

KOSHA



e - MAGAZINE

DEPARTMENT OF BIOTECHNOLOGY ENGINEERING

Mr. Ahsan Massod

(HOD)

Department of Biotechnology

Chief Editor

Mrs. Namrata Budhiraja

Assistant Professor

Department of Biotechnology

Editor



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Discoveries in the field of biotechnology

Vol. 01 | July | 2024



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Chairman's Message



Er. Mahesh Goel

Chairman, Goel Groups
of Institutions

With the Grace of God & the blessings of our visionary grandparents Sri Roop Chand Agarwal & our Father Shri Ramji Lal Agarwal, we formed a Trust Sri Roop Chand Ramji Lal Educational Trust (RCRL) with a vision to educate youth from all walks of life. At present RCRL Trust encompasses four colleges GITM, GIPS, offering education in all fields of Engineering (Diploma, B.Tech & M.Tech), Pharmacy (D. Pharma, B.Pharma & M.Pharma). All the colleges are equipped with experienced and enthusiastic & extremely supportive Staff, infrastructure, the latest gadgets of the teaching-learning process & the best internet connectivity. Our aim is to train the students efficiently & effectively across professional boundaries so that they encourage as leaders & innovators in their chosen professions. At GGI, though students come from different backgrounds they are trained to be complete Professional & Wealth Creators for Self & Country at Large. I welcome you to be part of our journey to acquire knowledge that provides benefits to both self & mankind...

Vice Chairman's Message



Shri Murari Lal Goel

Vice Chairman, Goel
Groups of Institutions

There is no better way to pay back to society than providing the most desired and important infrastructure in the form of modern education.

Here at Goel Group of Institutions, we tend to build a resourceful individual out of a naive human, rendering them the wisdom which will lead to a broader perspective of life.

Goel Group proclaims a powerful vision for the future of young people and has a deep understanding of responsibility to help shape their lives.

The academics and extracurricular activities, add a remarkable educational experience in students life & I hope that we will also create the landscape of our campus which is lush green, sprawling and eco-friendly. We are confident that in the years to come we shall equip our students with not only the basic knowledge of their concerned discipline but also a deep insight into it, so that they can stand on their own and achieve perfection in the careers of their choice.

Director's Message



Dr. Alok Kumar Jain

Director
(Coordination & Planning)
Goel Group of Institutions

Institutions of higher education have a single-minded purpose of directing the youth of the nation towards the path of progress and prosperity by inculcating ethical values along with holistic education. At Goel Group of Institutions, we believe in providing a conducive environment where students learn, discover, and innovate so that they become knowledgeable future leaders.

Paved with a strong vision of "olq/kSo dqVqEcde" in the mind 'Er. Mahesh Kumar Goel' (Hon'ble Chairman GGI) established the Goel Group of Institutions (GGI), under the Roop Chand Ramji Lal (RCRL) Educational Trust in 2008 with the establishment of two institutions Goel Institute of Technology & Management & Goel Institute of Pharmacy and Sciences. Today GGI have six establishments, having more than 7000 students, enrolled in our different educational programs viz. Engineering, Medical Sciences (Ayurveda), Management, Pharmacy, Fine Arts, Commerce, Polytechnic & K12. All these institutions are successfully running in the same campus having a large sports ground, well equipped gymnasium, swimming pool, canteen, enriched library, safe transportation facility and separate hostel facilities for boys and girls.

GGI has successfully created unique systems for harboring a student centric environment where learning unfolds through a strong academic structure, fundamental teaching methodologies, persistent research and innovation. With the paramount and enthusiastic efforts of our team mates (administration, faculty and staff), our students are constantly securing higher ranks in AKTU, BTE and LU exams. GGI has a dedicated training & placement cell which is continuously providing the best opportunities to students during their programs. With profound happiness, I welcome all the new students, I am sure that the students choosing to be part of Goel Group of Institutions will find themselves to be in a hugely advantageous position to achieve their dream careers.

Director's Message



Dr. Rishi Asthana

Director, GITM

Goel Institute Of Technology And Management Is On A Fascinating Path Of Growth And Development. As It Has Completed 13 Years Of Its Establishment, It Has Evolved Itself Into One Of The Top Technological Institutes Of The State. Starting With, B.Tech. Courses Only, It Has Expanded To Postgraduate Programs In MBA, Mechanical Engineering, Electronics & Communication Engineering, And Computer Science And Engineering. It Has Also Facilitated The Students To Enter At Diploma Level In Mechanical, Civil, And Electrical Engineering Disciplines. The Faculty At The Institute Is A Good Blend Of Young And Experienced Academicians And Dedicated Supporting Staffs Who Work Hard To Develop Students Not Only Technically But Also Develop Their Intrinsic Skills For Overall Personality Development. The Institute Has Excellent Infrastructure, Center Of Excellence, Industry-Academia Collaboration, Tie-Ups With International And National Reputed Institutes For Online Course Latest Technology Labs, And 100 Mbps Internet Facility Round The Clock Helps The Students To Excel In Their Chosen Field. Institute Is Also Having A Training And Placement Cell Which Is Continuously Working Hard To Fill The Gap Between Industry And The Institute By Arranging Various Personality Development Programs, Seminars Workshops, And Industrial Visits And Thus Enhancing Their Scope Not Only In Campus Placement But Also In Jobs Of Their Choice At Large.

Dean's Message



Prof. (Dr.) Devendra Agarwal

Dean, GITM

Dear Students,

Since our inception in 2008, our institution has been dedicated to providing high-quality education with the mission of fostering competent technocrats and business managers who are also principled, value-based leaders. Our success in achieving this mission is attributed to our 100% interactive educational philosophy that is embraced by both students and faculty across the organization. GITM is a center of learning where we nurture young talent in diverse fields of engineering and management. Our primary focus is on imparting technical training that encourages curiosity and innovation among our students, providing them with the foundation to acquire quick learning abilities and adapt to the fast-changing needs of the industry. We are confident that our students will become valuable assets to any organization with their technical and managerial capabilities.

We are confident that you will enjoy your time here and have an enriching learning

experience. Together, we will work, learn, and grow, elevating the institute to new heights in the academic field and maintaining the highest standards while celebrating our diverse cultural heritage. Our faculty members are renowned for their excellence in teaching and research, with frequent publications in top journals. They bring innovation and diversity to the classroom, providing our students with memorable learning experiences. Furthermore, our students have the opportunity to interact with industry specialists and alumni who offer invaluable insights into various concepts based on their own experiences

Vision of Institute

Bring together rural and urban students provide them with quality education to become a complete professional.

Mission of Institute

- To inculcate professional excellence in students with ethical and moral values.
- To arrange and maintain state-of-the-art infrastructure to excel in studies.
- To nurture an academic atmosphere to cater to the need for academic fraternity
- To enhance industry institute interaction with close relationships with alumni.



Vision of Department

To create skill Biotech engineers who can innovate, invent and spread knowledge, especially for the welfare of society and the environment.

Mission of Department

- To create young biotechnologists for bio-industry who contribute towards the growth of the nation research & development
- To inculcate the principles of bioethics, safety regulations with strong moral and ethical values among students,
- To expose and bring students to par with the needs of the biotechnology industry.



Program Educational Objectives (PEO)

1. To inculcate biotechnology graduates for a successful technical aptitude and professional career in the biotechnology industry with enriched professional communication skills.
2. To promote our students for awareness of lifelong learning and to introduce them to professional ethics and practices.
3. To make our students competent for working knowledge as per the needs of the biotechnology industry and motivate them for higher studies and research fields with strong fundamentals to design, analyze and solve technical problems.

Program Specific Outcomes (PSO)

1. Graduates shall have the ability to apply fundamental knowledge of biological and engineering principles and use of scientific methods to apply quantitative, qualitative and computational skills to solve the problems in biotechnology industry and research organizations.
2. Graduates shall have the research-based knowledge viz., experimental design, analysis and interpretation of various biological data related to genetics and molecular biology, genetic engineering, and bioinformatics for fruitful developments in biotechnology.
3. Graduates shall have the ability to work in groups or individually with strong moral values to promote the importance of entrepreneurship, communication and management skills for the next generation biotechnologists.

Highlights of Department

- Well qualified and experienced faculties from eminent universities with proven track records of research publications.
- Resilient links to many organizations like CSIR, ICMR, ICAR, Coca Cola, ITLS Academy, MRD Life Sciences, The Royal Honey Bee Farming Society, Acube Lab and IBRI for training and research aptitude.
- Vigorous interactions with academia, industry personnel and clinicians to boost young minds through:
 - Organizing Seminars & Conferences.
 - Workshops, Webinars and Guest lectures.
 - Industrial Visits.
- The current trend of Biotechnology research includes Genetics & Molecular Biology, Genetic Engineering, Plant Biotechnology, Microbiology, Proteomics, Bioinformatics, Immunotechnology, Bioprocess Engineering and Food Technology.
- Excellent and consistent placement records.
- E-learning and online certified courses from many agencies like NPTEL, MOOCS, SWAYAM, IITs, TCS etc.
- Meritorious and rank holders in the AKTU examination.
- Personality Development classes are conducted for overall growth and better placements of the students.

Laboratories of Department

- Genetics & Molecular Biology Lab
- Genetic Engineering Lab
- Biochemistry & Analytical Techniques Lab
- Enzyme Engineering Lab
- Microbiology & Immunology Lab
- Plant Tissue Culture Lab
- Bioprocess Engineering – I Lab
- Bioprocess Engineering – II & Fermentation Biotechnology Lab
- Bioseparation and Down Stream Processing Lab
- Environmental Biotechnology Lab
- Bioinformatics Lab



Faculty Editorial Board Members



Ahsan Masood

Head of Department-
Biotechnology
(Chief Editor)



Namrata Budhiraja

Assistant Professor
(Editor)



Kanchan Bhatt

Assistant Professor
Innovation Ambesoder
GITM Innovation Council
(Editor Board Member)



Surya Mishra

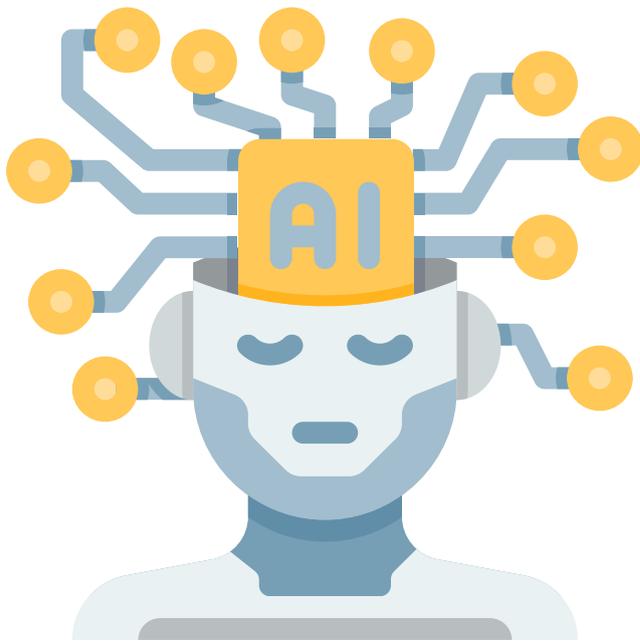
Assistant Professor
(Editor Board Member)

Article

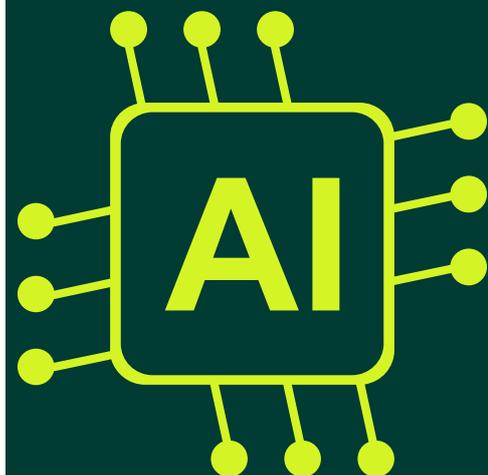
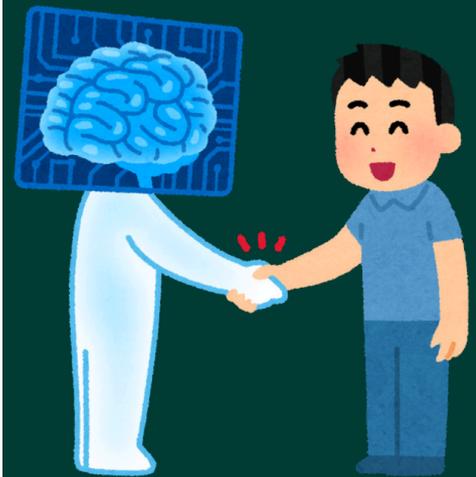
Role Of Artificial Intelligence (AI) In Revolutionizing the Field of Biotechnology

In the dynamic intersection of Artificial Intelligence (AI) and biotechnology, transformative breakthroughs are reshaping the landscape of healthcare. AI's ability to analyze vast biological datasets accelerates drug discovery, streamlines diagnostics, and personalizes treatment plans.

Machine learning algorithms decode intricate genetic patterns, enhancing our understanding of diseases at the molecular level. From predicting protein structures to optimizing drug design, AI empowers biotechnologists to navigate complexities with unprecedented efficiency. As we witness the symbiosis of AI and Biotech, the promise of targeted therapies and personalized medicine heralds a new era, fostering hope for more effective, tailored interventions in the realm of human health.



Mr. Ahsan Masood
Head of Department
Department of
Biotechnology Engineering



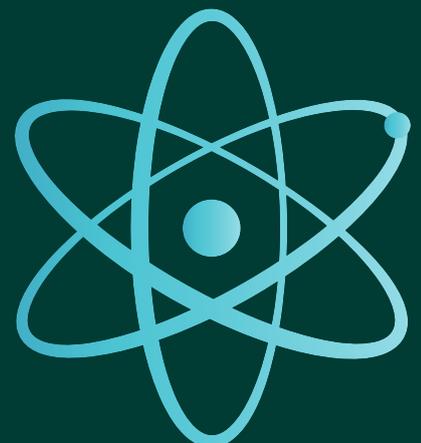
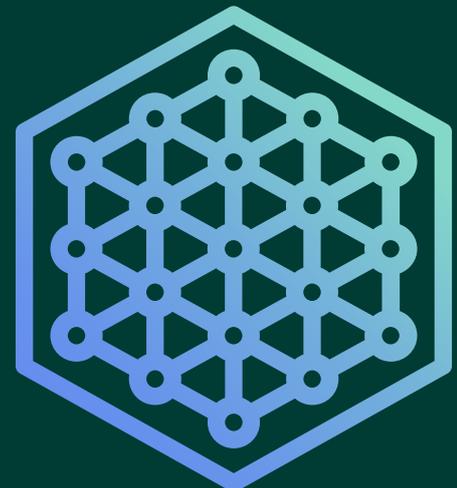
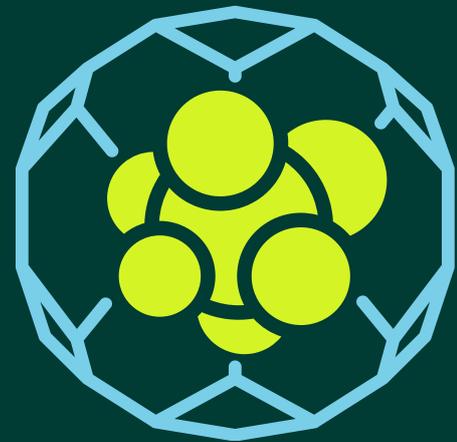
Article

Revolutionizing Nanobiotechnology: Bridging the Micro and Macro Worlds

Nanobiotechnology, a convergence of nanotechnology and biotechnology, holds immense promise in transforming various fields such as medicine, agriculture, environmental science, and materials science. By manipulating matter at the nanoscale, scientists can design novel tools and devices to understand and manipulate biological systems with unprecedented precision. In recent years, groundbreaking advancements have pushed the boundaries of what's possible in this interdisciplinary field, revolutionizing our approach to healthcare, sustainable agriculture, and beyond. One of the most exciting areas of nanobiotechnology is nanomedicine, where nanoscale materials and devices are applied for diagnosis, treatment, and monitoring of diseases. Beyond healthcare, nanobiotechnology is revolutionizing agriculture by enhancing crop productivity, sustainability, and food safety. Nanomaterials, such as nanopesticides and nanofertilizers, enable targeted delivery of agrochemicals, reducing environmental pollution and optimizing resource utilization. Nanosensors can monitor soil quality, crop health, and environmental conditions in real-time, allowing farmers to make informed decisions and maximize yields. Furthermore, nanotechnology-based packaging materials can extend the shelf life of perishable foods and minimize food spoilage, addressing global food security challenges. While the potential of nanobiotechnology is vast, several challenges must be addressed to realize its full impact. Safety concerns regarding the toxicity and long-term effects of nanomaterials raise ethical and regulatory considerations. Standardization of fabrication techniques and characterization methods is essential to ensure reproducibility and reliability of nanobiotechnological devices. Moreover, interdisciplinary collaboration between scientists, engineers, clinicians, and policymakers is crucial to translate laboratory discoveries into clinical applications and commercial products



Ms. Namrata Budhiraja
Assistant Professor
Department of
Biotechnology Engineering



Article

Stem Cells in Action : Recent Break thoughts in Regenerative Medicine

In the ever-evolving landscape of regenerative medicine, stem cells have emerged as the unsung heroes, holding the promise of repairing and rejuvenating damaged tissues. Stem cells are undifferentiated cells with the unique ability to develop into various specialized cell types in the body

Recent breakthroughs showcase their remarkable potential. Scientists have successfully harnessed induced pluripotent stem cells (iPSCs) to treat a myriad of diseases, from spinal cord injuries to degenerative disorders. Pioneering studies reveal the ability of stem cells to not only replace damaged cells but also stimulate the body's natural healing processes. These advancements mark a critical turning point in healthcare, offering new hope for patients worldwide. As researchers delve deeper into the therapeutic potential of stem cells, the horizon of possibilities in regenerative medicine continues to expand, bringing us closer to a future where debilitating conditions may become a thing of the past.



Ms. Kanchan Bhatt
Innovation
Ambassador, IIC-GITM
Convenor BIOME Club
Assistant Professor at
Department of
Biotechnology, GITM



Article

"Biopharmaceuticals: Pioneering Precision Medicine Through Innovative Drug Development"

The field of biopharmaceuticals has witnessed remarkable advancements in recent years, revolutionizing the landscape of drug development and therapy. Biopharmaceuticals are medicinal products derived from biological sources, such as living organisms or their products. Unlike traditional chemical drugs, which are synthesized through chemical processes, biopharmaceuticals are produced using biotechnological methods, including recombinant DNA technology and cell culture techniques. This unique approach has led to the development of highly targeted and effective therapies for a wide range of diseases, including cancer, autoimmune disorders, and genetic conditions.

One of the key innovations in biopharmaceuticals is the use of monoclonal antibodies (mAbs). These are laboratory-produced antibodies that can target specific antigens, such as proteins on cancer cells or inflammatory molecules in autoimmune diseases. mAbs have revolutionized the treatment of diseases like rheumatoid arthritis, psoriasis, and certain types of cancer, offering patients more effective and less toxic treatment options.

Another significant advancement in biopharmaceuticals is the development of therapeutic proteins and peptides. These include hormones, enzymes, and growth factors that can be used to treat various conditions, such as diabetes, hemophilia, and growth disorders. By replacing or supplementing deficient proteins in the body, these biopharmaceuticals can improve patient outcomes and quality of life.

In addition to mAbs and therapeutic proteins, biopharmaceuticals also include nucleic acid-based therapies, such as gene therapies and RNA-based drugs. These innovative approaches aim to treat diseases at the genetic level, offering the potential for cures rather than just symptom management. Recent successes in gene therapy, particularly in treating rare genetic disorders, highlight the transformative potential of these technologies.

The development of biopharmaceuticals has been facilitated by advances in biotechnology, bioinformatics, and personalized medicine. These fields have enabled researchers to better understand disease mechanisms, identify new drug targets, and tailor treatments to individual patients based on their genetic makeup and other factors. This personalized approach has the potential to improve treatment outcomes and reduce adverse effects.



Ms. Surya Mishra
Assistant Professor at
Department of
Biotechnology, GITM



Article

CADD: The Future of Medication

As human civilizations is growing diseases are also growing in the world that has led to immense need of medication and treatment, to sustain with such need of medication there comes the existence of Computer aided drug designing(CADD). CADD is technology that employs computer software in order to predict the ability of molecule to bind with receptor followed by predicting its toxicity and its action on body and brain, It can also predict about drug likeliness of the compound (By employing Rule of Lipinski's). There have been a lot of different drugs that are discovered through this procedure some of them are Isoniazid for Tuberculosis, Norfloxacin for Gastrointestinal Tract and many more and When it comes to present time it is being incorporated for Diseases like Cancer, and Alzheimer's and the results obtained from it are³ quite satisfactory and Futuristic



Rahul Tiwari
Biotech-4th Year

Abhishek Gupta
Biotech-4th Year

Sweta Singh
Biotech-4th Year



Article

Printing the Future: 3D Bioprinting Revolutionizes Tissue Regeneration

Imagine a future where damaged organs and tissues are repaired not with transplants, but with bioprinted replacements made from a patient's own cells. This revolutionary concept is inching closer to reality thanks to the burgeoning field of 3D bioprinting. Unlike traditional 3D printing, bioprinting utilizes bioinks - a blend of biocompatible materials and living cells. These bioinks are loaded into a specialized printer, which precisely deposits them layer by layer, building complex 3D structures that mimic natural tissues.

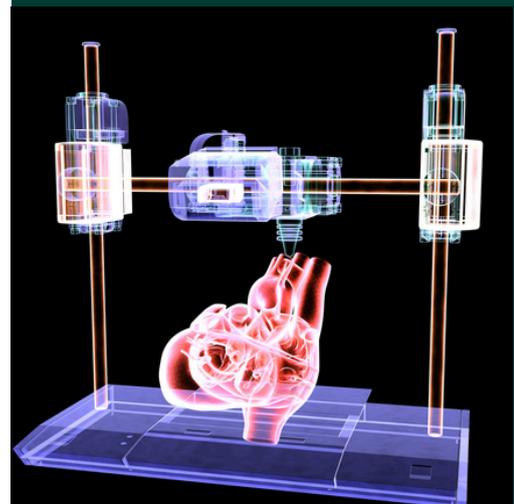
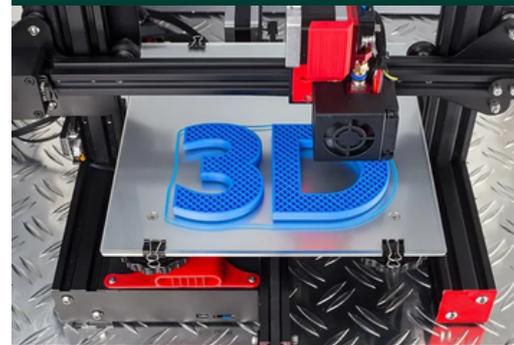
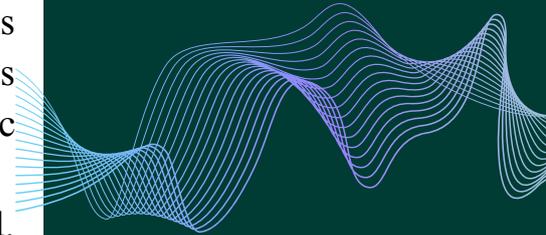
The implications for regenerative medicine are profound. Imagine personalized skin grafts for burn victims, engineered heart patches that seamlessly integrate with damaged cardiac tissue, or even the bioprinting of intricate bone structures to mend complex fractures - all using a patient's own cells, thereby eliminating the risk of immunological rejection.

Researchers are actively developing bioinks that not only replicate the structural properties of native tissues but also incorporate biochemical cues to guide cellular organization and function. A major hurdle lies in vascularization - the formation of blood vessels within the bioprinted constructs, essential for nutrient delivery and waste removal. However, significant strides are being made in this area, with researchers exploring various strategies to integrate microfluidic channels or co-printing vascular networks within the bioprinted tissues.

While challenges persist - perfecting the bioprinting process for complex organs and ensuring the long-term viability and functionality of bioprinted tissues are just a few - 3D bioprinting holds immense promise. It has the potential to usher in a paradigm shift in regenerative medicine, offering a future where organ failure, debilitating injuries, and a multitude of medical conditions can be addressed by simply "printing" a replacement part. This technology has the potential to save countless lives and improve the quality of life for millions.



Ritik Saini
Biotech-3rd Year



Article

Introduction of Statin treatment intensity and cerebral vasomotor reactivity response in patients with ischemic stroke

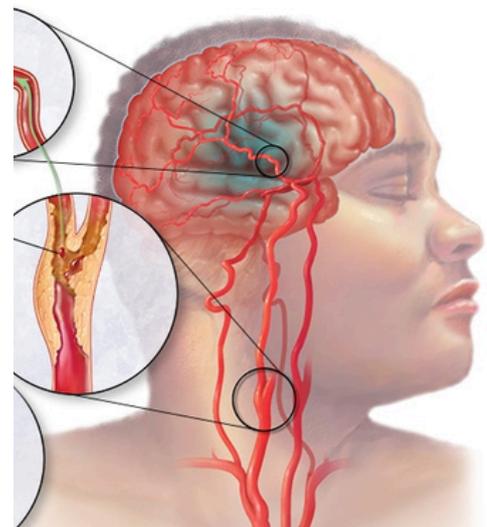
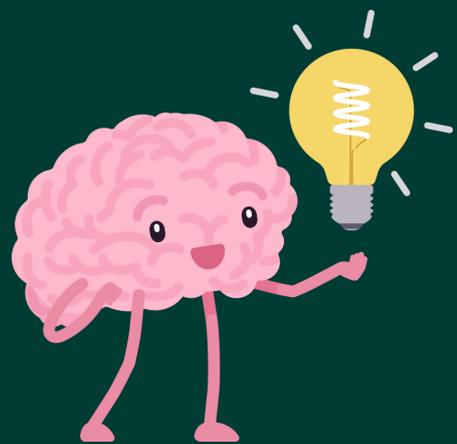
Ischemic stroke is a leading cause for mortality and disability worldwide. Despite the acute nature of stroke at the time of presentation, the underlying vascular damage is a consequence of prolonged accumulations of diverse pathologies, including inflammation, atherosclerosis, and endothelial damage. Thus, assessing the extent of cerebrovascular dysfunction can offer valuable insights into the likelihood of future stroke occurrences and post-stroke outcomes.

Cerebral vasomotor reactivity (VMR) serves as an established indicator of the cerebral vasculature's ability to increase blood flow in response to hypercapnia. Clinically, compromised VMR is linked to a diminished cerebrovascular reserve and an elevated risk of stroke. Furthermore, impaired VMR is associated with a higher risk of subcortical infarcts and small vessel vasculopathy in individuals with a history of transient ischemic attack and stroke. Various methodologies can be employed to assess VMR, and the breath-hold test emerges as a convenient and noninvasive approach, utilizing transcranial Doppler (TCD) ultrasound to measure the "breath-holding index" (BHI). During this procedure, patients can induce hypercapnia by briefly pausing respiration while recording simultaneous changes in cerebrovascular hemodynamics. This measure is widely utilized to evaluate the functional integrity of brain vessels, with higher BHI values indicating higher VMR.

Previous studies have demonstrated that statins, in addition to their lipid-lowering properties, confer beneficial effects on endothelial cell functions and reduce inflammation through a direct impact on endothelial cells. Theoretically, and in accordance with previous literature, statins may positively influence VMR, potentially benefiting patients by reducing the occurrence of strokes and improving clinical outcomes. In this study, we assessed VMR using BHI² during the fourth-week follow-up period in patients recovering from ischemic stroke. Comparisons were drawn between BHI values and the prescribed statin intensity, aiming to explore the association between statin therapy intensity and VMR response.



Falak Naz
Biotech-3rd Year



Article

Rare quadruple- helix DNA

New probes allow scientists to see four-stranded DNA interacting with molecules inside living human cells, unravelling its role in cellular processes.

DNA usually forms the classic double helix shape of two strands wound around each other. While DNA can form some more exotic shapes in test tubes, few are seen in real living cells.

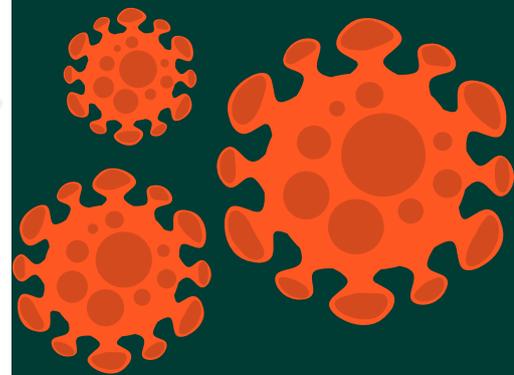
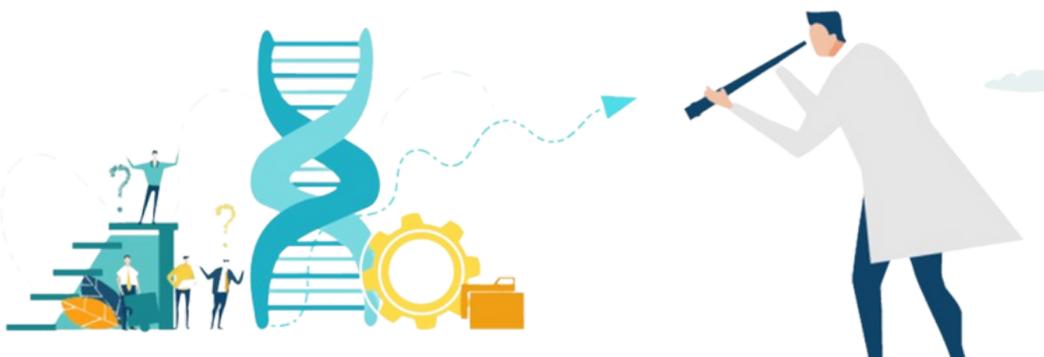
G-quadruplexes play an important role in a wide variety of processes vital for life, and in a range of diseases, but the missing link has been imaging this structure directly in living cells.

However, four-stranded DNA, known as G-quadruplex, has recently been seen forming naturally in human cells. Now, in new research published today in Nature Communications, a team led by Imperial College London scientists have created new probes that can see how G-quadruplexes are interacting with other molecules inside living cells.

G-quadruplexes are found in higher concentrations in cancer cells, so are thought to play a role in the disease. The probes reveal how G-quadruplexes are 'unwound' by certain proteins, and can also help identify molecules that bind to G-quadruplexes, leading to potential new drug targets that can disrupt their activity. Many researchers have been interested in the potential of G-quadruplex binding molecules as potential drugs for diseases such as cancers. Our method will help to progress our understanding of these potential new drugs.



Ritesh Kumar Verma
Biotech-2nd Year



Article

Bioenergy & Biomanufacturing

In recent years, the fields of bioenergy and biomanufacturing have gained significant attention due to their pivotal roles in fostering sustainable energy generation, efficient resource utilization, and the production of valuable bio-based products. The integration of biotechnology principles with energy production and manufacturing processes has opened up new avenues for addressing global energy challenges and promoting environmentally conscious industrial practices. Potential topics include but are not limited to:

1. Bioenergy Generation:

Advances in biofuel production (bioethanol, biodiesel, biohydrogen, etc.).

Microbial electrochemical systems for energy extraction.

Algal bioenergy and bioproducts.

Biomass conversion technologies.

Biogas production and upgrading.

2. Biomanufacturing Processes:

Engineering microorganisms for bio-based product synthesis.

Metabolic engineering for enhanced bioproduction.

Synthetic biology approaches in biomanufacturing.

Bioprocess optimization and scale-up.

Upcycling of waste materials into valuable products.



Kratika Srivastava
Biotech-2nd Year



Article

Discoveries in the field of Biotechnology around the world

Genetically Engineered Plants that Resist Environmental Stresses
Biotechnology researchers at the University of Pennsylvania have discovered that the overexpression of a gene, GRP8, increases the production of root hairs and thus, increased the surface area for water and nutrient absorption. The overexpression of this glycine-rich RNA binding protein has also been found to improve plant tolerance to phosphate starvation, enhancing resistance to environmental stresses and reducing the need for fertilizer.

Recycling Plastics with Synthetic Organisms
Macquarie University researchers have developed a novel method that uses engineered microbial synthesis to produce moth, fungal and/or bacteria PE degrading enzymes. The result is the degradation or recycling of PE into commercially viable products (such as biofuels, fertilizers or other chemical products), creating an alternative to a major component of environmental plastic waste.

Genetically Modified Fiber Crops to make Waterproof Materials
Biotech researchers at the Luxembourg Institute of Science and Technology have developed an alternative method to create fiber crops that express amphipathic proteins which can form monolayers at hydrophilic-hydrophobic interfaces. These could work as a suitable substitute to widely-used chemical methods used to achieve permeability, as this method doesn't cause negative changes in the bast fibers morphology.

Naturally Occurring, Biocompatible Proteins for Tunable Proton Conduction
Researchers at the University of California, Irvine have fabricated a biocompatible and versatile proton-conducting material from naturally occurring, structural proteins found in cephalopods. These Proton-Conducting Cephalopod Proteins ("PCCPs") can withstand heat and acidity and can be modified using genetic engineering techniques to tune the resulting electrical properties to different specifications, allowing ease of integration into protonic flow systems.



Soumya Tripathi
Biotech-2nd Year



Article

Title: Beyond the Double helix: Triplex DNA and its role in genetic regulation.

Introduction:

Through the cognition of DNA's double helix structure which was announced by the Watson and Crick at the last year of 1953, the theory of heredity completely changed. But there's something else: DNA consists of three strands twisted to form a helix. It operates the same way as DNA but double stranded; it is with three strands instead of two. In this article, triplex DNA is unpackaged as it is discussed what it is, how it works, and how it can be used in biotechnology and the medicine field.

Understanding Triplex DNA:

Imagine the DNA as a twisted ladder, which has rails on which the protein information is read. It is the triple helix of the DNA which is: the third rail. For this daredevil way, the rail can be enhanced that it interconnects with the ladder rungs in a different way while making a strong bond. Its links the whole body together and strengthens it. Stable nucleotide base-pairs are formed thereby.

Functions and Roles:

Triplex DNA acts as a workhorse in the cells of our body to regulate genes, duplicates the DNA and defends it from damage in a range of ways. On the other hand, precisely controlling one gene is a tough job. The able to turn on genes or off is one feature of triplex DNA that is vital it wont on how the cell is working.

Biotechnological Applications:

The Multiplex DNA's particular traits are applied in Biotech. Scientists could come up with Triplex DNA molecules which could be targeted at the specific genes without mistakes. This is why we need funding for research on genetic engineering. The possibilities are endless: from correcting genes to detecting diseases or even battling cancer.

Challenges and Future Directions:

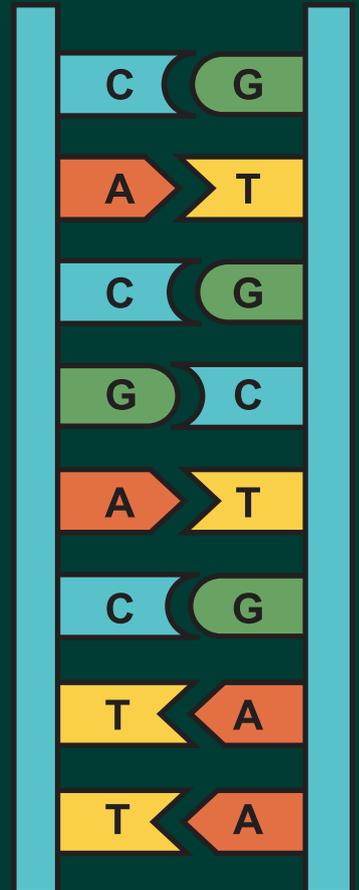
The barriers to the use of triplex DNA in the technology are not small, they include, but not only, the finding of safe and effective methods for taking it into cells and for making it to target only the right genes. Further studies must be made to find solutions to problems associated with it and to investigate into the world of the triplex DNA molecule.

Conclusion:

Triplex DNA is the equivalent of a new horizon in genetics. Cutting edge technologies such as genome mapping, gene editing, and genetic engineering are now commonly used as tools to shape and improve life. Triplex DNA "digging" can make great sense and give us excellent hope for medicate therapies and biotech innovations. The more the scientists root out its envelope, the more enchanting we can be, with some brilliant discovery looming in the future.



Shreya Singh
Biotech-2nd Year



Article

Title:- Unlocking the mystery of golden blood

It refers to a rare blood type known as Rh-null or Rhnull. People with this blood type lack all Rh antigens, which are part of the Rh blood group system. This makes their blood incredibly valuable for medical purposes because it can be transfused into anyone, regardless of their blood type, without causing a reaction.

Due to its rarity, only a few dozen people worldwide are known to have this blood type. It's often called "golden blood" because it's considered the universal blood type for transfusions. This blood type is crucial for patients with rare blood types or those with multiple transfusion needs.

It was first seen in Aboriginal Australians.

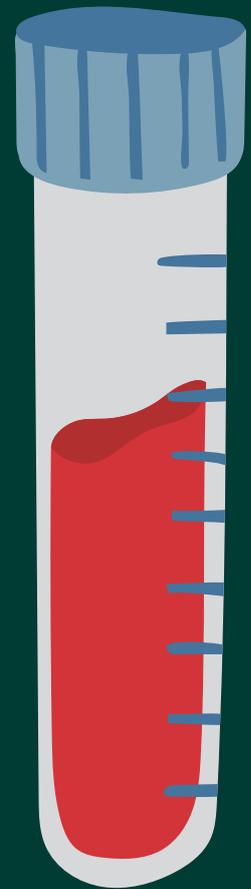
Golden blood type, also known as Rh-null, is an extremely rare blood type that is inherited through genetics. The inheritance of blood types, including Rh-null, follows the same principles as other blood types. The Rh blood group system is determined by specific genes that are inherited from parents.

In the case of Rh-null blood type, a person must inherit two copies of a recessive gene for the Rh antigen to be absent. This means that both parents must pass on the gene for Rh-null in order for a child to have this rare blood type. If only one parent passes on the gene, the child will be a carrier but not have the Rh-null blood type.

Because of the rarity of the Rh-null blood type, it is essential to understand the genetic inheritance patterns to identify and manage this unique blood type effectively.



Anjali Yadav
Biotech-2nd Year



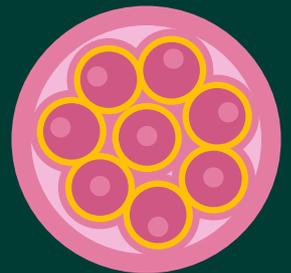
Article

Title:- Identification of embryonic lethal genes in humans by autozygosity

The study "identification of embryonic lethal genes in humans by autozygosity mapping and exome sequencing in consanguineous families" focuses on identifying genes associated with embryonic lethality using a combination of autozygosity mapping and exome sequencing in families with consanguineous backgrounds. By analyzing regions of homozygosity and sequencing the exomes of affected individuals within these families, researchers aim to pinpoint genetic variants linked to embryonic lethality. The study likely employs next-generation sequencing technologies and bioinformatics tools to sift through large datasets and identify candidate genes. Understanding the genetic basis of embryonic lethality in humans is crucial for unraveling the mechanisms underlying prenatal development and could lead to improved genetic counseling and prenatal diagnosis for families at risk of such conditions.



Shradha Singh
Biotech-2nd Year



Article

Title:- CRISPR- Cas9

A recent exciting discovery in biotechnology is the development of CRISPR-Cas9 technology. CRISPR-Cas9 is a revolutionary gene-editing tool that allows scientists to precisely modify genes within organisms. It has opened up new possibilities in areas like genetic engineering, agriculture, and medicine. Researchers are continually exploring its potential applications in treating genetic disorders, creating genetically modified crops, and even fighting diseases like cancer.

1. **CRISPR-Cas9?*** - CRISPR-Cas9 is a powerful gene-editing tool derived from a natural defense mechanism found in bacteria. It consists of two main components: CRISPR, which is a segment of DNA containing short, repetitive sequences, and Cas9, a protein that acts as molecular scissors to cut DNA.

2. ****How does it work?*** - Describe the process of how CRISPR-Cas9 works. The CRISPR component guides the Cas9 protein to a specific location in the DNA sequence, where Cas9 makes a precise cut. This cut can be used to disable a gene, repair a mutation, or insert new genetic material.

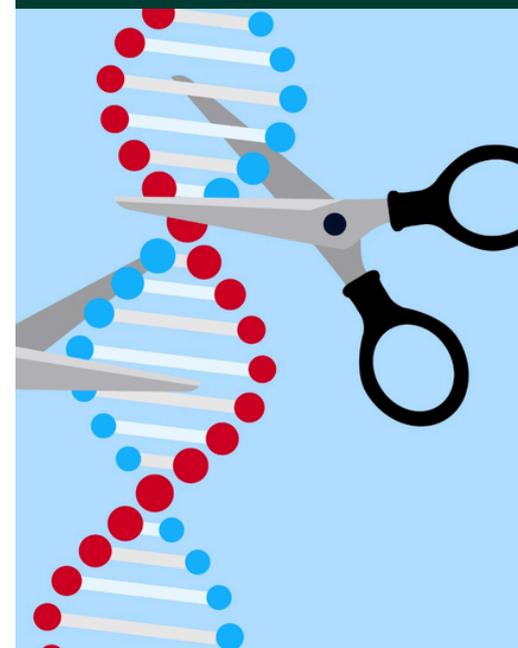
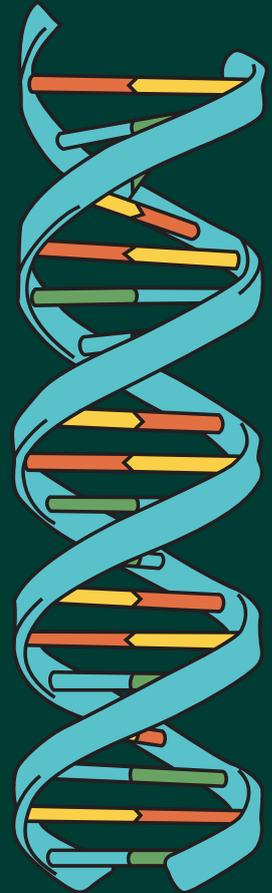
3. ****Applications of CRISPR-Cas9*** - Discuss the wide range of applications of CRISPR-Cas9 technology. This includes potential uses in medicine, such as treating genetic disorders like sickle cell anemia, creating more effective cancer therapies, and developing personalized medicine. In agriculture, CRISPR-Cas9 can be used to create crops with improved traits, such as drought resistance or increased nutritional value.

4. ****Ethical Considerations*** - Mention the ethical considerations surrounding the use of CRISPR-Cas9, such as concerns about unintended genetic changes, the potential for designer babies, and the need for regulatory oversight.

It's a cutting-edge technology that's reshaping the field of biotechnology!



Preeti Singh
Biotech-2nd Year



Article

Food Biotechnology

Food biotechnology is an advanced technology which modifies the living organisms such as microorganisms, animals and plants and also for the production of pharmaceuticals , food etc.

Food biotechnology is the emerging technology of biology , chemistry with technology through which enhance agricultural practices , nutrition and food production.

There are several aspects which plays an crucial role in food biotechnology like genetic engineering , fermentation and food preservation , enzymes in food processing which helps in high yielding of crops , reduce environmental impact , enhanced nutritional value and food security.

There are some important applications of food biotechnology are :-

Genetically modified organisms

Biofortification

Enzyme technology

Fermentation

Food safety and Quality assurance

Food packaging and preservation

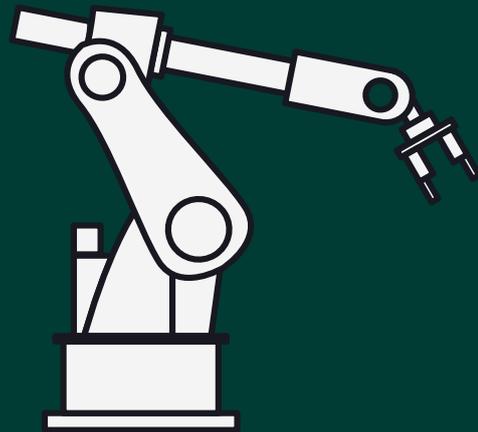
Nutraceuticals and Functional foods

Agricultural Biotechnology

These applications of food biotechnology importance in addressing global challenges related to food security and safety



Anika Soni
Biotech-2nd Year



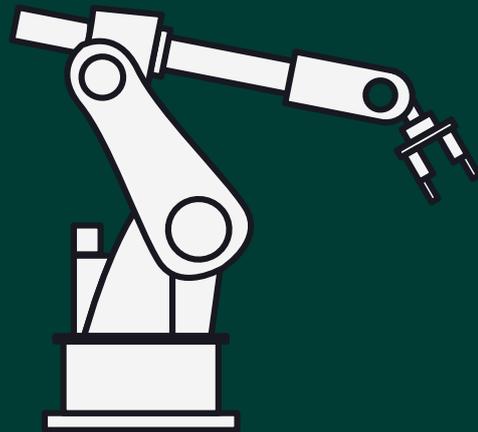
Article

Why we need to adapt Algae as superfood

In recent years, there has been a growing interest in exploring alternative sources of food that can address the global challenges of population growth, food security, and sustainability. As a result, microalgae have emerged as a potential future superfood due to their high protein content. Microalgae are single-celled organisms that can be found in various aquatic environments, ranging from freshwater lakes to oceans. Microalgae are not only a promising source of protein but also contain other essential nutrients such as omega-3 long chain polyunsaturated fatty acids, minerals, antioxidants, vitamins, carotenoids, phycobilins, polysaccharides, and sterols (Bernaerts, T. et al., 2018). These bioactive compounds present in microalgae contribute to their high nutritional value, making them an attractive option for incorporating into food products. The versatile nature of microalgae cultivation makes it a sustainable and cost-effective option for food production. Notably, microalgae can be grown on a variety of substrates, including effluent water and food waste, which minimizes the special needs for their cultivation. The wide array of functional ingredients found in microalgae opens up a multitude of food applications, offering not only nutritional benefits but also enhanced functionality in food products. With the increasing trend towards developing healthy and sustainable food options, microalgae have become a powerful reserve of functional ingredients that are suitable for a wide range of food applications. This has led to their utilization in the production of various food items like pasta, snack foods, candy bars, gums, and beverages, reflecting the growing interest in their nutritional benefits. However, in order to fully harness the potential of microalgae in food products, further research is needed to understand their impact on food structure and processability.



Isarar Siddique
Biotech-3rd Year



Article

Discovery of a New Friend: Introducing Pantoea Tagorei

A living diamond found in soil of an open-cast coal mine of Jharia, Jharkhand, India. Scientists have isolated tiny fortune - another strain of microscopic organisms MR1 (Mine Rhizosphere) named *Pantoea Tagorei*. This little member, named *Pantoea Tagorei* on regard of the Nobel laureate Rabindranath Tagore, this is a powerful companion for plants.

As usual like most bacteria, it can survive in harsh environments like salty environments and extreme temperatures. In any case, its most astonishing ability is its capacity to unlocking hidden nutrients. It can break down heavy potassium compounds, making them easily accessible for plants to grow strong and healthy.

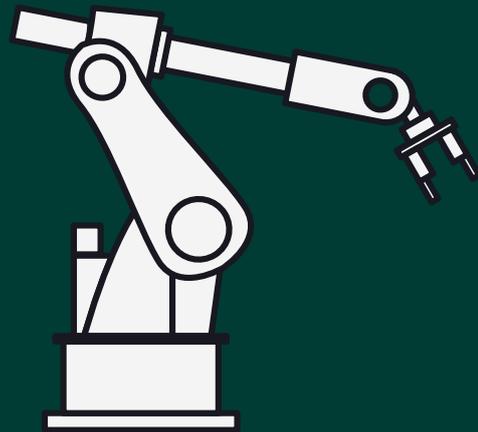
Imagine barren terrains, failed to help crops to grow. *Pantoea Tagorei* could be the way to transforming such land's soil into fertile land. By acting as a natural fertilizer, it could help in high yields production and help farmers regarding nutrient-deficient soil problem.

But wait there is something else, this friendly bacteria isn't just have a limited power. It may also have other superpowers for plants, like boosting root growth and protecting them from harmful diseases, according to studies.

While more research is needed to completely comprehend its true potential, *Pantoea Tagorei* offers a brief look into a future where nature's tiny living partners can change farming. We might be able to find long-term solutions for sustaining a healthy planet and feeding a large population by taking advantage of its unique capabilities.



Arshi Niyaz
Biotech-2nd Year



Faculty Achievement

Ms. Namrata Budhiraja



Student Achievement



GOEL
INSTITUTE OF TECHNOLOGY & MANAGEMENT
LUCKNOW



PROUD MOMENT Mr. RAHUL TIWARI

B.Tech IV Year (Biotechnology Engineering)

Star Ranker

GATE 2024

scoring All India Rank in both.

GATE BT (AIR-55) | GATE XL (AIR-49)

BIOTECHNOLOGY

LIFESCIENCES

Qualified TIFR JGEEBILS



Student Achievement

Mr. Kashif Siddiqui



School of Minerals, Metallurgical and Materials Engineering
भारतीय प्रौद्योगिकी संस्थान भुवनेश्वर
Indian Institute of Technology Bhubaneswar

Dr. Kisor Kumar Sahu
Associate Professor

Date: 24th December, 2023

To whomsoever it may concern

This is to certify that Mr. Kashif Raza Siddique has been offered an internship position with me starting from today, 24th December, 2023 on a project dealing with Rare Earth extraction.

I wish him all the success in his life.

(Dr. Kisor Kumar Sahu)

Room 103 SMMME building | Indian Institute of Technology Bhubaneswar | Bhubaneswar 752050 | Odisha | India
P: +91-674-2576174 | Mobile: (+91)801 802 0053 | Email: kisorsahu@iitbbs.ac.in
Web: <http://www.iitbbs.ac.in/profile.php/kisorsahu/>
Google Scholar: <http://scholar.google.com/citations?hl=en&user=&user=138GzMAAAAJ>



डॉ० पी० मण्डल
प्राध्यापक
Dr. P. Mondal
Professor

भारतीय प्रौद्योगिकी संस्थान रुड़की

रासायनिक अभियांत्रिकी विभाग
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Fax : +91 - 1332 - 276535, 273560
e-mail : mondal2001@gmail.com; pmondfeh@itr.ac.in

Date: 28.09.23

To Whom it May Concern

This is to certify that Mr. Kashif Raza Siddique, a student of Goel Institute of Technology and Management, Lucknow, has worked in the Sustainable Processing and Water Treatment Lab, Department of Chemical Engineering, IIT Roorkee during 20th August 2023 to 28th September 2023. He has worked on the topic "Management of sludge generated through the treatment of arsenic contaminated water using electrocoagulation technique". He worked well in this topic and his behaviour in the laboratory was excellent. I wish him all success in his endeavour.

P Mondal

Student Achievement

Arshi Niyaz



Centre for Ecological Sciences
INDIAN INSTITUTE OF SCIENCE

Maria Thaker, Ph.D.
Associate Professor

CERTIFICATE

This is to certify that **Ms. Arshi Niyaj**, a student of Goel Institute of Technology and Management (Lucknow), conducted an internship in my laboratory at the Centre for Ecological Sciences, Indian Institute of Science from 30th March to 30th April, 2023.

During that period, **Ms Arshi** worked on a project, entitled "Nutritional Ecology of the Indian Spiny-Tailed Lizard". The project involved data extraction and image analysis. Specifically, he analyzed digital imagery of vegetation plots of 1 sq.m. using photoshop. This involved editing and overlaying of images to create gridded plot image & worked closely with a PhD



Certificate of Publication



We acknowledge the manuscript

Enhancing Biofuel Production Through Nanoparticle-assisted Fermentation: A Comparative Study

Submitted by

Arshi Niyaz

Published in *Journal of Alternate Energy Sources & Technologies*

ISSN 2230-7982 *Year* 2023 *Volume* 14 *Issue* 03



Aakarna Mehta
Director's Signature



INDIAN INSTITUTE OF TECHNOLOGY INDORE

(An autonomous institute under the Ministry of Education, Government of India)

e-CERTIFICATE

This is to certify that **Ms. Arshi Niyaz** has successfully completed the "Online Internship for the Undergraduate Students" with IIT Indore Faculty Mentor Dr. Kiran Bala, Department of Biosciences and Biomedical Engineering from January 2 to February 2, 2023. He has worked on the area entitled "Wastewater treatment using Algae".

Dr. Kiran Bala
IIT Indore Faculty Mentor

Professor Anand Parey
Dean, Resources Generation

Student Achievement

Isarar Siddique

भौतिक अनुसंधान प्रयोगशाला
(भारत सरकार, अंतरिक्ष विभाग की इकाई)
नवरंगपुरा, अहमदाबाद 380009, भारत



Physical Research Laboratory
(A Unit of Department of Space, Government of India)
Navrangpura, Ahmedabad 380009, India



Centre for Ecological Sciences
INDIAN INSTITUTE OF SCIENCE

डॉ. अमजद एच. लस्कर
Dr. Amzad H. Laskar
असिस्टेंट प्रोफेसर, भूविज्ञान प्रभाग
Assistant Professor, Geosciences Division
amzad@prl.res.in
+917926314258

Dr. Isarar Thaker, Ph.D.
Associate Professor

To Whomsoever It May Concern

INTERNSHIP LETTER

This is to certify that Mr. Isarar Siddique Student of GITM, Lucknow has successfully completed 8 weeks of an internship program from 07/08/2023 to 07/10/2023 Geoscience division of our organization. He worked on processing samples in the laboratory with AMS and ICPMS and measuring their stable isotope ratios and radiocarbon content. Also he had done several Literature survey. He was highly motivated and hardworking. He worked sincerely at his tasks and did a very good job. We wish him great success in his future endeavours.

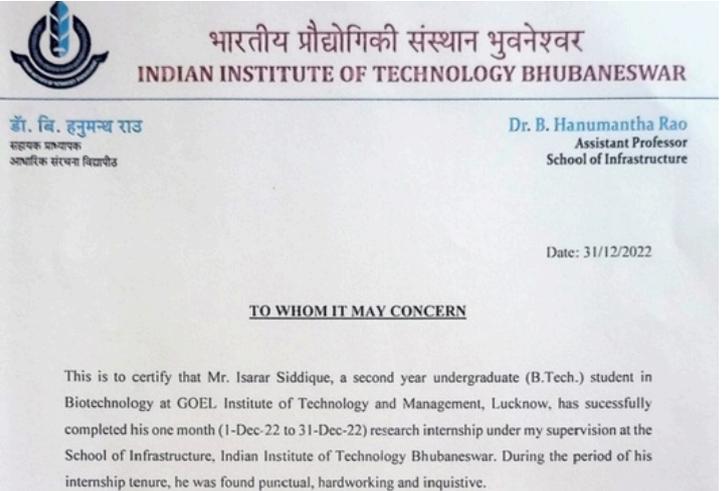
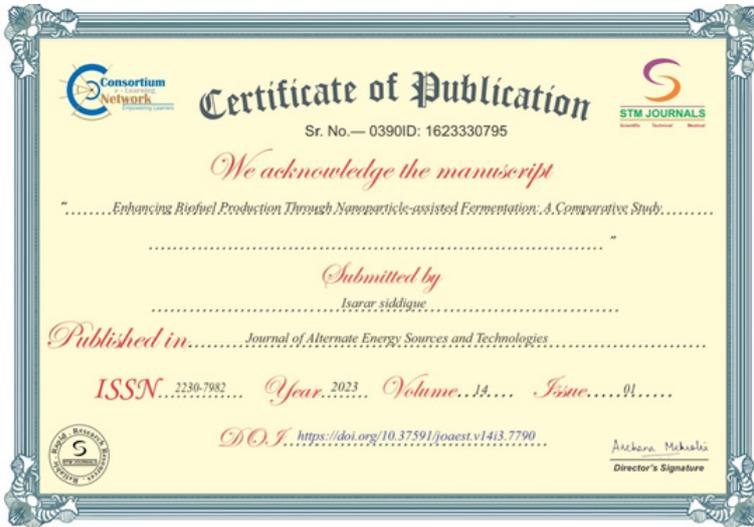
To whomsoever it may concern,

This is to certify that Mr. Isarar Siddique will conduct an internship in my laboratory at the Centre for Ecological Sciences, Indian Institute of Science from 30th March to 30th April, 2023.

During that period, Mr Isarar will work on a project, entitled "Nutritional Ecology of Indian Spiny-tailed Lizards". The project involves data extraction, photo analysis, and literature surveys. He will be working closely with a PhD student in my lab, and conduct his internship under his supervision.

Amzad H. Laskar
Assistant Professor

Thank you.



Student Achievement

RITESH KUMAR VERMA



INDIAN INSTITUTE OF TECHNOLOGY INDORE

(An autonomous institute under the Ministry of Education, Government of India)

e-CERTIFICATE

This is to certify that **Mr. Ritesh Verma** has successfully completed the “**Online Internship for the Undergraduate Students**” with IIT Indore Faculty Mentor **Dr. Kiran Bala**, Department of Biosciences and Biomedical Engineering from **24 Sept to 30 Oct, 2023**. He has worked on the area entitled “**Basic Techniques In Biotechnology**”.

Dr. Kiran Bala
IIT Indore Faculty Mentor

Professor Anand Parey
Dean, Resources Generation



Certificate of Participation



This certificate is proudly awarded to

Mr. Ritesh Kumar Verma of Biotechnology

for active participation and contribution to the success of “Uttar Pradesh, an Emerging Destination for Innovation Driven Indigenous Technologies- BioSpark-2024” conference held on the occasion of National Science Day, February 28, 2024, organized by Department of Biotechnology, Institute of Engineering and Technology, Lucknow

DR. VINEET KANSAL

PROF. B.N. MISHRA

PROF. SEETHALEKSHMI

Rank Holder in AKTU



Mahima Gupta

Department of
Biotechnology
6th Rank
Chemical Engg Group



Anand Shukla

Department of
Biotechnology
8th Rank
Chemical Engg Group

Events and Exposure Visits



Biospark, IET Lucknow.

Events and Exposure Visits



World AIDS Day, Lucknow.

Events and Exposure Visits



NBRI, Lucknow.



Smilex Pharmaceutical Company, Baddi, HP

Events and Exposure Visits



NBRI, Lucknow.



ELISA workshop, GITM Lucknow.

Events and Exposure Visits



AKTU, Lucknow.



Amul Banas Dairy, Lucknow.

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