R&D and in discovering new regimes in faster and cost-effective way than previously.

Biotech starts up, industry leaders are joining hands with IT experts or companies to develop tools for analyzing, interpreting and getting insight of biological big data present in heterogeneous and complex format (clinical test images, whole genome, disease associated SNPs etc) for escalating innovations.

LATEST NGC INNOVATIONS

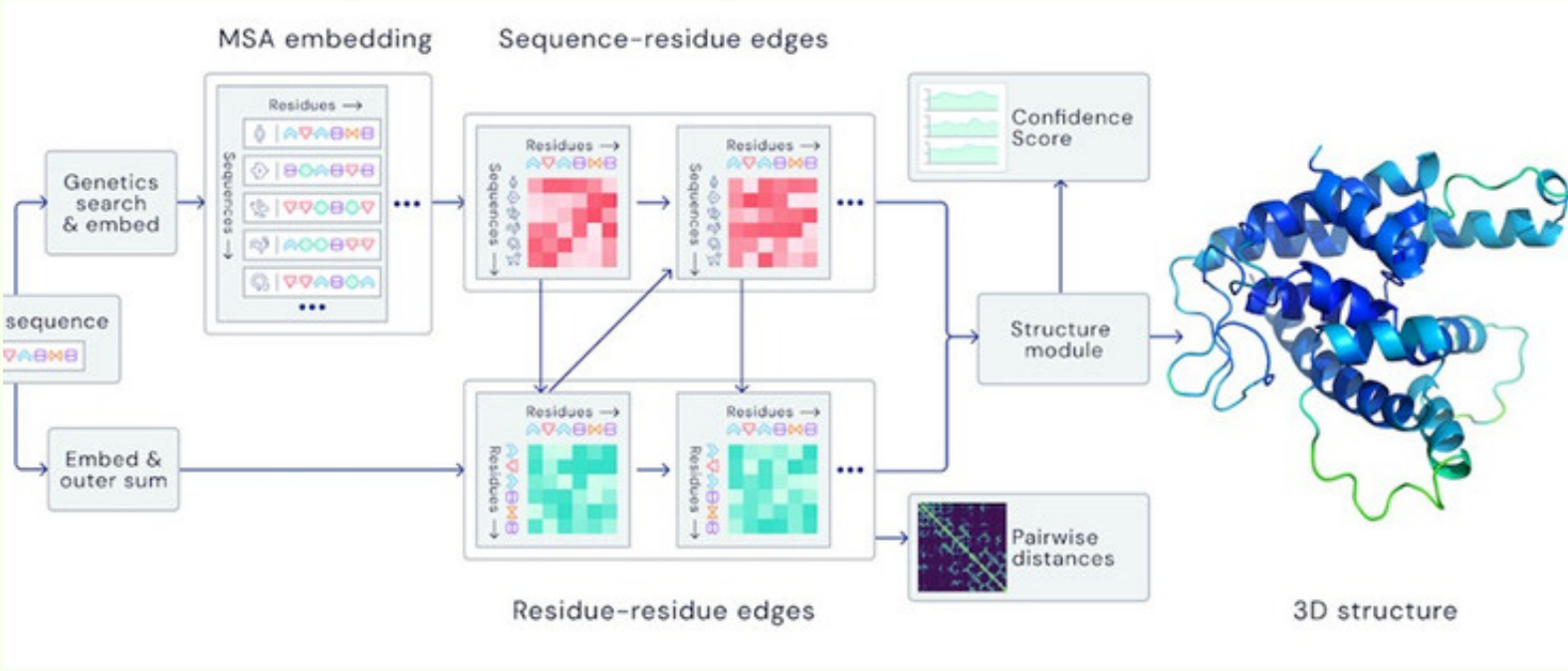

Figure 1: AlphaFold working diagram from AlphaFold blogpost (https://deepmind.com/blog/article/alphafold-a-solution-to-a-50-year-old-grand-challenge-in-biology)

ALPHAFOLDS

In a ground-breaking innovation. DeepMind a London based AI company developed AlphaFold system to predict 3D structure of protein with a considerable accuracy (Fig.-1). This innovation may help in predicting the function of proteins which do not have a homologue with 3D structure [1].

The impact of this innovation in shaping the future of drug discovery, could be estimated by a comment from Professor Andrei Lupas, Director of the Max Planck Institute for Developmental Biology and a CASP assessor as mentioned in AlphaFold blog "AlphaFold's astonishingly accurate models have allowed us to solve a protein structure we were stuck on for close to a decade, relaunching our effort to understand how signals are transmitted across cell membranes."

This discovery has further raised the hope of getting a solution of finding AI and ML based solution to age old problems of molecular biology like how multiple proteins are folding to form a complex and how proteins are interacting with DNA, RNA or small molecules.

OPTIVAX

Moderna, Cambridge based institute developed their COVID-19 vaccine candidate mRNA-1273 using OptiVax. OptiVax is a combinatorial machine learning system (Fig.-2) to evaluate and enhance existing candidate as well as to design new peptides and is developed by Computer Science and AI Lab at MIT [2].

NGC: OPENING NEW AVENUES FOR BIOLOGICAL SCIENCE STUDENTS

On advancement of research and development methods using AI and ML Biotech and Health care industries will look forward for those biology experts who can understand the IT perspective of the research. The IT understanding ability of the candidate will enhance a smooth, faster and accurate system of project delivery.

BIOLOGICAL SCIENCE STUDENT FIRST STEP TOWARDS THE NGC BASED JOB OPPERTUNITIES

Several AI based tech companies providing biotech and health care solutions are looking for Data Scientist, Scientific Managers, Data Analyst, Data Scientist who are subject experts as well as have programming skills. Programming skills are required for development of AI/ ML based tools as well as for the execution. Learning powerful programming languages like Python or R will equipped biological science student to bridge the gap and open the door for new possibilities. In addition to programming skills a good understanding of statistics will be an added advantage for the perspective candidate to get better chances as compare to their counter parts.

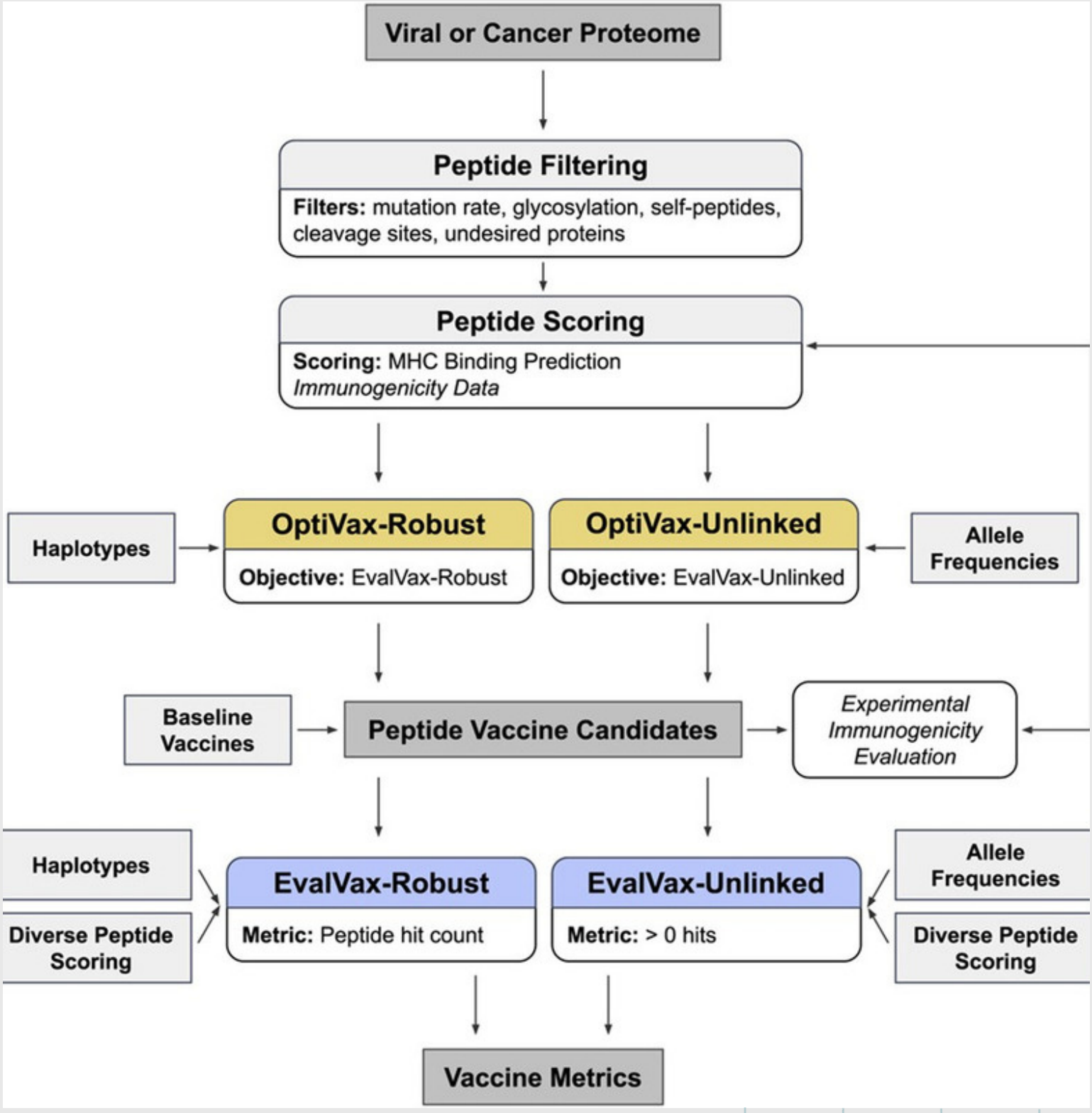

Figure 2: Graphical Abstract of Combinatorial machine learning method of OptiVax published in Cell System [2]

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BIONICS CLUB

To imbibe a true spirit of learning and competition amongst students, Bionics Club was organized the event ‘CRACK ‘N’ GRAB’ to ignite the spark of brains, boost up confidence, think out of the box.

The activity was open to all courses in which 72 students were participated. The Activity was an extempore with basic science titles in which participants had to select the topic and then had to sort out the right components from chits kept under the cups, related and accurate according to the selected topic within a timeframe of 60 seconds. Every participant was given one minute precisely to prepare the speech on the topic allotted at that moment. The judgment has taken based on the content, confidence, oratory skills and diction. It was indeed amazing to see how confidently students had put their thoughts, insights, humor and delivered the speech. The winners were selected based on their skills with zeal and enthusiasm. The manner in which the students presented their thoughts and opinions was commendable and praiseworthy.
THE JOURN

THE JOURNAL CLUB

School of Biosciences, IMS Ghaziabad University Courses organized a "Journal Club" meeting based on Research Paper Presentation by the students pursuing Specialization of Agriculture Biotechnology on 15th January 2021, Friday. Main agenda of this club is to enhance the research paper reading and paper presentation among graduate and post graduate students with special reference to scientific literature.

Dr. Hemlata Srivastava discussed in her presentation about history, benefits and advantages of "The Journal Club" for research learners in the field of Biotechnology & Microbiology and students of B. Sc. (H) Biotechology Divya Badoni, Nikita Arora, Yashda Singh, and Bharti Singhal have presented their reviews on selected research papers and discussed about the various aspects of biofortification, salt stress and plant derived edible vaccine against Hepatitis-B viruses and vermicomposting.

A second "Journal Club (JC_02)" meeting based on Research Paper Presentation by the IMS students was organized on 17th January 2021, Wednesday. The theme of "JC-02" meeting was "Disease biology". The primary goal of this club activity was to motivate the college students in the direction of research and development. In this respect, it is an endeavor to enhance the understanding and presentation of scientific literature and research papersthrough this club activity which is a major part of academics. Students of B. Sc. (Ist year) Biotechology, Nidhi Mishra, Janvi Sharma, Stayam Bathla and Bhupender Sahu have presented their reviews on selected research papers related to disease biology and discussed about the various disease that are spreading at international level such as Cancer, Fatal Familial Insomnia (FFI), African swine fever and hair greying problems due to stress. They have elucidated the present scenario and future effect of these diseases. They have also discussed the ongoing research work on the vaccine against these diseases and explained the efficient information in this context.

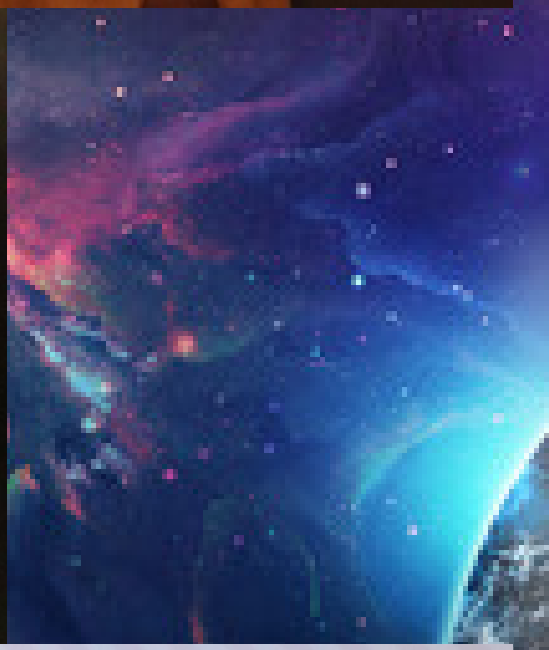
NATIONAL SCIENCE DAY

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. This creates an opportunity to showcase the activities, efforts and achievements in the field of science for human welfare. School of Biosciences, IMS Ghaziabad (University Courses Campus) celebrated National Science day on 25thFebruary 2021, to commemorate the discovery of the 'Raman Effect' by the great Indian physicist, Sir C V Raman. Dr. Samar Husain Naqvi, Head, R&D and Productions, Genetix Biotech Asia (P) Ltd. was the guest for the day, during his session he emphasized the importance of innovations in science and technology with the aspect of current changing technological world, he highlighted the recent innovations carried out by his organization. He also discussed the importance of soft and hard skills in life science industry in current prospects.

Theme of National Science Day Celebration 2021 was declared as "Future of Science, Technology & Innovation: Impacts on Education, Skills and Work". This year's theme highlights the importance of Science, Technology and innovation in economic and social development of a country. Keeping the theme in mind, School of Biosciences organized Open forum on "Frugal Innovation". Students presented path breaking Indian innovations such as solar power-heated military tent and artificial glaciers developed by Sonam Wangchuk, mitti cool, electric cycle etc. Muskan Garg, Bhupender Sahu and Kanishka Jasaul secured winning positions. Suraj Singh Bisht, Kashish Tomar, Bhavya Sharma and Satyam Bathla received consolations prizes.

Participation of society in such celebrations develops scientific temperament in the public and also the sense of responsibility and belongingness towards nation.


Post pandemic career opportunities
IMS




PRESENTS
Guest Lecture

CLIMA QUIZ

School of Biosciences in association with, IMS Greens organized an event “Clima-Quiz” based on the theme “Impact of global temperature change and planet EARTH!” on 15th February. The main objective of this event was to test the student’s knowledge and to familiarize them with the latest on-going global temperature changes and its effects.
Students across all the courses participated in Clima Quiz. It was fun-filled and exciting experience which acknowledged with emerging trends, innovative solution and many more global concerns to the environment. It was really appreciable that new entrants of session 2020-23 students, Anurag Rawal & Atul Yadav of B.Sc. Microbiology, Sumit Yadav & Megha Chaudhary of BCA and Kajal Sirohi & Anushka Kailkhura of B.Sc. Biotechnology secured three winning categories respectively.

International Women's Day

International Women's Day is celebrated world over, every year on the eight day of March. It celebrates womanhood and pays tribute to the indomitable spirit of women across the globe. This day brings many things for women – a cause for celebration, a reason to pause and re-evaluate a remembrance, an inspiration and a time to honour, loved and admired. To honor womanhood, School of Biosciences in association with IMS Cares and Women cell, Institute of Management studies, Ghaziabad (University Courses Campus) celebrated the International Women's Day on Monday, 8th March, 2021.International Women's Day is a global day celebrating the social, economic, cultural and political achievements of women. The day also marks a call to action for Women's health. Today's woman is multi-faceted; who takes care of the family as well as her aspirations. There are times when she falls prey to lifestyle diseases. Women health problems are on the rise partly because of a constant race against time and partly due to sheer ignorance. Dr.NeeraBhan, Consultant – Obstetrics &Gynecology was the guest of the day. Dr. Bhan delivered a talk on Women's Health, "Care for Today, Cure for Tomorrow", wherein she highlighted that for women, healthy aging depends largely on healthy living that includes eating a healthy diet, staying active, and having regular health screenings. The session was very interactive and emphasized the importance of body image to overall health.

World Water Day

World Water Day is held annually on 22 March as a means of focusing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources. The theme of World Water Day 2021 was valuing water.

On this occasion, School of Biosciences in association with IMS Greens, Institute of Management Studies, Ghaziabad (University Courses Campus) organised an awareness campaign on "Conserve Water, Conserve Life".The Campaign was conducted on the bank of Hindon river, Ghaziabad. Students under the guidance of faculty member addressed the local community living in the area and expressed their concern over water and sanitation issues and suggested community women how to keep the water safe, and also focused on the use of toilet that is necessary in present day society to make the environment clean. They suggested to keep the livestock away from home to maintain hygiene conditions. This small gathering ventilated the key messages and highlighted issues of water and sanitation and issues related to climate change and survival of well-being.

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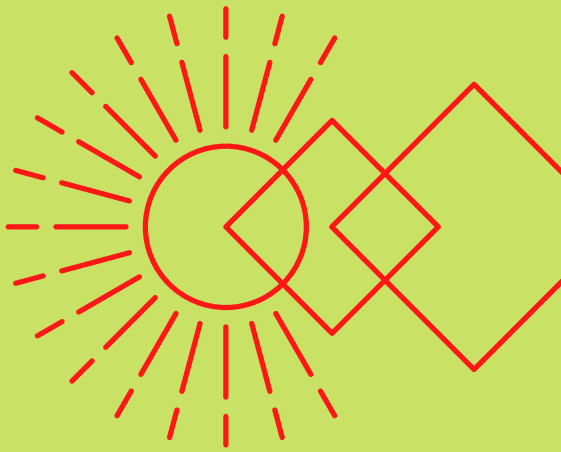
EARTH DAY

Every April 22, we celebrate Earth Day! founded by Senator Gaylord Nelson. Earth Day was first organized in 1970 to promote ecology and raise awareness of the growing problems of air, water, and soil pollution. School of Biosciences in association with IMS Greens is organizing an Article writing competition on "Restore Our Earth" to mark the 51st anniversary of this day, appreciating and respecting the natural world.

Our Achievers



- **Ashish Vats & Suraj Singh Bisht was winner in "SCIENTOFABIO QUEST- A National Level Science Quiz" organized by NSS Unit & EBSB Club in association with student council JECRC University Jaipur on the occasion of National Science Day on 26th Feb 2021.**

- **Janvi Sharma & Diksha Sharma was runner-up winner in "SCIENTOFABIO QUEST- A National Level Science Quiz" organized by NSS Unit & EBSB Club in association with student council JECRC University Jaipur on the occasion of National Science Day on 26thFeb 2021.**

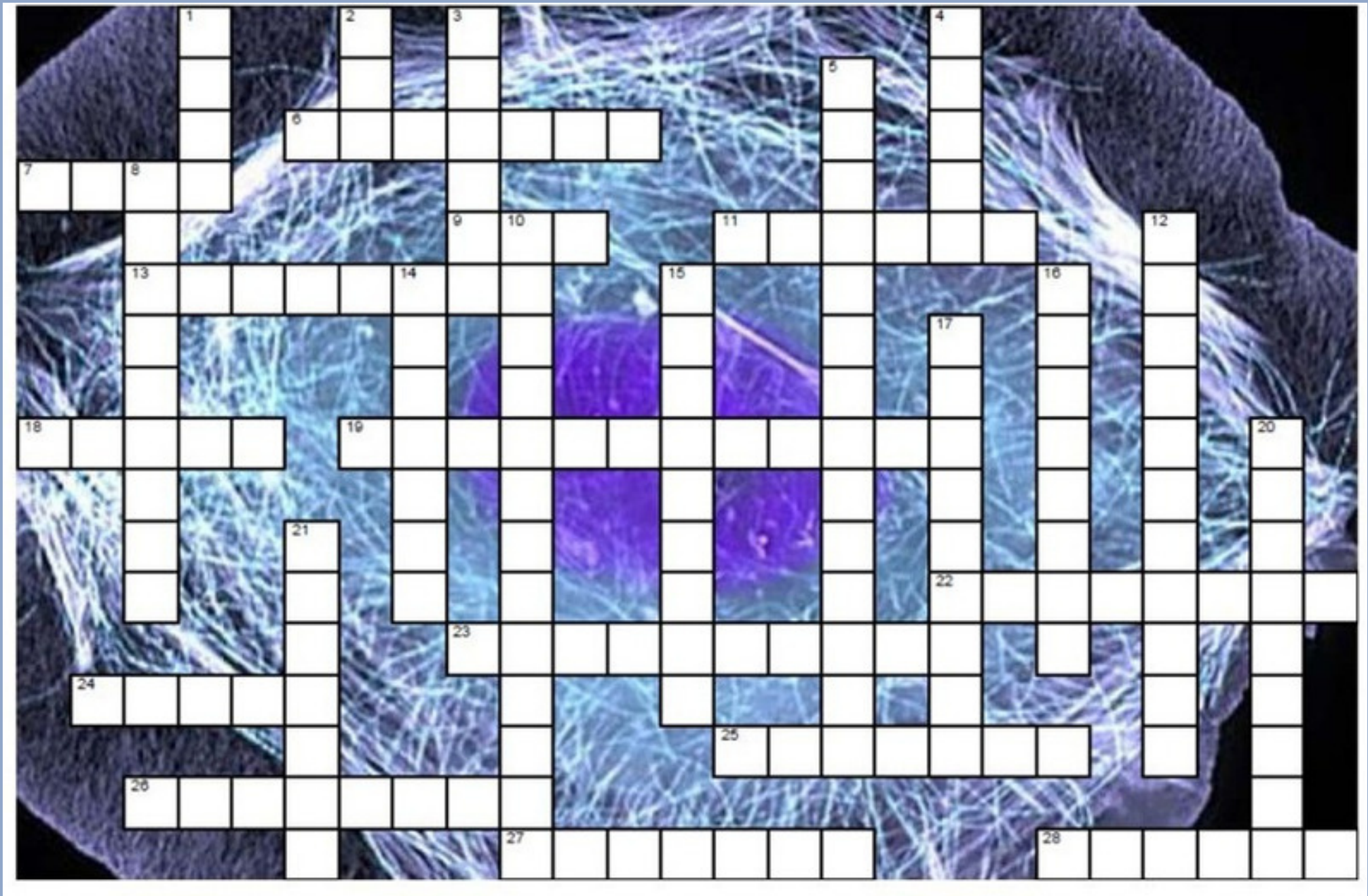
Findings: The Last Word

Across ▶

6. Reduce, reuse...
7. A nerve's long stem.
9. Makes our tissues gooey or stiff.
11. Preventing cell death in the_might help treat eye diseases.
13. Leading cause of blindness.
18. Enrique De La Cruz studies how actinfilaments.
19. Cellular power plants.
22. Most powerful type of microscope.
23. Study of proteins.
24. Rebecca Heald's favorite researchorganism.
25. Sugary molecules.
26. Complete collection of lipids.
27. Separates paired chromosomesduring cell division.
28. In amphibians, body size correlateswith size.

Down ▼

1. Ouch!
2. Scientists use fluorescent ones tocolor-code molecules.
3. Really cool microscopy technique.
4. Forms filaments that allow cells tomove, contract and keep theirshape.
5. A whole new world.
8. Component of the cell.
10. Long chains of sugar molecules.
12. Induce unconsciousness.
14. Microscope that uses light.
15. Very small unit.
16. Most abundant protein in our bodies.
17. Inability to feel pain
20. Stuff inside a cell, minus theorganelles.
21. Really stretchy protein.



Answer Key

Across ▶

6. RECYCLE
7. AXON
9. ECM
11. RETINA
13. GLAUCOMA
18. BREAK
19. MITOCHONDRIA
22. ELECTRON
23. PROTEOMICS
24. FROGS
25. GLYCANS
26. LIPIDOME
27. SPINDLE
28. GENOME

Down ▼

1. PAIN
2. DYE
3. CRYOEM
4. ACTIN
5. VIRTUAL REALITY
8. ORGANELLE
10. CARBOHYDRATES
12. ANESTHETICS
14. OPTICAL
15. NANOMETER
16. COLLAGEN
17. ANALGESIA
20. CYTOPLASM
21. ELASTIN