

THE BIOSCOPE

Department of Biosciences

INTEGRAL UNIVERSITY, LUCKNOW

• Recent Discoveries

Articles covering recent breakthroughs in science

• Students' Zone

Creative scientific writings, student accomplishments and sci-art

• Departmental Activities

Interview, reports and orientation

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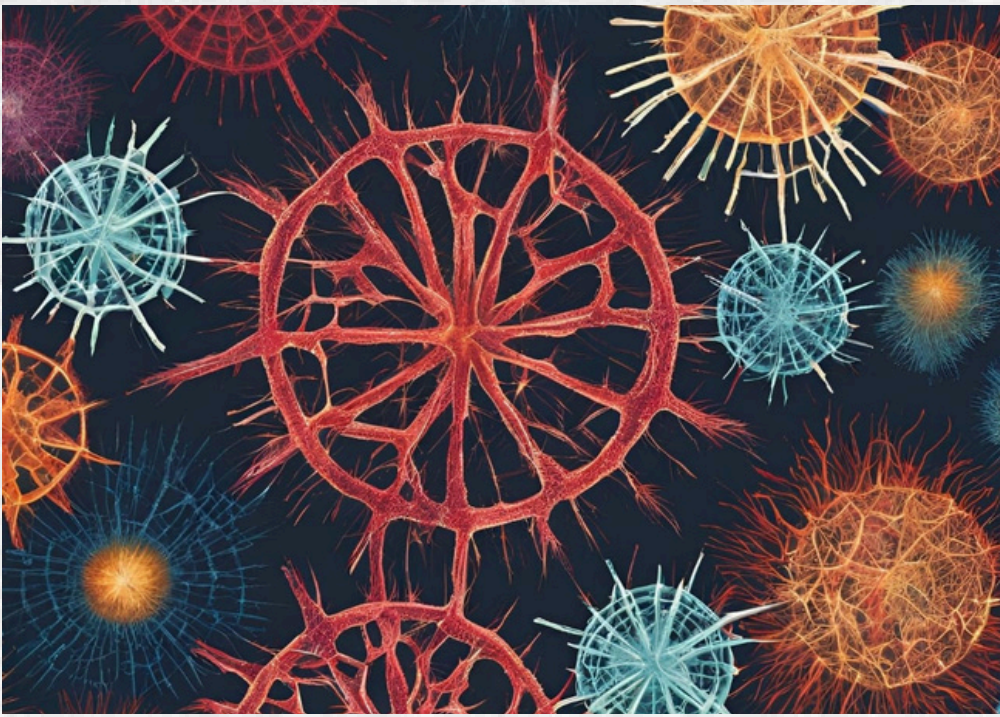
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SCIENTIFIC *News*

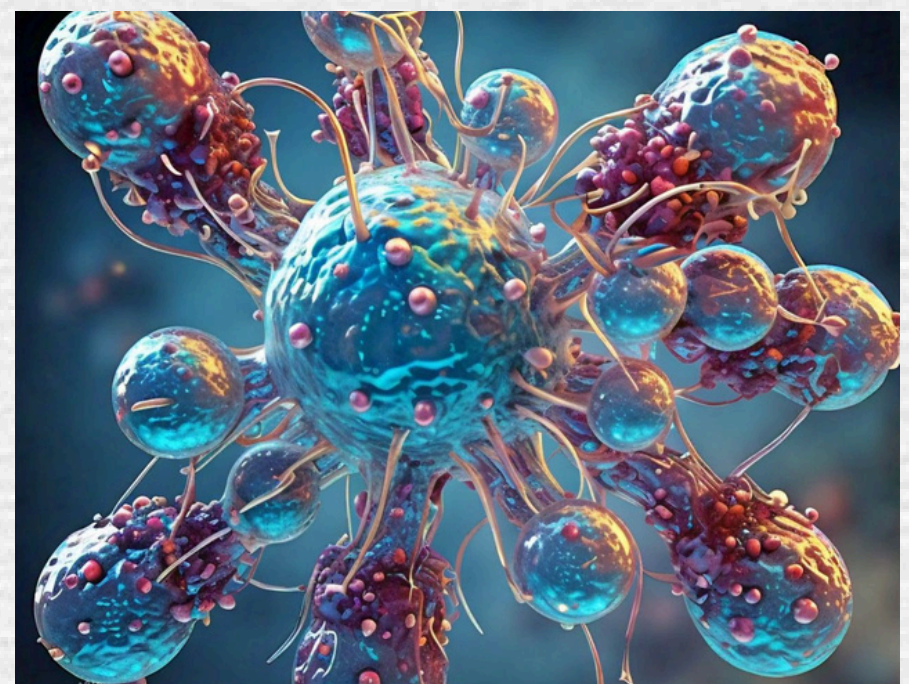
1. VECTOR TAKES CHARGE TO STAMP OUT DUCHENNE MUSCULAR DYSTROPHY



According to the latest findings published in Nature, scientists at the University of Washington School of Medicine have discovered a new gene therapy treatment for the inheriting genetic disease Duchenne Muscular Dystrophy. The therapy has the potential to arrest the decline of muscles. This is done by adding the protein packets that code for dystrophin and consequently replacing the defective DMD genes within the muscles. As the cure is still not developed and the available drugs only slow down the disease, this new method discovered by Dr. Jeffery Chamberlain and Dr. Hichem Tasfaout uses a series of Adeno-associated viral vectors as small shuttles to deliver genes into the cell as done successfully on mouse models. As the dystrophin gene is one of the enormous genes, the series of AAVs take the parts of the genes inside the muscle. The latest approach may reduce or even eliminate the progression of disease and can even restore the health of muscle tissues.

<https://www.sciencedaily.com/releases/2024/07/240717120903.htm>

2. LLAMA NANOBOODIES BECOME A GAME CHANGER IN HIV IMMUNITY



A discovery in developing immunity against HIV is that Llama nanobodies can end up neutralizing strains of the HIV-1 virus. Scientists have been working on animals belonging to the camel family for the past 15 years because the shape of their antibodies is more effective at identifying the HIV virus. This research was first published in the Advance Science Journal on 17th July 2024, led by Jianliang Xu, Assistant Professor of Biology. This process of discovery was conducted at Georgia State University by various scientists. The process included the stimulation of llamas to produce antibodies, and then Xu and his team recognized the antibodies that were capable of targeting virus sites that also work against the strains of HIV-1. They came out to be 96 per cent successful at their action. Nanobodies are the recombinant domains of a heavy chain of antibodies. Now scientists are looking for a 100 percent success rate by combining these Nanobodies with other effective antibodies.

<https://theprint.in/scientifx/llama-nanobodies-can-target-hiv-1-strains-sun-starts-next-solar-cycle-halfway-throught-current-one/2184015/>

3. EUKARYOTIC GENOME- A SHELTER TO ANCIENT VIRAL GENOME



According to the study published in Science Advances, the researchers at Queen Mary University, London, found the remnants of ancient giant viruses in the genome of a microbe called *Amoebidium appalachense*, a freshwater unicellular parasite. The research offers a hint regarding the interconnection of the complex organism and virus and their relationship as an intruder and host. Although the insertion is highly varied and an ongoing process. During the research led by Dr. Alex de Mendoza Soler, the genome of the parasite was analyzed. They found out that plenty of genetic material was linked with that of the giant viruses. Now the question arises whether these viral insertions harm the parasite. The answer is no, as the genes of amoebidium chemically silence the viral genes. These viral remnants are found in humans, forming 8% of the total genome. These are the parts of endogenous retroviruses and play a role in human disease and development

<https://www.sciencedaily.com/releases/2024/07/240722155152.htm>

4. TURNING BACK TIME: INTERLEUKIN 11'S ANTI-AGING POTENTIAL REVEALED



The scientists have found out the effect of interleukin 11 protein. They noted that the healthy life span of mice was increased by 20% which has il 11 deleted. They noticed that the 75-week-old mice equivalent to 55 years in humans when treated with anti-IL11 antibodies until death expanded their median lifespan by 22.4% in males and 25% in females. These exciting results of scientists at the Medical Research Council Laboratory of Medical Science and Imperial College London were published in Nature. This also showed effects on reducing the diseases caused by fibrosis, chronic inflammation, and poor metabolism in addition to reducing the death rate from cancer in animals. The best part was that it showed very few side effects. This can be a milestone for anti-ageing drugs as previously designed drugs showed high side effects, were inefficient for both sexes and were unable to increase the healthy life span.

<https://www.sciencedaily.com/releases/2024/07/240717120907.htm>

5. MUSCLE REBORN: THE REGENERATION REVOLUTION



Skeletal muscles are concerned with the very core functions of life. They are involved in breathing, sitting, blinking, and many other functions. The fusion of specialized cells called myoblast results in the formation of skeletal muscles during embryonic development. In adults, satellite cells or muscle stem cells aid in maintaining the regeneration of skeletal muscles. The researchers at the University of Houston College of Pharmacy have discovered that a key signalling protein Inositol Requiring Enzyme1 is crucial for myoblast fusion. Ire1 reports to improve the activity of x-box binding protein1, which sequentially stimulates the gene expression of various transmembrane proteins for myoblast functioning. The researchers at Dr.Kumar's lab found that increasing the level of IRE1 or XBP1 in myoblast tends to form myotubes with an increased diameter. Given that muscles do not grow in number, size is immensely significant. According to the researchers, if injected in patients IRE1 can even improve muscle repair and reduce the severity of disease and thus open up ways in the direction of treatment for various muscle disorders and muscular dystrophy.

<https://www.sciencedaily.com/releases/2024/07/240722155152.htm>

6. ADVANCEMENT IN CRISPR TECHNOLOGY TO DETECT RNA BIOMARKERS



In the latest research led by Chase Beisel, head of the RNA Synthetic Biology department at the Helmholtz Institute for RNA-based Infection Research (HIRI) in Würzburg a new tool named PUMA (Programmable tracrRNAs Unlock protospacer-adjacent Motif-independent detection of ribonucleic Acids by Cas12 nucleases) an addition to CRISPR technology, is said to be more sensitive, accurate and efficient in identifying and cutting the DNA sequence. Bacteria have evolved with substantial defence against viruses. Bacteria utilize a CRISPR RNA (crRNA) that functions as a guide RNA and recognizes regions of foreign genome sequentially Cas nuclease cuts the viral DNA, making it harmless. The process uses the tracrRNAs that can reprogrammed to produce the desired guide RNAs. This was previously accomplished by the tool LEOPARD, which focused on Cas9. PUMA emerges as an extended version that prioritizes Cas12. PUMA will allow scientists to detect the biomarkers specific to different pathogens. This research is a significant advancement in molecular diagnostics and has numerous potential medical uses.

<https://www.sciencedaily.com/releases/2024/07/240716202302.htm>

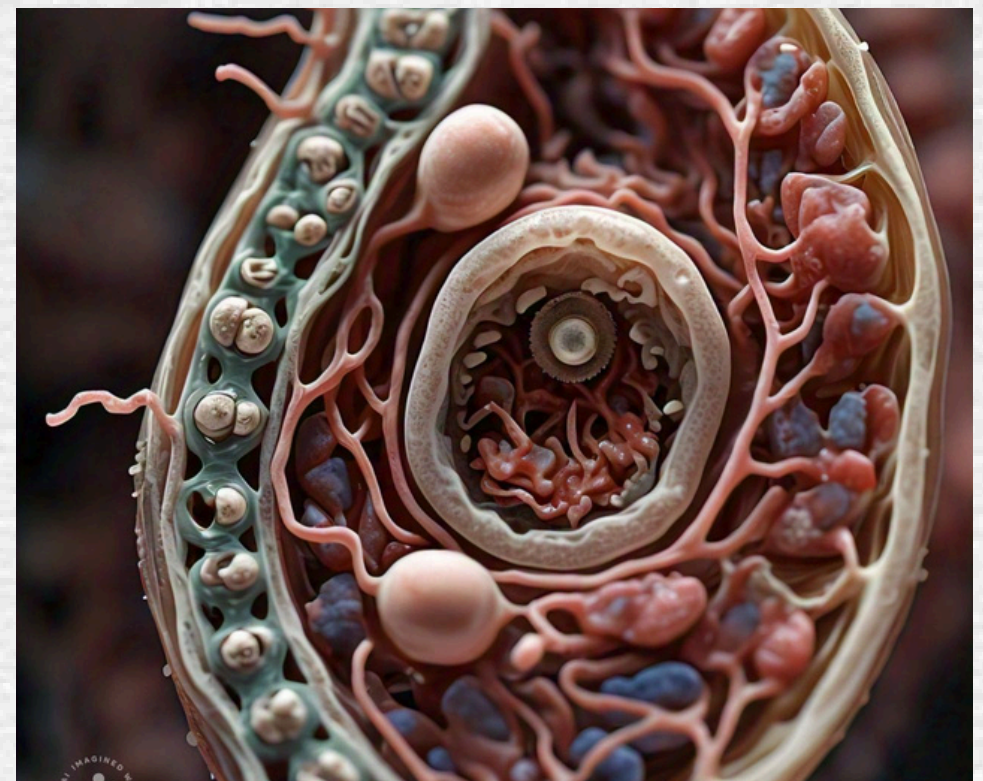
7. SELF-DEPENDENT SOIL: A BLESSING FOR FARMERS



An engineered soil, called the “smart soil” is a hydrogel material engineered at the University of Texas. The results of every experiment the scientists conducted demonstrated that plants growing in soil infused with hydrogel are far healthier and more productive than plants growing in regular soil. At night, the hydrogel absorbs water vapour, demonstrating its diurnal functioning, and then releases it during the day as an outcome of a polymer phase shift that contains calcium chloride (CaCl_2), further enhancing the regulated release of nutrients. This research was first reported in ACS Materials Letters. Given that it has been discovered to require less water and fertilizer, this new gel technology can ease the load on farmers by reducing the requirement for frequent irrigation and fertilizer usage. It is beneficial in numerous ways, the most important of which is helping save water which has been observed up to 40 percent. This technology is easily adaptable to many temperatures and geographical locations worldwide. It can ensure sustainable food and development, making the lives of the farmers easier.

<https://www.sciencedaily.com/releases/2024/07/240717121013.htm>

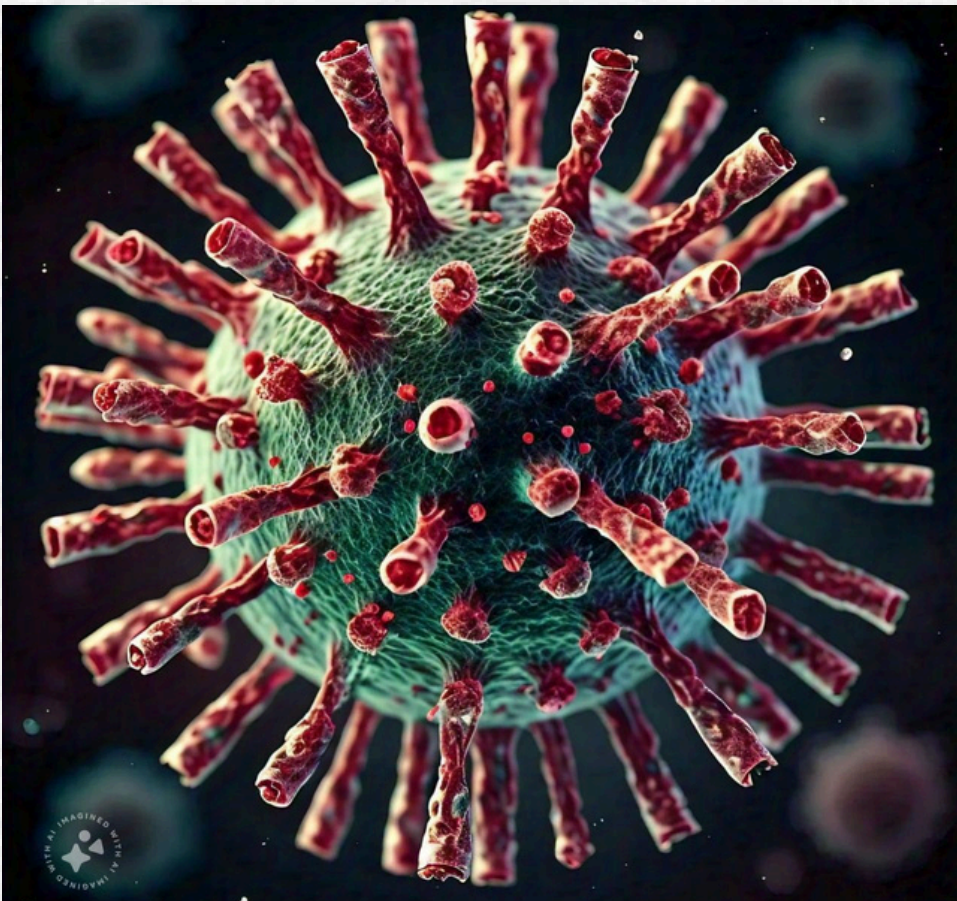
8. FORCE SENSORS IN A CHICKEN BECOME A MILESTONE OF BIOTECHNOLOGY



A new method has been successfully developed that will help in the better understanding and thus prevention of birth malformations of the spinal cord. Researchers have found it difficult to explain it completely through genetic and molecular biology alone. The complementary path is force fields which are produced during the various phases of embryonic development so studying them helps in detecting problems linked to the difficulty of acting on embryos. Thus a group of scientists from the University of Padua and the Veneto Institute of Molecular Medicine (VIMM), in collaboration with University College London (UCL) have developed 3D-printed tiny force sensors directly in the developing stage of the spinal cord and brain of a chicken. This allowed them to measure the forces that the embryo produces while forming the spinal cord. For normal development, the positive forces must exceed the negative opposing forces so that the spinal cord is formed properly. This has opened the way in the science field for the development of medicines to prevent spinal cord malformation.

<https://www.unipd.it/news/new-ways-study-congenital-spinal-cord-malformations>

9. INFLUENZA'S EVOLVING PATH: UNVEILING NEW ROUTES OF TRANSMISSION



Researchers at the University of Zurich have recently discovered that influenza viruses that enter cells through particular pathways, can also use another route to infect cells. This pathway is a protein complex of the immune system as it allows the influenza virus with the ability to travel between animals and humans and spread more of its infection. Professor Silke Stertz led this international research. The potential of the influenza virus was discovered in cell lines generated in the lab. The influenza virus can use MHC class 2 proteins for cell entry to open new pathways for more discovery in this field. This is also considered the major reason why the H2N2 influenza virus emerged as a pandemic in 1957. Although the majority of influenza viruses do not pose a threat to human health, the discovery has now shown that there is a risk that the influenza virus can up to this point, until now, so far trigger a flu pandemic even in humans. Thus, research has already started to prevent and control it.

<https://www.sciencedaily.com/releases/2024/07/240717120849.htm>

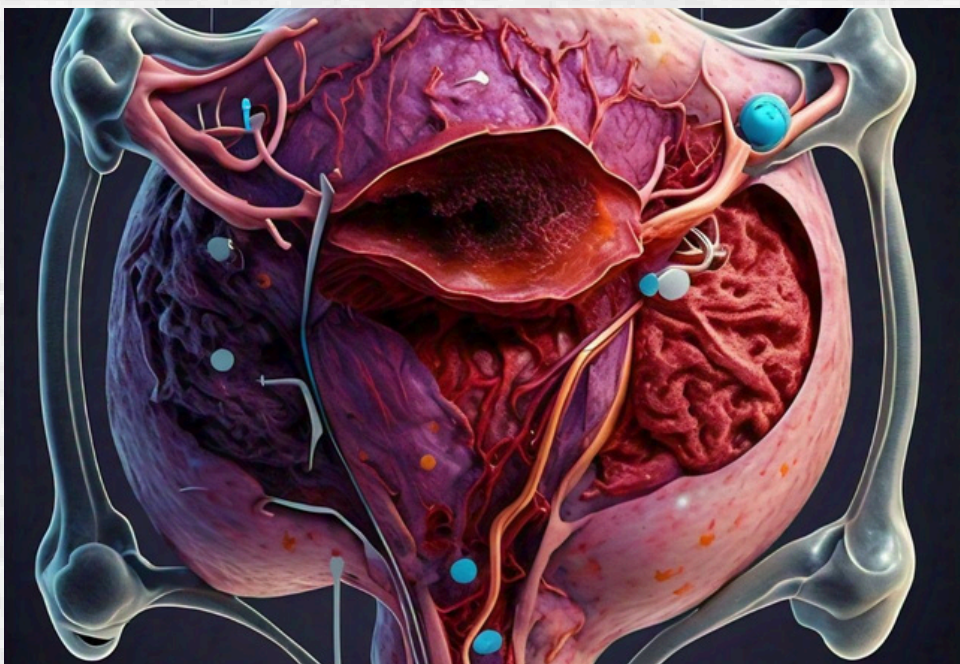
10. FIRST-EVER 3D RECONSTRUCTION OF 52,000-YEAR-OLD MAMMOTH CHROMOSOME.



An international combined research team has assembled the 3D chromosomal structures of a 52,000-year-old woolly mammoth to study its genome which has been an achievement in biotechnology. It was only made feasible by the mammoth's DNA preserved through freeze-drying, which occurred sometime after its death. It has given researchers insight into how the mammoth's genome was structured and information about the genes activated in the skin tissue. The DNA extracted from behind the mammoth's ear was used. The analysis revealed that woolly mammoths had 28 chromosomes—the same number of chromosomes that are present in Asian and African elephants of today. The mammoth skin cells had distinct gene activation patterns such as genes potentially related to its woolly-ness and cold tolerance. On July 11, 2024, the research was initially published in the journal Cell. These experiments were conducted with the support of the National Institutes of Health, the National Science Foundation, and the Welch Foundation.

<https://www.eurekalert.org/news-releases/1049787>

11. ETH ZURICH DEVELOPS INNOVATIVE HYDROGEL IMPLANT FOR ENDOMETRIOSIS TREATMENT



Researchers at ETH Zurich have developed a hydrogel implant designed to revolutionize the treatment of endometriosis, a weakening condition affecting millions of women worldwide. This approach aims to reduce pain, reduce inflammation, and improve fertility outcomes by providing targeted localized therapy. Endometriosis is characterized by the growth of tissue similar to the endometrium, the lining of the uterus, outside the uterine cavity. This ectopic tissue can cause severe pain, inflammation, and scar formation, leading to chronic pelvic pain and infertility. The hydrogel is designed to deliver therapeutic agents directly to the site of endometrial lesions. This targeted delivery system ensures a higher concentration of medication where it is needed most, reducing systemic side effects. The hydrogel can be loaded with anti-inflammatory drugs, hormones, or other therapeutic agents, providing sustained release over time. The hydrogel forms a physical barrier that helps prevent the spread and recurrence of endometrial tissue. By creating a localized environment that is hostile to the growth of ectopic tissue, the implant helps reduce the formation of adhesions and scar tissue. ETH Zurich is currently conducting preclinical studies to evaluate the safety and efficacy of the hydrogel implant. Early results are promising, showing significant reductions in pain and inflammation with minimal side effects.

<https://substack.com/redirect/cb66b570-79f0-4fdf-8ed3-5a02ce42e711?j=eyJ1ljo>

12. REVOLUTIONARY CAMERA TECHNOLOGY PROTECTS PERSONAL PRIVACY



In an era where smart devices are everywhere, privacy concerns are important. Recognizing this, researchers at the University of Michigan have developed a solution: PrivacyLens, a new camera system that prioritizes users' privacy while maintaining functionality. Smart devices like home security cameras, robotic vacuums, and other internet gadgets are becoming essential parts of our daily lives. However, these devices can capture and transmit personal data, including images and videos to cloud servers. This data can sometimes be misused. One notable incident occurred in 2020 when a smart vacuum's camera captured and shared images of a person on social media platforms. For these privacy concerns, the University of Michigan team, led by Associate Professor Alanson Sample, has developed PrivacyLens. PrivacyLens includes two types of sensors: a usual digital camera and a heat-sensing camera. The heat sensor enhances the system's ability to detect human body temperature. Once a person is detected, the system replaces their image with a generic stick figure that mirrors their movements. PrivacyLens also features a sliding privacy scale, allowing users to adjust the level of detail that the camera captures. For example, users might choose to blur only their faces in certain areas of the home. This feature empowers users to control their personal information. The development of Privacy Lens represents a significant step forward in balancing the benefits of smart technology with the essential need for privacy.

<https://substack.com/redirect/17092862-75d1-429c-b34b-075fdab72b67?j=eyJ1ljoIM2VkN2I5In0.aN3XVhKTVQn7HZO9TPG6RnwSI1tUFFOK57xMnSQTeqdk>

ARTICLES

by students

7

1. AI IN MEDICINE: A NEW ERA OF DIAGNOSIS AND TREATMENT

Artificial Intelligence (AI) is revolutionizing healthcare by transforming patient care, improving outcomes, and enhancing decision-making. Machine learning algorithms are being increasingly applied in clinical settings to optimize diagnosis, treatment, and resource allocation.

Recent advancements in deep learning have enabled the analysis of complex medical data, including images and genomic sequences. Convolutional neural networks (CNNs) have shown remarkable accuracy in detecting tumours and diabetic retinopathy. Additionally, natural language processing (NLP) algorithms can analyze electronic health records, enabling clinicians to identify high-risk patients and develop personalized treatment plans.

In predictive analytics, machine learning algorithms forecast patient outcomes, disease progression, and treatment response. Reinforcement learning algorithms optimize treatment strategies and resource allocation. Furthermore, AI-powered chatbots can enhance patient engagement and support. AI-assisted robotic systems can also aid in surgeries, reducing recovery time and improving accuracy. The applications of AI in healthcare are vast and varied. AI can help clinicians diagnose diseases more accurately and at an early stage, improving treatment outcomes. AI-powered algorithms can analyze medical images, such as X-rays and MRIs, to detect abnormalities. AI can also help identify high-risk patients and predict disease progression.

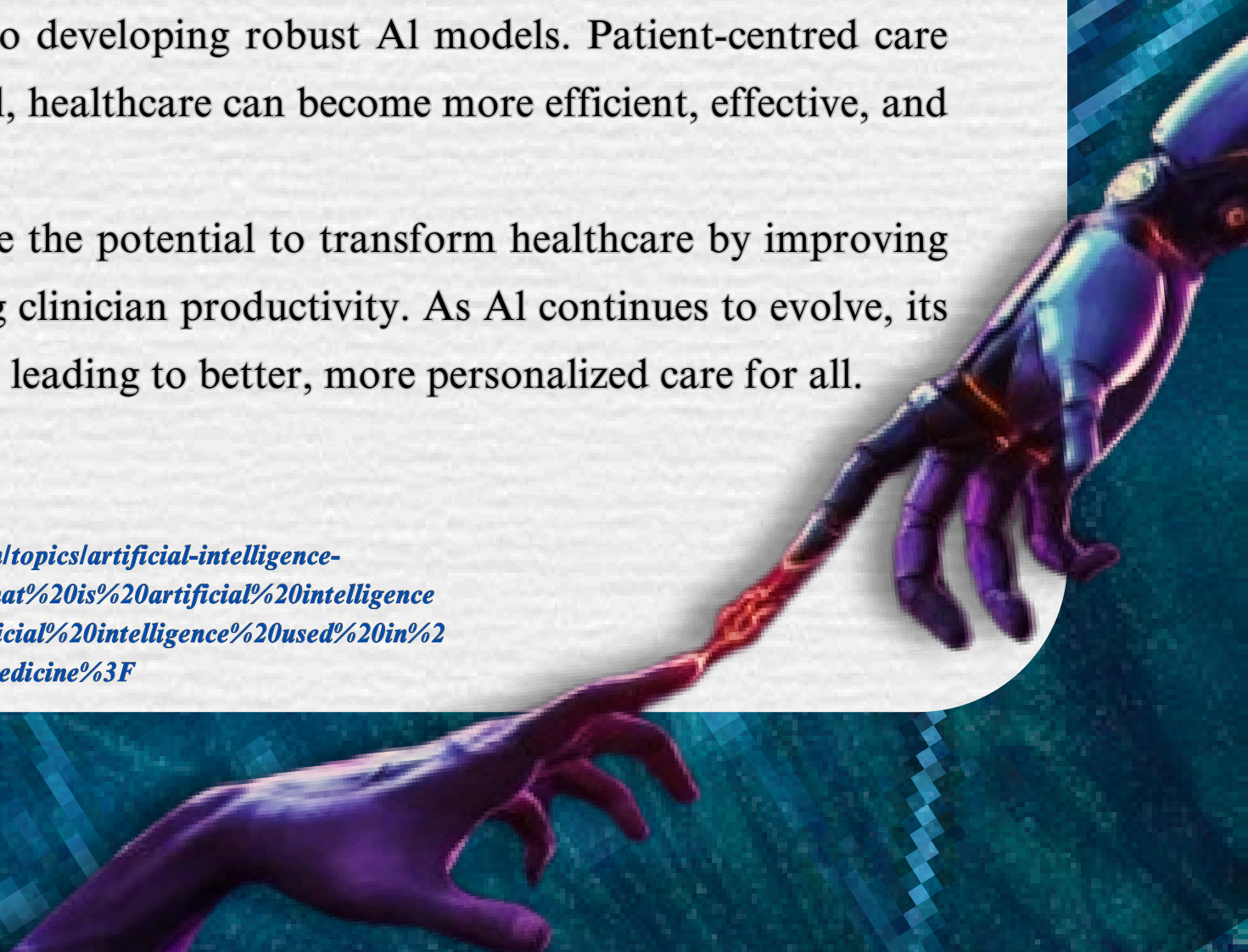
Moreover, AI can improve patient engagement and experience. AI-powered chatbots can provide personalized support and guidance to patients, helping them manage their conditions more effectively. AI can also help address healthcare disparities and improve access to care for underserved populations. To ensure the successful integration of AI in healthcare, it's crucial to address the challenges associated with data quality, annotation, and curation. Regulatory frameworks and standards for AI development and deployment are still evolving. Collaboration among clinicians, researchers, and industry stakeholders is vital to developing robust AI models. Patient-centred care must remain the primary focus. By leveraging AI, healthcare can become more efficient, effective, and compassionate.

In conclusion, machine learning algorithms have the potential to transform healthcare by improving patient outcomes, reducing costs, and enhancing clinician productivity. As AI continues to evolve, its impact on healthcare will only continue to grow, leading to better, more personalized care for all.

TAHURA HARAM

(B.Sc. ZBC 2nd year)

<https://www.ibm.com/topics/artificial-intelligence-medicine#:~:text=IBM-,What%20is%20artificial%20intelligence%20in%20medicine%3F,artificial%20intelligence%20used%20in%20medicine%3F>



2. TOBACCO IS NOT JUST A CARCINOGEN BUT A BIONUCLEAR SUBSTANCE

As we all know, tobacco is injurious to health and the environment. But when we see someone who is fighting cancer, that person's physical and mental state is worse due to consumption of large amounts of tobacco, but organic compounds like nicotine, tar and benzene are not that harmful and organic substances won't damage our bodies that much. What was the reason behind that brutal and fatal state? It is due to some radioactive elements such as thallium, polonium and lead. These are elements found in tobacco that break down and release a lot of energy and radiation that excite and influence human cells to divide continuously causing tumors. The political leaders want to ban tobacco farming in the world not because they are concerned about human health but it is because they don't want anybody to invent a bioreactor that can synthesize the radioactive elements from organic substances and lead to its weaponisation even the extraction of those elements from tobacco is easier.

"US patent document Barton (131/143), and Chemistry of Rare Radio Elements, Bengal Press, 1957, p. 49". These are the articles and documents that explain the extraction of radioelement easily. If bioscience learners ever invent a bioreactor that synthesises radio elements from organic substances it will change the world and bioscience dominate the nuclear mechanics of physics. But, it will also destructive to the world and humanity.

‘SOMETIMES THE PATH TO DEVELOPMENT MAY LEAD TO YOUR DESTRUCTION’

ARISH TAUQEER

(B.Sc. Biotechnology 2nd year)

<https://www.epa.gov/radtown/radioactivity-antiques>



3. EVALUATION OF ANTIMICROBIAL ACTIVITIES OF *Brassica nigra* (BLACK MUSTARD)

The Latin-specific epithet *nigra* is derived from the Latin word for black. *Brassica* vegetables are recognized to have cancer-preventive and therapeutic properties against a wide range of cancer types, including ovary, colon, bladder, lung, and breast. The oil extracted from the seeds is very effective as an antibacterial. It was demonstrated that mature oilseed, rapeseeds oil from double-low quality oilseed rape (low in erucic acid (up to 2% in consumption seeds) and low glucosinolate level (up to 25 $\mu\text{mol/g}$ of seeds)) contained 60% monosaturated oleic acid (C18:1), 30% polyunsaturated fatty acids (20% linolenic acid (C18:3)), 2% eicosenoic acid (C20:1), 7% saturated fatty acids (mainly palmitic (C16:0) and stearic acids (C18:0)), and 1% other acids. In addition to its importance as a food flavouring agent, the seeds of *B.nigra* also have important medicinal uses such as in the treatment of rheumatism and joint pains, indurations of the liver and spleen, throat tumours and as a laxative. *Brassica nigra*, or black mustard, is an annual plant cultivated for its dark-brown to black seeds, which are commonly used as a specie . as well as has antidiabetic, antioxidant and antimicrobial properties. The seeds have a significant amount of fatty oil, which is used as cooking oil. Ground seeds of the plant are mixed with honey and are used as a cough suppressant. It is also used to treat respiratory infections. *Brassica* species contain antioxidants such as α -tocopherol, ascorbic acid, canola, carotenoids (lutein and β -carotene), phenolic acids (gallic acid, caffeic acid, sinapic acid, ferulic acid, and 3,4-di-hydroxybenzoic acid), and flavonoids (rutin, quercetin, and kaempferol) that can protect the immune system by neutralizing free radicals. India is the world's third-largest producer of rapeseed mustard, following China and Canada.

SAKSHI DEVI

(M.Sc. Biotechnology 2nd year)

[https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/brassica-nigra#:~:text=Brassica%20nigra%20\(L.\)&text=nigra%20seed%20\(black%20mustard\)%20has,anti%2DParkinson%20and%20antimigraine%20properties](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/brassica-nigra#:~:text=Brassica%20nigra%20(L.)&text=nigra%20seed%20(black%20mustard)%20has,anti%2DParkinson%20and%20antimigraine%20properties)



4. THE MYSTERY OF CURIOSITY

One of the interesting trait of human being is *curiosity*. The urge to learn/know more and more. Curiosity is basic feature of our cognition, although it is a biological function. It is crucial for decision-making and healthy development of brain. Philosophers described curiosity as the impulse towards better cognition, which means it is a desire to understand what you know that you do not. Add another early definition of curiosity comes to consideration is A higher more intellectual form and impulse towards more complex scientific and philosophic knowledge. But have you wondered how does the human system senses curiosity? Some study reveals that the gene DRDH-7R coding for dopamine is immensely associated with curiosity. Dopamine is a chemical messenger neurotransmitter and a hormone that plays multiple roles in the body's functions. It is an organic chemical and also affects emotions, behaviour and movement. It plays a major role in how we feel pleasure and rewards. It is a big part of our unique ability to think and plan.

All humans have a dopamine baseline which drives us to seek for what we are looking for when we find it, we experience dopamine peak which is like the "high" we get from winning succeeding behaviour. But after this peak, level of dopamine falls down which is below the previous baseline, this means, you don't experience that feeling for so long. It has been found that 20 percent of the population possess this gene and it has been discovered that this gene is expressed at higher rate in few cells namely – pre frontal lobe and temporo-lymbic structure of brain, pinealocytes cells and retina. The expression of DRDH in pinealocytes is *100 times* higher than other tissues except retina. The DRDH gene is located on chromosome 11. In addition to this, the DRD-2 gene dopamine receptor D-2 is located on same. Curiosity is also generated by increased concentration of dopamine in blood. Additionally. Some brain regions specifically *dentate gyrus* part of hippocampus region. Brain plays a major role to sense our curiosity. Thus, the curiosity develops in human is satisfied, it makes them more happy.

KHUSHI MAHESHWARI
(M.Sc. Microbiology 2nd year)

<https://sapientscapital.com/insights/the-mystery-of-curiosity-2123/#:~:text=Our%20right%20hemisphere%20also%20directs,beneficial%20result>



5. ANTIMICROBIAL ACTIVITY OF *Foeniculum vulgare*

Foeniculum vulgare commonly called “Fennel” has been used in traditional medicine for various ailments related to the digestive, endocrine, reproductive and respiratory systems. Additionally, It is also used as a galactagogue agent for lactating mothers. It is a medicinal plant belonging to the Umbelliferae (Apiaceae) family, known and used by humans since ancient times, due to its flavour. It is universally known as Fennel and by more than 100 names. *F. vulgare* controls numerous infectious disorders of bacterial, fungal, viral, mycobacterium, and protozoal origin. It has antioxidant, antitumor, chemopreventive, cytoprotective, hepatoprotective, hypoglycemic, and oestrogenic activities.

Foeniculum vulgare has been extensively used in traditional medicine for a variety of ailments. Fennel is used in various traditional systems of medicine like the Ayurveda, Unani, and Siddha, in the Indian, and Iranian traditional systems of alternative and balancing medicine. It is a popular medicinal plant with various pharmacological activities mentioned in traditional Iranian medicine (TIM) and modern phytotherapy such as antioxidant, cytotoxic, anti-inflammatory, antimicrobial, bronchodilatory, estrogenic, diuretic, lithotriptic, galactagogue, emmenagogue, antithrombotic, hypotensive, gastroprotective, hepatoprotective, memory enhancing and antimutagenic activities. No serious adverse events were recorded after ingestion of *F. vulgare* except for some cases of allergic reactions. It may show hepatoprotective (liver protective) properties, hypoglycaemic (blood sugar lowering) properties, chemopreventive properties and antitumor (stopping the growth of tumour) properties. Traditionally fennel has been used as a carminative agent. It may help remove the accumulated gas from the stomach, relieving bloating. Fennel water may also manage flatulence (gas) in infants. Fennel seeds may promote the release of digestion secretions necessary for good digestion and absorption of food. Fennel extract might be used for its protectivity against stomach damage.

ANJALI VERMA

(M.Sc. Biotechnology 2nd year)

[https://www.sciencedirect.com/science/article/pii/S1878535212000792#:~:text=Foeniculum%20vulgare%20\(Apiaceae\)%20commonly%20known,treating%20respiratory%20and%20gastrointestinal%20disorders](https://www.sciencedirect.com/science/article/pii/S1878535212000792#:~:text=Foeniculum%20vulgare%20(Apiaceae)%20commonly%20known,treating%20respiratory%20and%20gastrointestinal%20disorders)

6. CHERNOBYL RADIATION EATING

FUNGI: LIFE FINDS A WAY

Outstanding species such as *Cladosporium sphaerospermum*, *Cryptococcus neoformans*, and *Wangiella dermatitidis* have appeared an exceptional capacity to adjust in the harsh radiative environment of Chernobyl. Their survival unveils an intriguing discovery in diversity of organic material and shows new pathways for natural cleanup, “Earth heals itself”.

These organisms, known as radiotrophic organisms, utilize radiation as a source of nutrition, that is possible due to their reserve in melanin. Melanin helps these parasites to prosper in situations with high radiation level as it retains radiation through its complex atomic structure, that allows it to absorb high-energy gamma beams. This process empowers the organisms to utilise radiation levels that would be deadly to most other life shapes. Once absorbed, the radiation activates melanin particles, starting a starting of chemical reactuons. Melanin changes the radiation into a structure that can be used by the parasites for development.

This includes producing responsive oxygen species (ROS) and other intermediates that drive metabolic functions needed for the fungi’s survival. The biochemical properties of melanin, due to it's two fold bonds, encourage this structural change. This permits organisms to use radiation as a maintainable nutrition source, turning a destructive figure into a crucial asset. The special adjustments of these parasites embody the extraordinary flexibility of life in extraordinary environments.

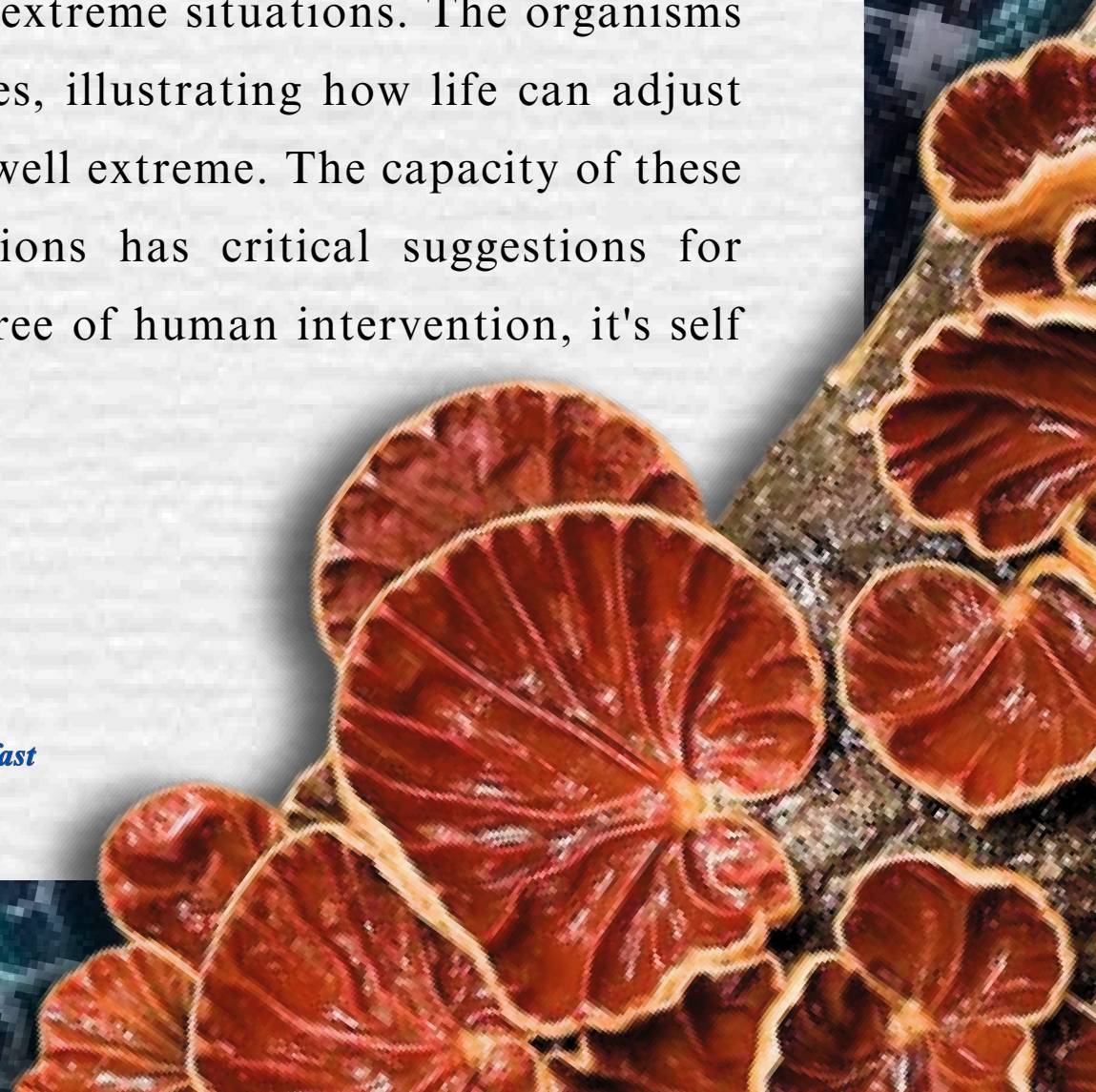
Not only this is a crucial point of turnover of biology on earth, but it can also be a huge step in the field of astrobiology, unleashing new ideas that suggest the use of similar fungi in planetary sciences to reduce the levels of radiation in various planets and make them habitable for human inhabitation. This could lead to unending continuity of human race.

The Chernobyl catastrophe, which discharged enormous sums of radioactive materials, the extraordinary conditions have turned the region into a normal research facility for examining extremophiles—organisms that can flourish in extreme situations. The organisms found in Chernobyl are prime cases of such extremophiles, illustrating how life can adjust and flourish beneath conditions already thought to be as well extreme. The capacity of these parasites to survive and develop in radioactive situations has critical suggestions for bioremediation, suggesting that if a part of earth is left free of human intervention, it's self healing process will takeover.

SAMIYA ZEHRA

(B.Sc. Biotechnology 2nd year)

<https://www.rsb.org.uk/biologist-features/eating-gamma-radiation-for-breakfast>



7. NANOTECHNOLOGY RNA-MEDIATED THERAPY

RNA technology represents a promise as a Therapeutic intervention for targeted gene Silencing in cancer, and there are already some RNA-based mutations in clinical trials. The use of nanomedicine employing nanoparticles represents encapsulating RNA. It may represent a Suitable platform for major challenges hampering its therapeutic application. RNA therapy acts on messenger RNA (mRNA) by using oligonucleotides, which interfere in splicing, transport, translation and degradation. Specifically, we review nanoparticle Splicing, including lipid, polymer, inorganic and biomimetic materials that have been employed. To deliver therapeutic RNAs and evoke tumour-suppressing responses.

The types of RNA molecules that have been undertaken are mRNA, siRNA, microRNA, and sgRNA. Regulate Cancer-specific genes by this RNA. RNA-based therapeutics can suppress Tumor progression by silencing these genes. The defence mechanism of the human body systems, such as exonucleases and RNases, catalyze the degradation of exogenous RNAs.

In mRNA-based therapies, there is consistent and predictable regulation of protein expression and minimal risk of insertional mutagenesis. Other therapeutic mRNAs encode viral antigens. Effect in antigen dendritic cells, macrophages and APCs. Dendritic cells are translated into protein antigens and processed into peptide epitopes.

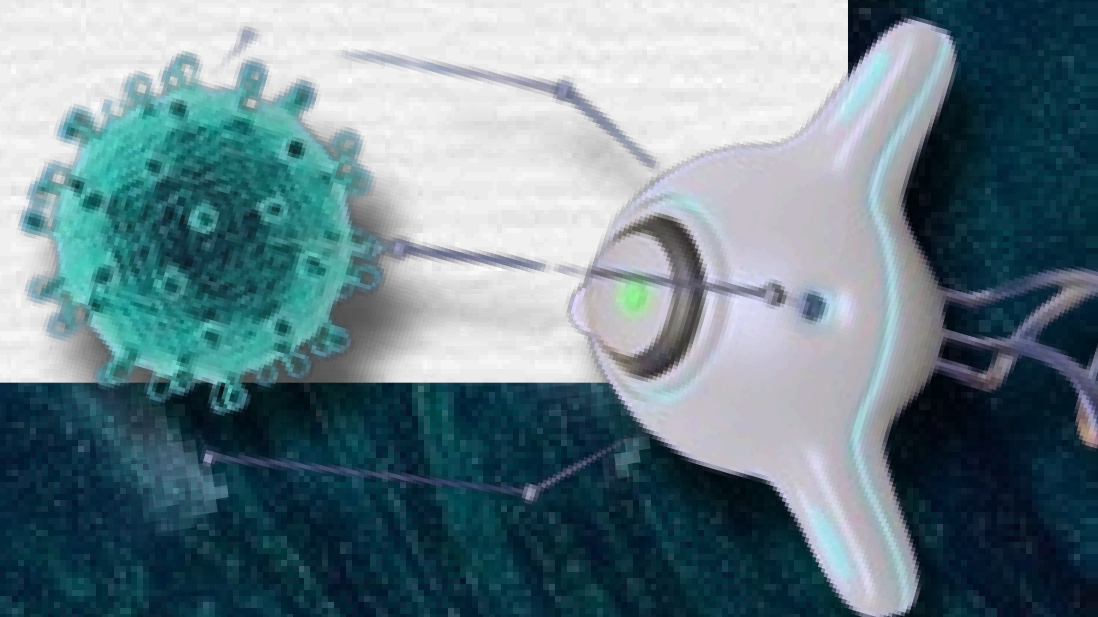
The epitopes bind to Major Histocompatibility Complex (MHC) molecules, and together, they are transported to the cell surface. The epitopes induce strong effector and memory T- cell immune responses and the immuno-genetic nature of in vitro transcription (IVT). The mRNA may diminish mRNA-based cancer therapies.

In this therapy of cancer, a patient who undergoes surgery for a specific tumour (especially malignant) is prescribed specific postoperative conditions for chemotherapy and is introduced during the surgical process in the patient's body for a regular time period. Then, the remainder of the proliferative cells. Within the body are targeted this technique has disadvantages, such as its lethal effects on normal cells in the body. The therapy is provided for the tumour cells, but it is lethal for the normal cells, which leads to neural toxicity, Suppression of bone marrow and cardiomyopathy. The bad effects of chemotherapy could be efficiently decreased by using monotherapy, as we could effectively design particular complex-nanoparticles that specifically target the tumour site, and approximately monotherapy has a negligible adverse effect to the surround. Finally, nanotechnology therapeutics has been successful to improve the pharmacokinetics and reduce the systemic toxicities of chemotherapy by Selectively targeting and delivering anticancer drugs to tumour tissue and we further discuss the challenges and considerations that may help to grow in nanotechnology-mediated RNA Therapy.

MANTASHA MOIN

(B.Sc. Biotechnology 2nd year)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3422774/>



8. PLASTIC EATING FUNGUS: NATURE'S CLEANUP CREW FOR OCEAN POLLUTION

Scientists in Germany have identified plastic-eating fungi that could offer a beacon of hope for addressing this pressing issue. And create a more sustainable future. The world's oceans are choking on plastic waste, with over 8 million tons of plastic entering the marine environment every year. Plastic pollution harms marine life, contaminates the food chain, and even affects human health. The Great Pacific Garbage Patch, a massive collection of plastic debris, is now twice the size of Texas. Grossart believes the microbial plastic destroyers could be used in sewage treatment plants or other facilities with controlled conditions. However, the fungi are unlikely to be a solution for stemming the global flood of waste. Plastic is made up of fossil carbon, and if the mushrooms break it down, it will be equivalent to burning oil or gas and releasing CO₂ into the atmosphere. Hans-Peter Grossart, head of the research group at the Leibniz Institute of Freshwater Ecology and Inland Fisheries, told Reuters TV that the most surprising finding of their work is that their fungi could exclusively grow on some of the synthetic polymers and could even form biomass. Out of 18 selected fungal strains, four proved to be particularly "hungry," which means they could efficiently utilize plastics, especially polyurethane, which is used to make construction foam. Fungi break down plastic via a process known as degradation that includes the following processes:

- 1. FUNGAL ENZYMES** : Certain fungi, such as oyster mushrooms and mycelium, produce enzymes that could degrade plastic polymers.
- 2. PLASTIC ABSORPTION** : Fungal hyphae (branching filaments) absorb plastic particles, allowing enzymes to break them down.
- 3. ENZYMATIC DEGRADATION** : Enzymes- laccase, manganese peroxidase, and lysozyme degrade plastic polymers into smaller components.
- 4. MICROBIAL COMMUNITY** : Fungi interact with other microorganisms, like bacteria, to create a synergistic effect, enhancing plastic degradation.
- 5. NUTRIENT UPTAKE** : Fungi absorb nutrients released during plastic degradation, which supports their growth and reproduction.

Fungi can degrade different types of plastics, including polyurethane (PU), polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), and polycarbonate (PC). Polyethylene, used in plastic bags and packaging, was found much slower to degrade, and microplastics from tire abrasion were the most difficult to degrade because of additives like heavy metals. Grossart said he believes the fungi's ability to utilize plastic is an adaptation to the vast amounts of plastic carbon in the environment. However, their enzyme activity is greatly dependent on external conditions, such as temperature or micronutrients.

BINISH ALI

(B.Sc. Biotechnology 1st year)

<https://www.reuters.com/business/environment/plastic-eating-fungi-could-be-glimmer-hope-cutting-ocean-pollution-2024-08-08/>



9. MINI BRAINS OR OGRANOIDS BY STEM CELL TECHNOLOGY

Researchers at Austria's Institute of Molecular Biotechnology have made a ground-breaking discovery. The mini-brains were created using stem cells extracted from human bodies. These stem cells were then treated with growth factors to transform them into brain cells. Scientists injected Noggin growth factor into stem cells and placed them in conditions mimicking the human body. After 3-4 days, some stem cells died, but the surviving ones successfully transformed into brain cells (neurons) and formed small brain tissues. Over 60 days, the brain cells grew significantly in size and developed structures resembling the midbrain and forebrain. To communicate with the mini-brains, scientists designed a microchip that could translate electrical impulses.

MINI BRAIN DEVELOPMENT AND CAPABILITIES:

The microchip allowed scientists to send information to the mini-brains and receive signals back, enabling them to train these by feeding them electrical signals representing 8 different male voices for two days. Their ability to recognize voices was tested by presenting them with 240 audio clips of the 8 male voices, and they accurately identified the voices in 8 out of 10 audio clips, demonstrating an 80% accuracy rate. These are capable of mimicking human senses, particularly taste and smell, which are difficult to replicate due to their subjective nature. The technology being discussed involves a mini-brain that can be connected to a smartphone, allowing the user to experience smells wireless and then quickly learn new skills by installing these trained mini-brains into their bodies.

BRAIN TISSUE TRANSPLANT AND POTENTIAL FOR CURING BRAIN DISORDERS

In 2021, scientists conducted an experiment where they injected brain tissue created in a lab into the brains of mice. After three months, the lab-grown brain cells formed neural connections similar to the mice's original brain cells. The technology involves the use of patients' cells to create new lab-grown cells to potentially cure brain disorders like Parkinson's disease, Alzheimer's disease, and Dementia, as it could replace damaged brain cells, eliminating the risk of rejection.

LIMITATIONS

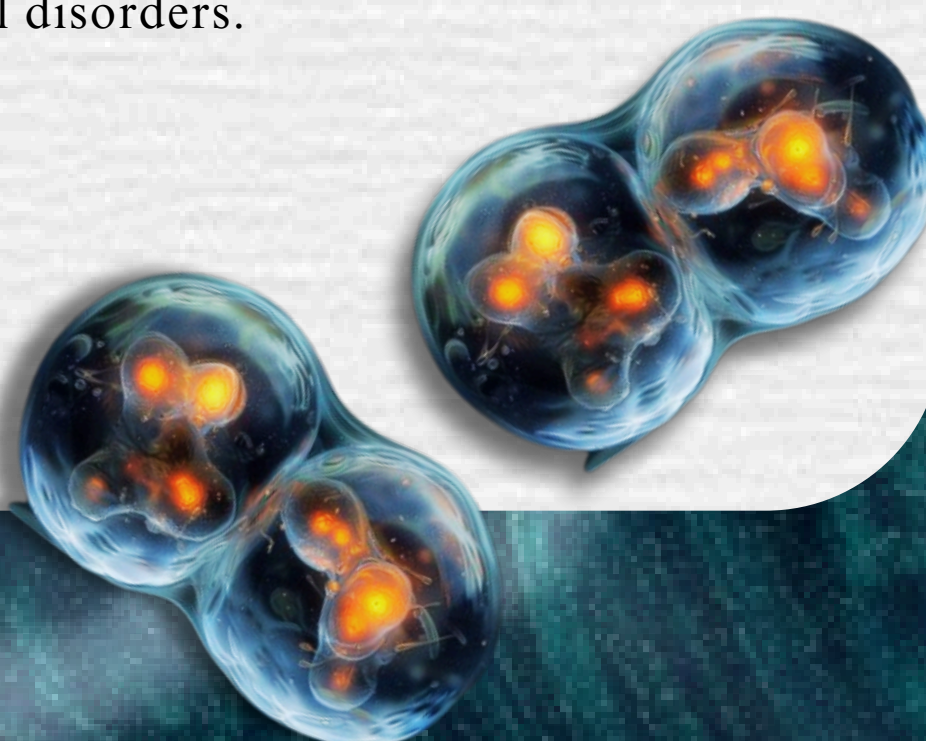
The mini-brain technology is not yet ready for mainstream use due to the potential risks associated with the microchip as their functionality is heavily reliant on the chips. The mini-brain has a small thinking capacity compared to a human foetus.

Despite the limitations, scientists are continuing to research the technology due to its potential medical applications and ability to treat mental disorders.

DILDAR HUSSAIN USMANI

(B.Sc. Biotechnology 1st year)

<https://www.oeaw.ac.at/imba/research-highlights/brains-on-demand>



10. OCULAR REGENERATIVE MEDICINE: A LEADING LIGHT IN THE VISION REVIVAL

Ocular regeneration is becoming a significant subject in the field of regenerative medicine. The eye is a prime candidate for RM therapy evaluation due to its easy accessibility and unique immune system. Age-related macular degeneration (AMD), retinitis pigmentosa, glaucoma, corneal illness, many blinding disorders, and ocular cancer can all be cured with it, which makes it significant and successful. The new and potential approaches like stem cell therapy, immunoglobulins, gene therapy, tissue regeneration and reprogramming are less harmful and more effective in treating degenerative disorders since existing practices do not shed light on degenerative ocular diseases. The stem cells used for ocular regeneration are adult, foetal and embryonic stem cells. These cells are extracted from donor tissues and injected directly into the injured organ/tissue or the bloodstream. Another therapy is reprogramming to generate specific cell types for regenerative medicine to restore tissues. Gene editing, epigenetic reprogramming, and gene treatments are examples of reprogramming techniques. In vivo, gene delivery aims to transfer a functional copy of a specific defective gene into the genome of transplanted cells using retroviruses. This method circumvents the logistical challenges associated with ex vivo cell-based gene therapy, such as cell collection, culture, modification, and transplantation. Ex-vivo gene therapy eliminates the risk of GVHD and histocompatibility of donor, unlike standard allogeneic transplantation. Epigenetic reprogramming includes histone alterations, DNA methylation, noncoding RNAs and gene editing tools such as CRISPR and cas9. Natural polymers such as collagen, silk fibroin, gelatin, chitosan, cellulose, hyaluronic acid, and de-cellularized cornea are biomaterials for corneal regeneration. Some of the most recent developments in ocular regenerative medicine are novel retinal progenitor cell-stem cell treatment for retinitis pigmentosa, a semi-automated method for treating glaucoma and AMD by scaling up the creation of retinal neurons from pluripotent stem cells and a renewable cell source and pioneered the use of stem cell-derived retinal ganglion cells in animal glaucoma models for transplantation investigations.

Limitations of regenerative medicine encompass immune tolerance to grafted cells, tumor-causing potential of grafted stem cells, and ethical concerns regarding the utilization and procurement of certain types of cells.

Even though the amount and quality of research in regenerative medicine vary greatly, this effort will eventually change the ophthalmological treatment conducted, thereby growing the field.

FARI FATIMA

(B.Sc. Biotechnology 2nd year)

<https://www.mdpi.com/2073-4409/13/2/179>



12. PROTEINS AS A SILENT ASSASSINS: PRIONS

Have you ever wondered about the amount of protein that is produced by our body every day? Are all these proteins useful to our body at all times? Studies show that a type of protein forces the normal healthy proteins in our brain to fold abnormally, becoming a cause of disease in humans and animals. This protein type was named PRION by Stanley Prusiner in 1982.

In animals, commonly found prion diseases are scrapie in sheep, mad cow disease in cattle, and chronic wasting disease in moose. These can occur from simple exposure to contamination. In humans, the prion diseases are Fatal Familial Insomnia, Creutzfeldt-Jakob disease, and Kuru disease. The most shocking revelation of prion research is that it can spread in a person's mind for years without showing any symptoms and eventually leads to the degradation of neurons. It has also been proved that they are self-replicating proteins capable of causing illness without the presence of any cellular machinery. Our immune system does not react to any prions in the body, so there is no option for developing a vaccine.

CREUTZFELDT-JAKOB DISEASE (CJD)

CJD is a condition that causes brain degeneration due to the presence of prions. About 10-15% of cases are mostly from inheritance, but the cause of the other 90% is still unknown. Only 1-2 people among a million worldwide are found to have it, but it is dangerous as the cure is not yet discovered. Symptoms usually include dementia, difficulty in movement and speaking, uncontrolled muscle spasms, hallucinations, and even seizures.

How is the disease diagnosed? The simplest way is testing cerebrospinal fluid for signs of abnormality and then getting a brain MRI. Doctors recommend EEG (electroencephalogram), spinal tap, and genetic testing to check mutations.

To this date the longest surviving CJD patient was a woman who was diagnosed when she was 57 years old and had a V180I mutation, became bedridden within six months, and died of pneumonia after 16 years of home care.

FATAL FAMILIAL INSOMNIA

FFI is also a genetic condition of prion diseases, and symptoms are dementia, insomnia, and uncontrolled muscle twitching. This is characterized by a genetic mutation of proteins that affects our CNS and thalamus and ruins its capability of putting us to sleep. Early symptoms of FFI are known to be similar to those of Alzheimer's disease. It is diagnosed using polysomnography to detect sleep pattern abnormalities, EEG, and CSF. In the direction of cure, the only successful discovery is that antibiotic doxycycline prolongs the life of people suffering from FFI.

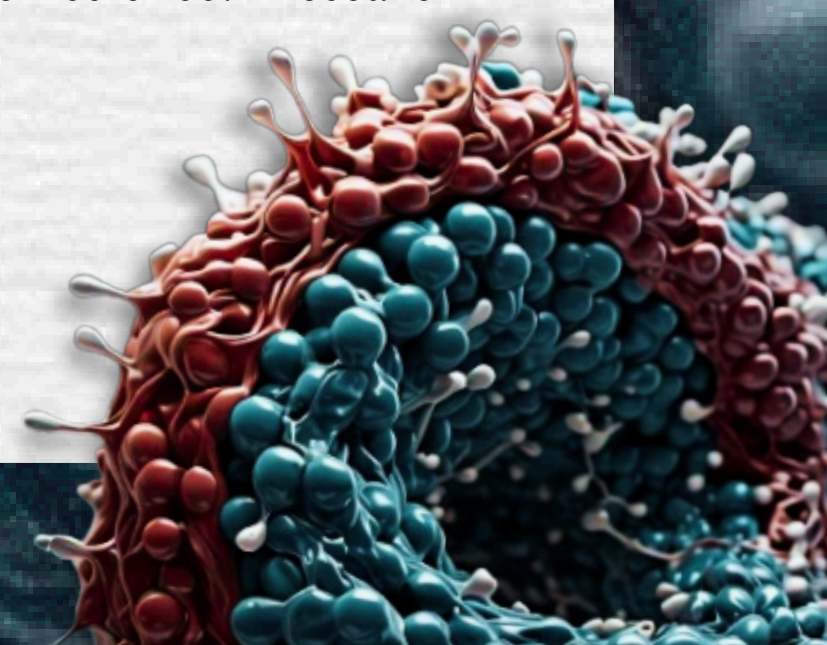
CANNIBALISM DISEASE

On the other hand, Kuru disease was mainly caused by cannibalism and was last reported in 2005, but it is still one of the most mysterious diseases in the history of science. Research related to prion diseases is still an ongoing topic.

AMRA AHMAD

(B.Sc. Biotechnology 2nd year)

<https://www.sciencedirect.com/topics/medicine-and-dentistry/prion-protein>



13. HEALING THE CODE : THE CASGEVY REVOLUTION IN PERSONALISED MEDICINE

Casgevy (exagamglogene autotemcel) is a cell-based gene therapy that uses CRISPR/Cas9 gene editing technology to treat sickle cell anemia and beta-thalassemia in patients older than 12 years. This treatment is effective for people with sickle cell anemia experiencing recurrent VOCs (vaso-occlusive crises) and transfusion-dependent beta-thalassemia. VOC is the pain occurring due to the blockage of blood vessels from crescent-shaped or sickle-like RBCs.

The BCL11A gene is responsible for blocking the production of fetal hemoglobin (special hemoglobin HbF) and increasing adult hemoglobin production. In sickle cell disease, the RBCs in the adult hemoglobin turn into a sickle shape, which blocks the blood vessels, resulting in poor blood flow. The purpose of this therapy is to break the genetic block that stops the production of HbF.

PROCEDURE TO PERFORM CASGEVY-

Firstly, the blood stem cells from the patient's body are collected for treatment. In next step, the gene BCL11A is edited in a way to restart HbF and gamma globin production; this step may take about 6 months to edit the gene. The last step is to transplant the genetically edited blood cells in the body, a medication is provided before infusion to clear the existing cells to create space for the modified blood cells. The blood cells are then transplanted into the bone marrow. This increases overall hemoglobin levels and improves the production and functioning of RBCs in the body.

POST-TREATMENT PATIENTS MAY EXPERIENCE SIDE EFFECTS SUCH AS:

- Lower level of WBCs (neutropenia, leukopenia and lymphopenia)
- Low level of platelets (thrombocytopenia)
- Inflammation of mucous membrane in mouth and GI tract
- Severe headache
- Decreased appetite
- Itching

Patients experiencing these symptoms are advised to immediately seek their healthcare provider.

Casgevy was primarily approved in the UK and then became the first cell-based gene therapy to be approved by the US FDA, which was on December 8th, 2023. 39 SCD patients have been treated with Casgevy with a follow-up period of 16 months, and 36 out of them have been found to be free from VOC. The success rate of casgevy for SCD is 92%. As for beta-thalassemia, a total of 52 patients have been treated, out of which 35 had sufficient follow-up time for evaluation, and the success rate is 91.4%.

Vertex is the manufacturer and license holder of Casgevy, and the word CASGEVY is a trademark of Vertex Pharmaceuticals Incorporated.

The approval of casgevy is a revolutionary achievement specifically in gene therapy but the high cost (estimated to be up to \$2 million per patient) of the treatment makes it impossible for the middle class to afford. Further development and research in the future may help it become more affordable for people with low income, turning casgevy into a widely available and accessible gene therapy.

NAGMA HUSSAIN

(B.Sc. Biotechnology 2nd year)

<http://casgevy.com/>
<http://investors.vrtx.com/>

14. THE GRAND REBIRTH OF THE BIOSCOPE: A MILESTONE EVENT IN INTERACTIVE ENTERTAINMENT

A turning point in the history of interactive entertainment, Imaginarium Studios, introduced its newest invention—the next-generation bioscope—at a magical ceremony held in Silicon Valley in an event called "The Grand Rebirth of the Bioscope." It combined high-tech equipment and the age-old art of storytelling.

A GLIMPSE INTO THE FUTURE

The event, held at the Crystal Dome Auditorium, was a great celebration of innovation and imagination. The venue was prepared for a complete experience of the new bioscope's capabilities, and the guests were attracted by the several interactive displays and virtual exhibitions. There was a live demonstration of the bioscope's advanced features. Basically, the walls became a huge virtual space, and the audience was transported into a magical medieval kingdom. The bioscope's magic of merging augmented reality (AR) with virtual reality (VR) turned into a holistic experience that astounded everybody.

REVOLUTIONARY FEATURES AND INNOVATIONS

Imaginarium Studios said that the latest model of the bioscope comes with several cutting-edge technologies:

Dynamic Narrative Engine: The AI narrative engine adapted to the user's choice is the new core of the bioscope story and makes the storyline unique for each person.

Haptic Feedback Integration: The bioscope has introduced a new haptic feedback technology that enables the user to feel the sensations of the virtual world to make the experience much more alive and vibrant.

Multi-Sensory Experience: Bioscope also includes scent and modulation of temperature.

Collaborative Storytelling: Multiple users can interact within the same narrative, making the live story collaborative storytelling.

INDUSTRY REACTIONS AND FUTURE IMPLICATIONS

The event attracted a heterogeneous audience of industry pros, from tech innovators to storytellers to critics. The reactions were mostly positive, as people praised the bioscope for pushing the limits of interactive entertainment. Educational institutions are already figuring out how to use this technology for immersive learning experiences, while therapists foresee the new possibilities of engaging and therapeutic environments.

A NIGHT OF CELEBRATION AND INSPIRATION

The guests got to interact with the creators of the bioscope. Through interactive art displays and live performances, the event contributed to the ethos of innovation and creativity intrinsic to Imaginarium Studios. In his closing remarks, CEO Michael Bennett said it is like a new chapter in storytelling. The Grand Bioscope Revival was not merely an event but a portal to a world of interactive entertainment that has just begun, where the stories can be manifested in ways only imagined in dreams.

ZEHRA JAMAL
(B.Sc. ZBC 3rd Year)

<https://www.sciencedirect.com/sciencedirect/article/abs/pii/S0168900205008806>



15. STANDING WHILE EATING: A HIDDEN RISK FACTOR FOR INTESTINAL CANCER ?

When it comes to eating, most of us are accustomed to sitting down and enjoying our meals. However, a growing trend of standing while eating, whether at work or home, may have unintended consequences for our health. Recent research suggests that standing while eating could potentially increase the risk of intestinal cancer.

THE SCIENCE BEHIND THE RISK

Standing while eating can lead to swallowing air, which can enter the digestive system and cause inflammation in the intestines. Chronic inflammation is a known risk factor for intestinal cancer. Furthermore, standing can also put pressure on the digestive system, leading to poor digestion and potentially toxic compounds that can damage the intestinal lining.

THE STATISTICS

While more research is needed to confirm the link between standing while eating and intestinal cancer, some studies have already shown a concerning correlation. A recent study found that individuals who stood for more than 4 hours a day while eating had a 30% higher risk of developing intestinal cancer compared to those who sat while eating.

PREVENTION IS KEY

To minimize the potential risk, consider the following:

- Sit while eating to reduce swallowing air and pressure on the digestive system
- Eat slowly and mindfully to aid digestion
- Avoid standing for long periods, especially while eating
- Maintain a healthy weight and exercise regularly to reduce overall cancer risk.

CONCLUSION

Standing while eating may seem harmless, but the potential link to intestinal cancer is a concern. By being mindful of our eating habits and taking simple precautions, we can reduce our risk and maintain a healthy digestive system. Experts at the 2nd foundation day of the Radiotherapy department at KALYAN SINGH SUPER SPECIALITY CANCER INSTITUTE highlighted that diseases related to the oesophagus could develop due to certain dietary habits:-

- HOD at PGI Chandigarh, Dr. Rakesh Kapoor, figured out that eating and drinking while standing could lead to various injuries, such as acid reflux, as it prevents muscles of the oesophagus from throughout functioning.
- The risk of oesophageal cancer "increases the normal digestive process gets hammered due to standing while eating and drinking, requiring more efforts from the intestines and elevating the risk of colorectal cancer" said Dr. Rakesh Kapoor.

NADA HAYAT

(B.Sc. Biotechnology 2nd year)

<https://timesofindia.indiatimes.com/life-style/food-news/is-eating-while-standing-bad-for-your-health/photostory/71686054.cms?picid=71686073>

16. REVOLUTIONIZING BRAIN CANCER TREATMENT: BURST SINE WAVE ELECTROPORATION ENHANCES DRUG DELIVERY BY DISRUPTING THE BLOOD-BRAIN BARRIER

Recently published in APL Bioengineering, a groundbreaking study by Georgia Tech and Virginia Tech teams investigates a unique strategy to battle glioblastoma, the most prominent malignant brain tumour, constituting over 50% of all malignant brain tumours. This work expands on earlier research on high-frequency irreversible electroporation (H-FIRE), a minimally invasive method that targets and destroys cancer cells using non-thermal electrical pulses. The blood-brain barrier (BBB) may be broken down using a novel technique called burst sine wave electroporation (B-SWE), which the researchers report. At the same time, the procedure does as little harm as possible to the surrounding healthy brain tissue.

The blood-brain barrier (BBB), which successfully defends the brain from toxins and filters out viruses in the circulatory system to prevent them from entering the central nervous system, poses a major obstacle to the treatment of brain malignancies. Though it also drastically hinders the delivery of 99 per cent of small-molecule drugs, this natural defensive system also severely limits the therapeutic choices available for illnesses like glioblastoma. The BBB, which is vital for protecting brain health but frequently obstructs the passage of bigger therapeutic molecules required for efficient tumour targeting and therapy, is largely to blame for the poor prognosis associated with glioblastoma. Because of the BBB's dual function, brain tumour treatment is a challenging task that requires innovative strategies that can overcome this formidable barrier.

The study compared the effects of burst sine wave electroporation (B-SWE) and high-frequency irreversible electroporation (H-FIRE) on blood-brain barrier (BBB) disruption, tissue ablation, and neuromuscular contractions. The researchers found that B-SWE caused greater disruption of the BBB with minimal tissue damage, but it also led to increased neuromuscular contractions, raising concerns about potential organ damage. By carefully adjusting the B-SWE dosage, the team minimized these adverse contractions without compromising BBB disruption, achieving a critical balance that allows for targeted drug delivery while preserving healthy brain tissue.

The most significant benefit of this study is its ability to guide the development of treatment plans that are specifically adapted to meet desired therapeutic goals. For the management of expanding tumours, clinicians can deliberately choose between burst sine wave electroporation (B-SWE) protocols, which offer substantial BBB disruption while maintaining the integrity of surrounding tissue in sensitive regions, or high-frequency irreversible electroporation (H-FIRE) protocols, which facilitate extensive disruption of the blood-brain barrier (BBB) accompanied by moderate tissue ablation. When treating brain tumours, this tactical adaptability improves the accuracy of therapeutic treatments and improves patient outcomes.

The next stage of this study will examine the effects of burst sine wave electroporation (B-SWE) using an animal model of brain cancer with the goal of conducting a thorough assessment of the sinusoidal waveform's effectiveness relative to the traditional high-frequency irreversible electroporation (H-FIRE) method. In the end, this comparative analysis will clarify the potential benefits of B-SWE in clinical applications for the treatment of glioblastoma and other malignant brain tumours by evaluating not only the relative efficacy of BBB disruption and tumour ablation achieved by each modality but also their respective impacts on surrounding healthy tissue.

TAHREEM JUNAID

(B.Sc. Biotechnology 3rd year)

<https://ls1.in/hZuWP>

SCI-ART

Sci-Art



COSMIC GENESIS

This sci-art appears to be a creative interpretation of the concept of "Cosmic Genesis" - the idea of the origin and birth of life within the vast, mysterious expanse of the universe. The central image depicts a fetal figure suspended within a glowing, golden womb-like orb, surrounded by a swirling, starry night sky reminiscent of Van Gogh's iconic "Starry Night" painting.

The fetal form, rendered in vivid shades of red, symbolizes the emergence of new life, while the celestial background with its spiraling, luminous patterns suggests the cosmic forces that give rise to and sustain existence. The overall impression is one of wonder, mystery, and the profound connection between the microcosm of the individual and the macrocosm of the universe.

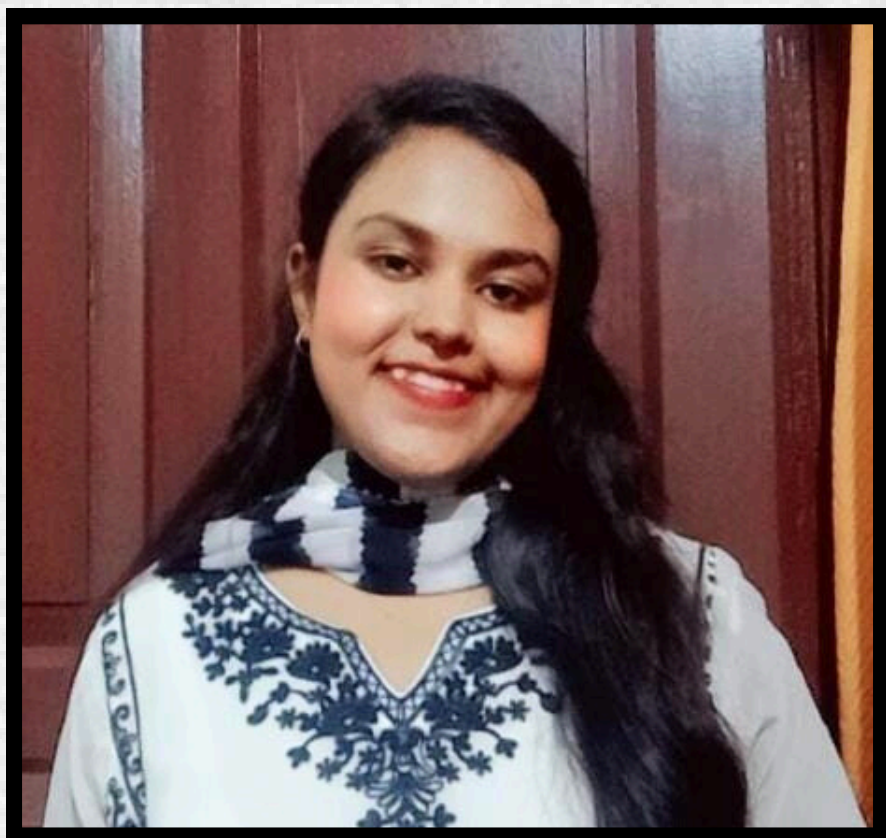
The image serves as a poetic and imaginative exploration of the "Cosmic Genesis" concept, capturing the essence of life's emergence from the mysterious depths of the universe.

ZEHRA ASIF HUSAIN
 (B.Sc. Biotechnology 3rd year)

STUDENT

Accomplishments

Abhishek, from the B.Sc. ZBC 2021-2024 cohort in the Department of Biosciences, has successfully secured campus placements with prominent organizations including Wipro HR Services India Pvt. Ltd., Sutherland, IGT Solutions, and YHills Edutech.



Fiza Jahangir, from the B.Sc. ZBC 2021-2024 batch in the Department of Biosciences, has achieved a notable campus placement at YHills Edutech Pvt. Ltd.

Wazeeha Zubair Ansari, a student from the B.Sc. ZBC 2021-2024 batch in the Department of Biosciences, has distinguished herself by securing 5th position in the entrance examination for the M.Sc. in Industrial Chemistry at Aligarh Muslim University.



Nashra Mubeen from the M.Sc. Microbiology 2022-2024 batch in the Department of Biosciences, has been selected for the prestigious project-based student training program at the CSIR-Centre for Cellular and Molecular Biology (CCMB). This opportunity is a part of the Scholarship and Mentorship Programme for Women in STEM Education and Careers, organized by the Research and Innovation Circle of Hyderabad (RICH) in collaboration with Syngene and the Biocon Foundation.



Yash Nigam, a member of the B.Sc. ZBC 2021-2024 batch of the Department of Biosciences, has achieved an impressive 2nd rank in the entrance examination for the M.Sc. in Botany at Allahabad University.

Mohd. Ramish, from the B.Sc. Biotechnology 2021-2024 batch in the Department of Biosciences, has attained 3rd place in the entrance examination for the M.Sc. in Biochemistry at Lucknow University.



INTERVIEW

Reports

CULTIVATING THE FUTURE: AN INTERVIEW

REPORT OF Dr.SWATI SHARMA



Dr. Swati Sharma is an assistant professor at Department of Biosciences, Integral University, Lucknow. She pursued and completed her academic journey at Lucknow University. Dr. Swati has published 37 research papers, 2 patents and many book chapters. Her passion and commitment is evident in her research. The ongoing research focuses on plant-microbial interactions integral to our terrestrial ecosystem. Her study concentrates to extend the shelf life of Broccoli, Carrots and perishable fruits like Tomatoes while preserving their nutritional value and inhibiting the growth of microorganisms.

The aim is to coat the fruit with an edible coating containing yeast, proteins, polysaccharides, sodium benzoate, or extract from medicinal herbs like Neem, Tulsi, and Green Tea to facilitate convenient transportation with the least damage and enable consumers to eat the fruits after only a little washing without ingesting dangerous chemicals. She has got patent on these coating as a research breakthrough. The research centres on post-harvest methods that support marketability and value addition, quality preservation, and shelf-life extension for usage as a supplement consequently promoting sustainable agriculture, financial gains, food safety and cleanliness. Her other ongoing projects include plant growth and survival rate under salt stress and PGPR sponsored by UP-CST. The soil salt concentration and the effect of bacteria in wheat, peas and maize is also being studied. Dr. Swati is a beacon of inspiration and a pride of our department and we look forward to her studies which proves to be beneficial to everyone of us.

Reported by:

Fari Fatima

(B.Sc. Biotechnology 2nd year)

Dr. MOHAMMAD ISRAIL ANSARI: A VISIONARY LEADER IN PLANT BIOTECHNOLOGY AND INNOVATION



Dr. Mohammad Israil Ansari, a distinguished professor at Lucknow University, embarked on his research career as a Research Associate in the Biochemistry Department of the Indian Institute of Sugarcane Research in Lucknow. His initial focus on sugarcane was driven by a profound ambition and a desire to delve deeper into the realms of plant science, which propelled him to the Institute of Botany, Academia Sinica in Taipei, Taiwan. There, he held the esteemed position of Research Scientist, where he achieved a significant milestone by becoming the first researcher to

clone and characterize GABA-transaminase. His groundbreaking work culminated in the publication of a pivotal research paper titled “Functional Loss of GABA Transaminase (GABA-T) Expressed Early Leaf Senescence Under Various Stress Conditions in *Arabidopsis thaliana*.”

Additionally, Dr. Ansari characterized mitochondrial DNA in mung bean, leading to the publication of another influential paper entitled “Correlation Between mt DNA Complexity and mt DNA Replication Mode in Developing Cotyledon Mitochondria During Mung Bean Seed Germination.” His unwavering dedication to research did not wane upon his return to India. In 2007, he joined the Amity Institute of Biotechnology at Amity University Uttar Pradesh, Lucknow, as an Associate Professor, where he coordinated numerous training programs and major projects for Master's degree students. He also served as a Board Member of the Paper Moderation Committee, all while advancing his research initiatives.

Dr. Ansari later transitioned to the esteemed Lucknow University, where he dedicated his research to investigating the impact of bioengineered silver nanoparticles on GABA accumulation during spinach leaf development and the senescence process. His exceptional contributions to the field have been recognized with the UDDEEPAN Award for Best Paper from the University of Lucknow on three separate occasions. Looking ahead, Dr. Ansari is poised to advance his research focus toward the bioengineering of nanoparticles for lettuce, aiming to enhance the nutritional and medicinal properties of this important crop. His academic journey is marked by a relentless pursuit of knowledge and innovation, establishing him as a prominent figure in the field of plant biotechnology.

Reported by:

Tahreem Junaid

(B.Sc. Biotechnology 3rd year)

STUDENT PARTICIPATION AT AKTU FOR NATIONAL SPACE DAY CELEBRATION BY INDIAN SPACE RESEARCH ORGANISATION



On August 8th, the esteemed ISRO hosted the National Space Day celebration at A. P. J. Abdul Kalam Technical University, Lucknow. It marked the successful 1-year journey of the Chandrayaan-3 mission. The occasion featured a notable speech by reputable ISRO scientists, who discussed the recent developments in space technology and forthcoming projects of the organization. The director of ISTRAC, Dr. Subramanya Ganesh T, delivered a thought-provoking speech and introduced the audience to the upcoming missions of ISRO like Gaganyaan, Aditya L-1 and Bhartiya Antriksha Station. The one-to-one interaction with the experts fuelled the desire to delve deeper into space-related studies. An intriguing quiz competition ensued following the address by the speaker. Integral University represented three teams of 3 participants each. The participants included Fari Fatima (BSc. Biotechnology), Irtiqua Miran, Zainab Fatima, Shubham Pandey, Zavil Huda Quraishi and Abdus Samad Khan of B. Tech, CSE, Abdul Rahman and Aradhna Yadav of D. pharm and a student of BA LLB Areesha Aafreen. The questions covered topics about ISRO and Chandrayaan history, space development from the first space mission to the latest. The teams' excellent performance indicated their strong preparation and enthusiasm for the competition. Another noteworthy part was the display of launch vehicles, rockets, landers, and other payload models. This event demonstrated the importance of such learning activities in preparing tomorrow's scientists and engineers.

Reported by:

Fari Fatima

(B.Sc. Biotechnology 2nd year)

DEEKSHARAMBH 2024



A BRIEF REPORT ON ARTISTIC AND LITERARY EVENTS HELD TO CELEBRATE DEEKSHARAMBH (STUDENT INTRODUCTION PROGRAM)



The Department of Biosciences, Faculty of Science, Integral University, Lucknow Organized “ARTISTIC AND LITERARY EVENTS” to celebrate “DEEKSHARAMBH (STUDENT INDUCTION PROGRAM)” On November 1st, 2024 in Hall 1, Central Auditorium at 9 a.m. Deeksharambh is a comprehensive student induction program designed to facilitate the smooth transition of new students into academic life. Aimed at fostering a sense of community and belonging, the program typically includes orientation sessions and interactive activities that introduce students to the university’s values, resources, and culture. Through engaging discussions and mentorship opportunities, Deeksharambh equips students with essential skills for academic success and personal development. The initiative emphasizes holistic growth, encouraging students to form connections, enhance their communication skills, and build a supportive network as they embark on their educational journey.

The literary activity invited students to compose a reflective piece on the intricacies of familial relationships, encouraging them to explore and articulate the dynamics that shape their connections with family members. Meanwhile, the artistic component challenged participants to visually represent their interpretation of an exemplary student through drawing, allowing them to creatively express their perceptions of qualities such as diligence, integrity, and leadership. Together, these activities aimed to foster both introspection and artistic expression, highlighting the diverse ways in which students can engage with and reflect on their experiences.

The judges for the event were: Dr. Swati Sharma and Dr. Sangeeta.

The faculty Coordinators for the event were: Dr. Swati Sharma, Dr. Arshi Siddiqui, Dr. Sangeeta, Dr. Shahida Hamid, Mr. Abdullah Hassan and Student Council Biosciences members.

The winners of the Artistic and Literary events were awarded the medals and certificates.

The names of the winners are as follows:

- Hiba Jamal (literary activity) B.Sc. Biotechnology
- Arisha Siddique (artistic activity) M.Sc. Biotechnology

A BRIEF REPORT ON SPORTS ACTIVITY HELD TO CELEBRATE DEEKSHARAMBH (STUDENT INDUCTION PROGRAM)



The Department of Biosciences, Faculty of Science, Integral University, Lucknow Organized “SPORTS ACTIVITY” to celebrate “DEEKSHARAMBH (STUDENT INDUCTION PROGRAM)” On August 2,nd 2024 in Hall 1, Central Auditorium at 2 p.m. which includes activities like Tug Of War and Badminton. Deeksharambh is a thorough student induction program that aims to help incoming students adjust to academic life. The program aims to develop a sense of community and belonging by introducing students to the university's principles, resources, and culture through orientation seminars and participatory activities. Deeksharambh prepares kids for academic success and personal development through interesting debates and mentorship opportunities. The initiative stresses holistic development, encouraging students to interact, improve their communication skills, and form a supportive network as they begin their scholastic path.

Organizing sports activities in Universities can be important for student's physical, mental and emotional well-being. Sports activities in universities can be important for students in many ways, including:

- **Physical and mental development:** Sports can help students develop physically, mentally, and emotionally. They can improve bone density, lung function, and muscle strength, and help prevent chronic diseases. Sports can also help students learn to manage their time, which can improve their ability to learn, focus, and think.
- **Character building:** Sports can help students develop skills like perseverance, respect, fair play, decision making, and self-confidence. They can also help students learn to accept setbacks and victories, which can help them deal with difficult situations.
- **Social development:** Sports events can provide opportunities for students to interact with each other, parents, and teachers, which can strengthen relationships and bonds. Sports can also teach students empathy, understanding, and mutual respect, which are important components of building meaningful relationships.

Sports events can also provide opportunities for students, parents, and teachers to interact, which can strengthen their bonds. They can serve as social gatherings where students can celebrate achievements, applaud resilience, and embrace sportsmanship. Here are the few glimpses from the sports activity that was held in our university:

The faculty coordinators for the event were: Dr. Mohd Khubaib, Dr. Mohd Rumman, Mr. Zaryab Shafi alongwith Student Council Biosciences.

The champions of the Sports Activity were awarded medals and certificates, and the following is the list of them:

1. BADMINTON: Mr. Mohd. Tauheed Wajid
2. TUG OF WAR: Mr. Akhlaq Zafar, Mr. Yazdaan, Mr. Faiz Ahmad, Ms. Binish, Ms. Jahnvi

A BRIEF REPORT ON OPEN MIC ACTIVITY HELD TO CELEBRATE DEEKSHARAMBH (STUDENT INDUCTION PROGRAM)



The Department of Biosciences at Integral University, Lucknow, hosted a three-day Student Induction Program (Deeksharambh) from August 1st to 3rd, 2024, held at Hall No. 1 of the Central Auditorium. The aim of deeksharambh was to aid students in transitioning and settling in the new environment under proper guidance. After initial introductions of the faculty members, campus facilities and future prospects on August 1st, the program continued to include various games, esteemed external professors, mindful discussions and many more activities. The last day of the program conducted on August 3rd, was coordinated by Dr. Durdana Yasin and Dr. Taiba Saeed. This day mainly focused on getting newly admitted students to get accustomed to universities lab and research programs and discuss opportunities that come with biosciences. Dr. Andleeb Khan and Dr. Sangeeta Singh, two distinguished professors of the department of biosciences, specified various topics related to the wonders of biosciences. Moreover, an open mic session was conducted to keep the event moving. To top it off, Dr. Manoj Prasad, Professor and J.C. Bose National Fellow, Department of Genetics, University of Delhi, South Campus, New Delhi gave an enlightening lecture that benefited a lot of students. Lastly, the program ended with a valedictory ceremony to felicitate students who won in various activities. Dr. Snober S. Mir, Dr. Manoj Prasad, Dr. Andleeb Khan and Dr. Swati Sharma jointly felicitated the winners with certificates and words of encouragement. In the end, the purpose of the event was accomplished and received positive responses from everyone involved.

SHINING

Alumna



My journey at Integral University began in 2016, fueled by a thirst for knowledge and a blossoming fascination with the intricate world of life sciences. Earning my Bachelor of Science in Life Sciences provided a solid foundation in biological principles. This foundation fueled my desire to delve deeper, leading me to pursue a Master of Science in Microbiology.

This academic foundation provided me with a deep understanding of the biological world's delicate threads.

With each course, I unravelled new mysteries, weaving a tapestry of knowledge that would guide me on my future endeavours.

One particularly impactful experience was my six-month dissertation at CSIR-Central Institute of Medicinal and Aromatic Plants. Here, I delved into the field of computational drug discovery, a transformative experience that culminated in my first published article in an international peer-reviewed journal. This accomplishment ignited a thrill for contributing to scientific advancement.

Graduation presented an exciting crossroads. Many microbiologists followed a familiar path, but my eagerness to learn and embrace new challenges steered me towards the burgeoning realm of Health Tech. This dynamic field, where healthcare meets technology, was reshaping the industry, and I wanted to be at the forefront of this revolution.

My role as a Health Tech Consultant in Saudi Arabia throws me into the heart of this exciting field. I navigate the complexities of digital health solutions, collaborate with leading experts, and leverage technology to improve patient care. This journey from Biosciences to Digital Health wouldn't have been possible without my relentless curiosity, strong work ethic, and a willingness to take responsibility. Beyond academics, my time at Integral University nurtured other valuable skills. Inspired by Dr. Swati Sharma, a phenomenal professor, I co-founded the Department of Biosciences' Artistic Society and Social Welfare Society. These initiatives, along with numerous art, cultural, and social campaigns, provided invaluable experiences in leadership and teamwork.

As I stand here today, a testament to Integral University's nurturing environment, I encourage current students to embrace curiosity and explore uncharted territories. The academic world may lay the foundation, but it's the willingness to adapt and venture beyond the familiar, coupled with a strong work ethic and eagerness to learn, that empowers you to shape the future.

IMANUL HASAN

M.Sc. Microbiology

2019 - 2020



13 CLIMATE ACTION





INTEGRAL UNIVERSITY

3 GOOD HEALTH AND WELL-BEING



EDITORIAL TEAM

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Dr. Arshi Siddiqui (mentor)