MIET

Biotaction

Reaching new Horizons...

Molecular Biology & Environmental Biotechnology

MIET BIOTECHNOLOGY SOCIETY, MEERUT

2021-22

Biotaction

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Departmental Vision

To be a leading department in the country imparting biotechnological education and problem solving skills to the budding biotechnocrats capable of meeting emerging challenges in the area of inter-disciplinary education and industries.

Departmental Mission

1. Educating young aspirants in the field of biotechnology and allied fields to fulfill national and global requirements of human resource.
2. Generating trained man-power with advanced techniques in order to meet the professional responsibilities.
3. Imparting social and ethical values in graduates for progressive attainment at social level.

Program Educational Objectives (PEOs)

The Biotechnology Department of Meerut Institute of Engineering & Technology, Meerut produces graduates with a strong foundation of scientific and technical knowledge and who are equipped with problem solving, teamwork, and communication skills that will serve them throughout their career. The specific program educational objectives are:

PEO1: Pursue career as biotechnocrats in core and allied biotechnological fields all over the world.

PEO2: Undertake advanced domain research and development in the field of translational research, in a sustainable, environment-friendly, and inventive manner.

PEO3: Become an entrepreneur to meet the expectations and demand of modern industrial technologies and health care system.

PEO4: Carry out professional leadership roles in industries as well as academics with a commitment to continuous learning.

PEO5: Serve the society as a bonafide global citizen with strong sense of professional responsibility and ethics.

Program Specific Outcomes (PSOs)

1. An ability to apply biotechnology skills (including molecular & micro biology, immunology & genetic engineering, bioprocess & fermentation, enzyme & food technology and bioinformatics) and its applications in core and allied fields.
2. An ability to integrate technologies and develop solutions based on interdisciplinary skills.

Message from Chairman

Shri Vishnu Saran
B.E. (Mechanical)

T o burn always with this hard gem like flame, to maintain this ecstasy, is success in life.

It's a feeling of pride for me that the MIET Biotechnology Society is coming up with the new edition of magazine **BIOTACTION**, which is going to explore the technical and creative talent of our students. We in MIET have always supported intellectual and technical growth in all the distinct spheres of life. The publication of this magazine is a example of the same, and for sure it showcases talent, innovation and dedication of our students who deserve to excel and achieve the zenith. I wish my students good luck in their current academic endeavors and their future and professional careers. I congratulate the entire Biotechnology Society for the excellent effort of brining out **BIOTACTION**.

Message from Director

Prof. (Dr.) Arun V. Parwate
B.E., M.E., Ph.D.

There is no limit to the goals you can attain or success you can achieve, your possibilities are as endless, as your dreams

MIET stands for a healthy, intellectual and creative environment so that the young minds are transformed into responsible and progressive citizens of the nation. It is a great feeling ahead to the numerous positions. It is a matter of immense pleasure and pride that the MIET Biotechnology Society is coming up with its new edition of the Biotech magazine **BIOTACTION.** I sincerely appreciate the initiative of the students of Biotechnology in bringing up this magazine. I wish this opens up new vistas of knowledge and the good work continues in time to come.

Message from HoD

Dr. Avinash Singh
M. Tech., Ph.D.

Dear Students,

I am elated to present the new issue of the MIET Biotechnology Society 's official magazine: **BIOTACTION.**

In today's world, it is extremely important, especially for students, teachers as well as entrepreneurs in the field of biotechnology to be fully aware of the recent developments in the biotechnological arena.

Biotechnology offers the widest range opportunities in the present global scenario. Therefore, **BIOTACTION** is an effort from the MIET Biotechnology Society towards increasing the knowledge-base of its readers.

I hope the exposure that **BIOTACTION** provides is helpful in generating interest, increasing awareness and spreading the message to the Society.

My sincere best wishes to all.

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Advancements in Vaccines –A New Era in Disease Prevention

As humanity continues to navigate the complex landscape of infectious diseases, one of the most potent weapons in our arsenal remains vaccines. These remarkable medical inventions have saved countless lives, eradicated deadly diseases, and transformed the course of human history. From the early days of inoculation to the cutting-edge mRNA vaccines of today, the development and deployment of vaccines represent a triumph of human ingenuity, collaboration, and scientific progress. In this article, we will take a journey through the astounding world of medical innovation and the groundbreaking advancements in vaccines that have emerged in recent years.

The successful development of vaccines for the prevention of fatal childhood illnesses is considered one of the most remarkable achievements in the previous century. The widespread implementation of universal immunization programs has resulted in the complete eradication of diseases in various regions and the near elimination of several other infectious diseases like diphtheria, tetanus, measles, mumps and so forth. However, despite this progress, several diseases, including HIV infection, tuberculosis, and malaria, which are responsible for a significant proportion of global mortality rates, still lack effective vaccines. Moreover, certain vaccine-preventable diseases such as influenza continue to pose a significant threat to public health.

From at least the 15th century, people in different parts of the world have attempted to prevent illness by deliberately exposing healthy people to smallpox– a practice known as "variolation" (after a name for smallpox, 'la variole'). Some sources even suggest that these practices were taking place as early as 200 BCE.

In the 1980s, with the use of recombinant technologies, the first recombinant vaccine, the Hepatitis B vaccine was developed. Recombinant techniques allow the production of target antigens outside the environment of the parent organism, thus requiring no manipulation of live infectious pathogens or potentially virulent components of these pathogens. Thus, antigen yield, vaccine safety and product purity are improved along with improvement in efficacy and cost reduction.

The second major development in the late 1980s was in the field of adjuvants. Adjuvants are used to improve the presentation of antigens to the immune system or to increase their immunogenicity.

Moving forward to the present, currently we have developed the following types of vaccines to prevent diseases and infections-

Inactivated vaccines: These vaccines are made from killed viruses or bacteria. They are safe for most people, including those with weakened immune systems, because the virus or bacteria cannot cause disease. Examples of inactivated vaccines include the polio vaccine, the hepatitis A vaccine, and the flu vaccine.

Live attenuated vaccines: These vaccines are made from weakened versions of the virus or bacteria that cause the disease. They can provide long-lasting

immunity with a single dose, but may not be safe for people with weakened immune systems. Examples include the MMR vaccine, the yellow fever vaccine, and the varicella (chickenpox) vaccine.

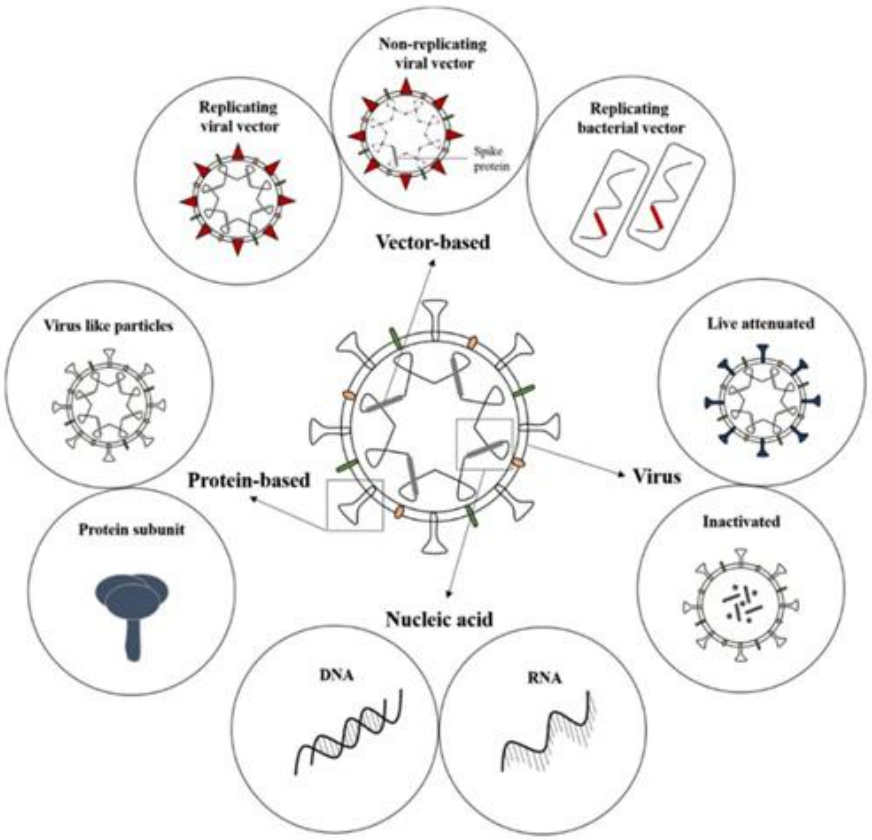
Subunit, recombinant, and conjugate vaccines: These vaccines use a small piece of the virus or bacteria to stimulate an immune response. Subunit vaccines use specific proteins or fragments of the virus or bacteria, while recombinant vaccines use genetic material to produce the proteins. Conjugate vaccines are made by linking the small piece of the virus or bacteria to a carrier protein to improve the immune response. Examples of subunit, recombinant, and conjugate vaccines include the human papillomavirus (HPV) vaccine, the pneumococcal vaccine, and the meningococcal vaccine.

Viral vector vaccines: These vaccines use a modified virus (not the one that causes the disease) to deliver genetic material into cells. The genetic material instructs the cells to produce a protein found on the surface of the virus, triggering an immune response. Examples of viral vector vaccines include the Johnson & Johnson COVID-19 vaccine and the Ebola vaccine.

Toxoid vaccines: Use chemically inactivated toxins produced by the pathogen.These train the immune system to tackle the harmful components of a pathogen, rather than the pathogen itself, such as the tetanus vaccine.

mRNA vaccines: These vaccines use a small piece of genetic material called messenger RNA (mRNA) to instruct cells to produce a protein found on the surface of the virus. The immune system then recognizes the protein as foreign and creates an immune response. Examples of mRNA vaccines include the Pfizer-BioNTech and Moderna COVID-19 vaccines.

DNA vaccines are also currently under study which utilize the pathogenic DNA as a base for vaccines based on the developments in genetic engineering and related fields, and the feasibility of obtaining entire viral genome in a very short span of time, it is highly likely that moving forward all vaccines would rely on genetic engineering in one form or another.



In conclusion, advancements in vaccines are transforming the way we approach disease prevention and opening up new possibilities for the future. With cutting-edge technology, innovative research methods, and tireless dedication from the scientific community, we have the potential to develop more effective and targeted vaccines that can protect us from a wide range of infectious diseases. While there are still many challenges to overcome, the progress we have made in the field of vaccine development is a testament to the power of human innovation and the extraordinary potential of science to improve human health and well-being.

Ayush Chutani
Batch 2020-24

Forensic DNA

Forensic genetics applies genetic tools and scientific methodology to solve criminal and civil litigations (Editorial, 2007). Locard's Exchange Principle states that every contact leaves a trace, making any evidence a key component in forensic analysis. Biological evidence can comprise of cellular material or cell-free DNA from crime scenes, and as technologies improved, genetic methodologies were expanded to include human and non-human forensic analyses. Although these methodologies can be used for any genome, the prevalence of databases and standard guidelines has allowed human DNA typing to become the gold standard. This review will discuss the historical progression of DNA analysis techniques, strengths and limitations, and their possible forensic applications applied to human and non-human genetics.

Historical progression of DNA analysis techniques, strengths and limitations, and their possible forensic applications applied to human and non-human genetics.

Methodologies to Detect Genetic Differences in Humans is the **"Gold Standard".**

"DNA Fingerprinting": The Beginning of Human Forensic DNA Typing.

"DNA fingerprinting" was serendipitously discovered in 1984 (Jeffreys, 2013). What they found propelled DNA "fingerprinting," or DNA typing, to the forefront in legal cases to become the "gold standard" for forensic genetics in a court of law. Jeffreys first used restriction enzymes to fragment DNA, a method in which restriction endonucleases (RE) enzymes fragment the genomic DNA, producing restriction fragment length polymorphisms (RFLP) patterns. Since each RE recognizes specific DNA sequences to enzymatically cut the DNA, then inherent differences between

gene sequences, due to evolutionary changes, will produce different fragment lengths. If the enzyme site is present in one individual but has changed in a different individual, the fragment lengths, once separated and visualized, will differ. While this technique was useful for some studies, Jeffreys did not find it useful for his particular genetic studies. Subsequently when working with the myoglobin gene in seals, he discovered that a short section of that gene – a minisatellite – was conserved and when isolated and cloned could be used to detect inherited genetic lineages as well as individualize a subject. Fragment length separation by electrophoresis, followed by transfer to Southern blot membranes, hybridized with a specific or non-specific complementary isotopic DNA probe, allowed for DNA fragments visualization (Jeffreys et al., 1985b). Upon careful analysis, Jeffreys determined that the fragments represented different combinations of DNA repetitive elements, unique to each individual, and could be used to better identify individuals or kinship lineages (Jeffreys et al., 1985b). Jeffreys' technology was used in several subsequent paternity, immigration, and forensic genetics cases (Gill et al., 1985; Jeffreys et al., 1985a; Evans, 2007). This was just the beginning of a whole new era in DNA typing.

Methodologies to Detect Intersequence Variation: The Past and Present

Sanger Sequencing and Single Nucleotide Polymorphism (SNP) Variation

The basis of genomic differentiation is the intrinsic order of base pairs within a region that can be evaluated by sequencing. Sanger sequencing has been the gold standard since the 1970s (Sanger and Coulson, 1975). Sanger sequencing was termed the gold standard because of the ability for single base pair resolution allowing for full sequence information to be determined. Robust and extensive databases are also readily available for comparison, i.e., GenBank, to identify an organism. However, it does have some limitations such as the short length(<500-700bp) and it cannot sequence mixtures of organisms, for example, without cloning, so it would not be useful for sequencing complex microbial communities without intense time, effort and cost.

Future Directions and Concluding Remarks

Forensic DNA typing has progressed quickly within a short timeframe (Figure 1), which can be attributed to the many advancements in molecular biology technologies. As these techniques advance, forensic scientists will analyze more atypical forms of evidence to answer questions deemed unresolvable with traditional DNA analyses. For example, epigenetics and DNA methylation markers have been proposed to estimate age, determine the tissue type, and even differentiate between monozygotic twins (Vidaki and Kayser, 2018). However, since epigenetic patterns are also influenced by environmental factors, they can be dynamic, and a number of confounding factors have the potential to affect predictions and must be taken into account when preparing prediction models (i.e., age estimation). Additionally, phenotype informative SNPs across the genome can infer physical characteristics like eye, hair, and skin colour, even age, from an unknown source of DNA retrieved from a crime scene. But this technology could pose an "implicit bias" toward minorities, e

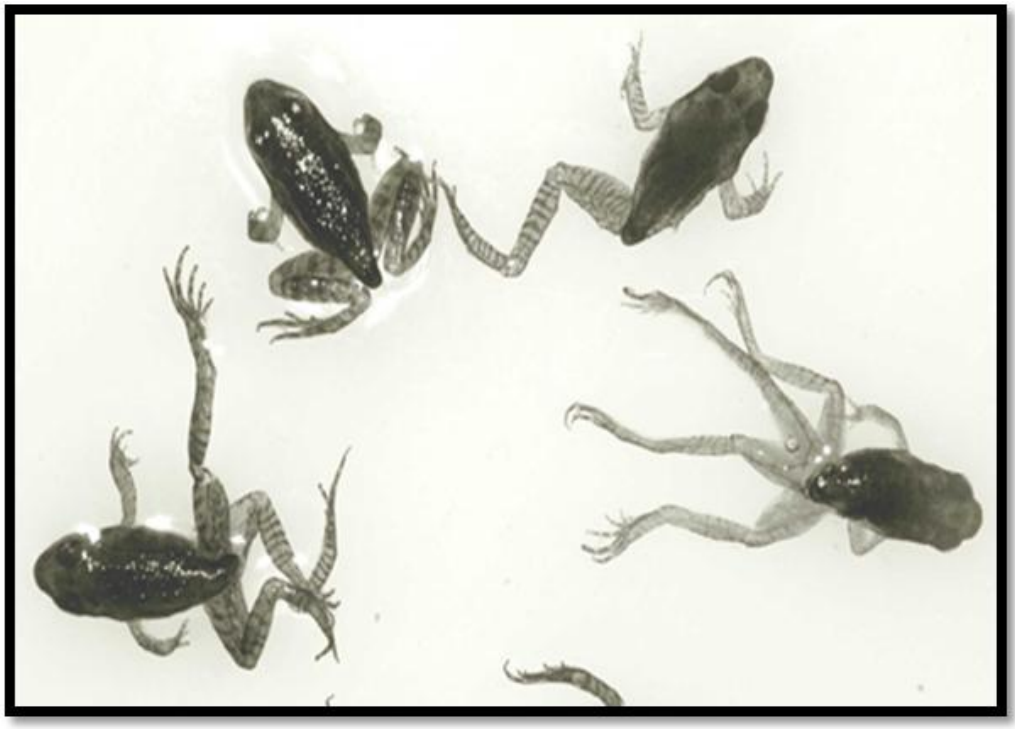
Chanda
Batch 2019-23

Regeneration of Body Part by Bioelectric Signal

Our brain send signal in the form of electric signal which stimulate each and every cell and acts as a instruction to start gene expression. These voltage difference also causes the stem cell to grow into heart,liver and other organ thus influencing the shape and function of body.

This is studied and researched by Michael Levin, assistant professor at Harvard. He forced tadpoles to grow an eye , induced frogs to sprout six legs , grow two heads on worm and he did it just by manipulating the bioelectric signals . He even worked upon complete specification of shape and function similar to the way work is done in a photoshop. For example, if someone want a triangular frog with 7 limbs and eyes should be located at back, it can be stimulated and created. Although his all claims are controversial but he couldn't find any reason why they can't do that.

The science behind this is hidden in signal transfer methodology, such as ion channel. These are a cause of changing cell polarity , voltage gradient by transferring charged molecule thus lead to cell growth , differentiation etc. If this voltage can be manipulated and controlled wecan control the growth or even control its functioning thus we can stimulate the pleuripotent cell back to regenerate the body part or we can even inhibit the growth or cancer cells thus cure most of disease, revolutionizing medical industry.



This can be experimented and can be used to regulate human body parts such as limbs. If someone lost his hand in war, within a decade or less it can be regenerated .we can even enhance human abilities through by manipulating and enhancing the expression of body and organs . but this come with various challenges such as body response against bioelectric signals , innovating instrument to generate such signal and even transfer this signal to specific organ etc . But this technology promises a great scope for future.

Chetanya Jain
Batch 2020-24

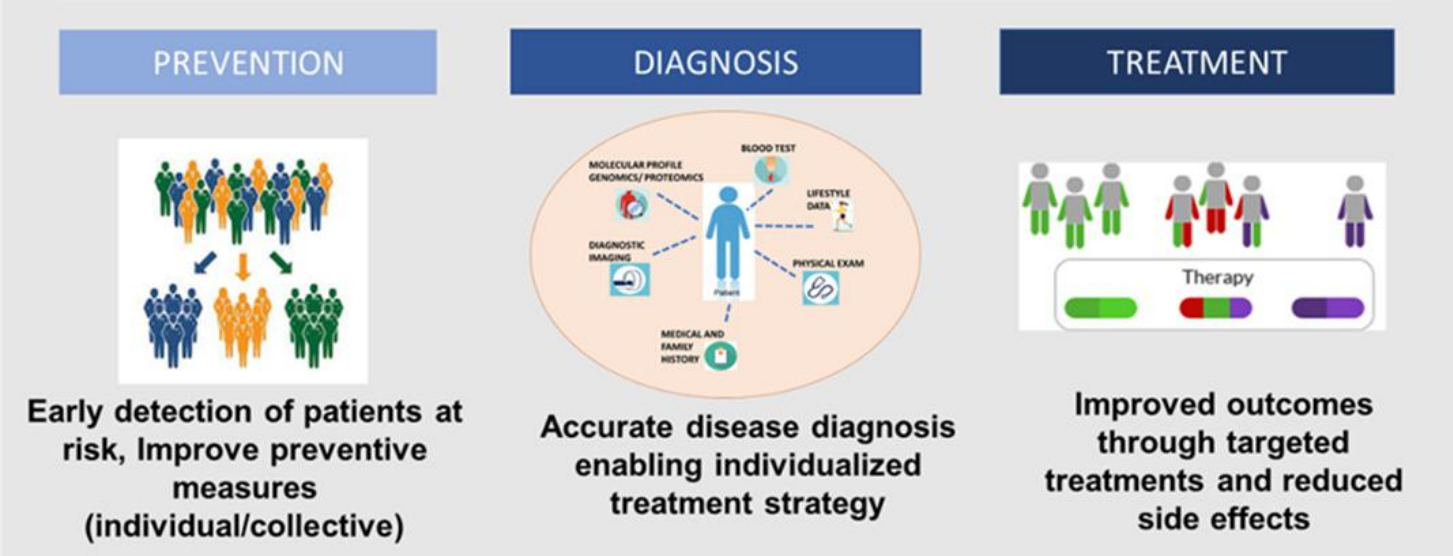
Current Trends in Biotechnology

Biotech is undergoing a global evolution. The most notable innovations in biotech involve personalized medicine, drug research, artificial intelligence, big data, and synthetic biology.

Following are few growing trends in biotech.

Personalized Medicine

Personalized medicine is growing as a result of the reduced time and cost. With personalized biotechnology, medical professionals can analyze genetics to identify medical risks in patients. By basing medical innovation on genetic sequencing, doctors develop unique, tailor-made health solutions.



Another benefit of personalized medicine is that it uses data compiled from screened clinical trials, enabling medical professionals to create individual treatment and therapy from those insights. An increase in personalized therapy is advantageous for general treatment as it identifies medical issues at their source: the patient's molecular and genetic profile.

Drug Research

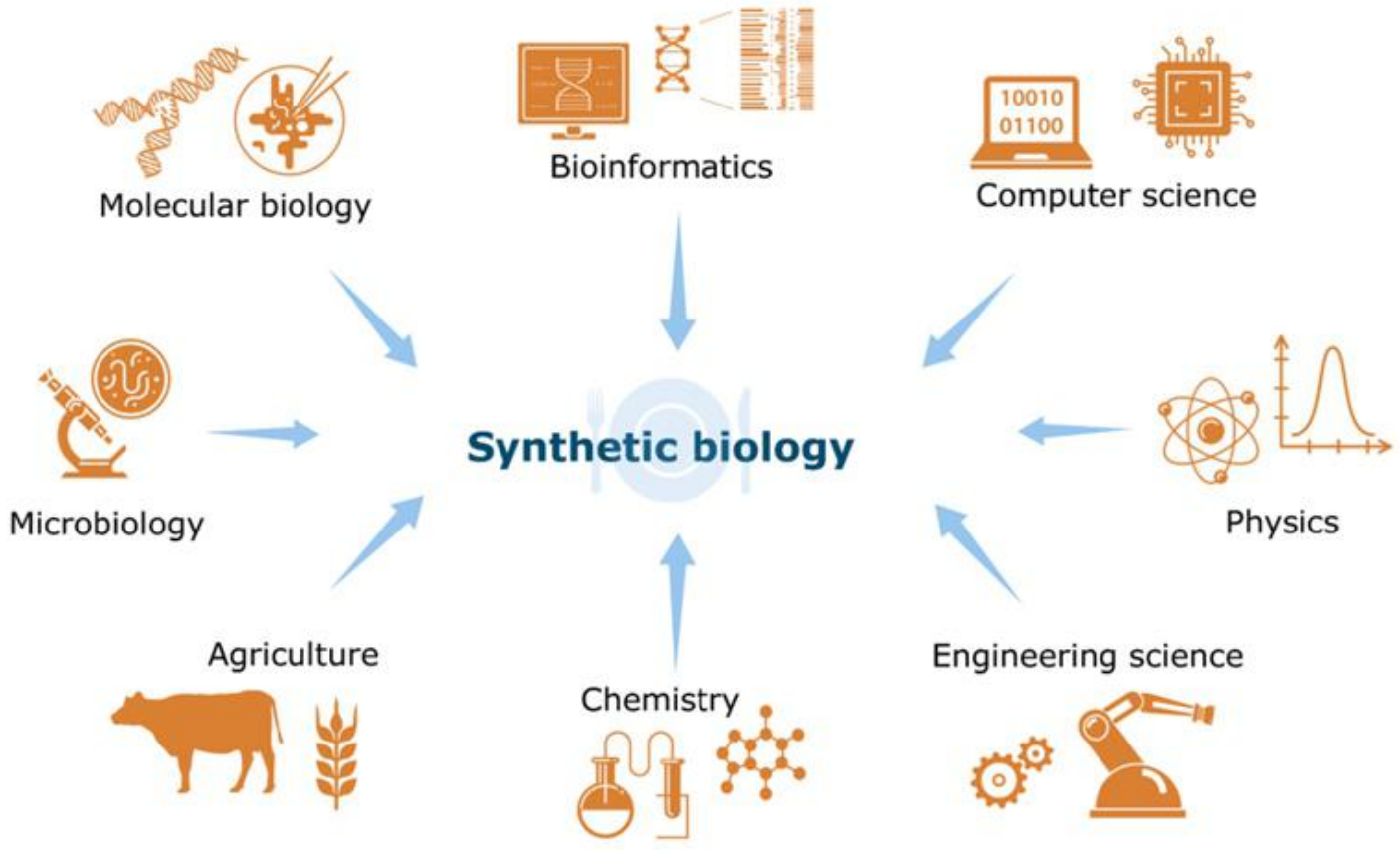
Drug research is one of the most promising biotech trends due to advancements in smart technology. Traditionally, drug research faced challenges with getting enough participants for trials, and long production timelines that can run into years. Machine learning technology presents immense possibilities for drug research, as well as ways to improve and assess diagnosis and treatment with medications.

Biotech companies can quickly analyze data from current trials and revisit data from previous trials. This analysis and ability to combine vast datasets offers the insight needed to provide a more accurate diagnosis, and ultimately, devise enhanced medicines and treatment paths for patients.

MRI scans and other in-patient monitoring devices provide medical professionals with more objective data that allows them to develop better drug treatments for patients. Biotech advances have made clinical trials less of a manual process, so drug manufacturers have lower costs when recruiting fewer in-person patients for trials.

With the digitization of clinical trials, biotech companies can combine genetic and biometric information to determine underlying causes of conditions such as heart disease.

Synthetic Biology



Synthetic biology applies to several sectors such as industry, agriculture, healthcare, and electronics. Examples of synthetic biology include biofabricated electronic film, cell engineering for therapy, and automated coronavirus testing using sequencing.

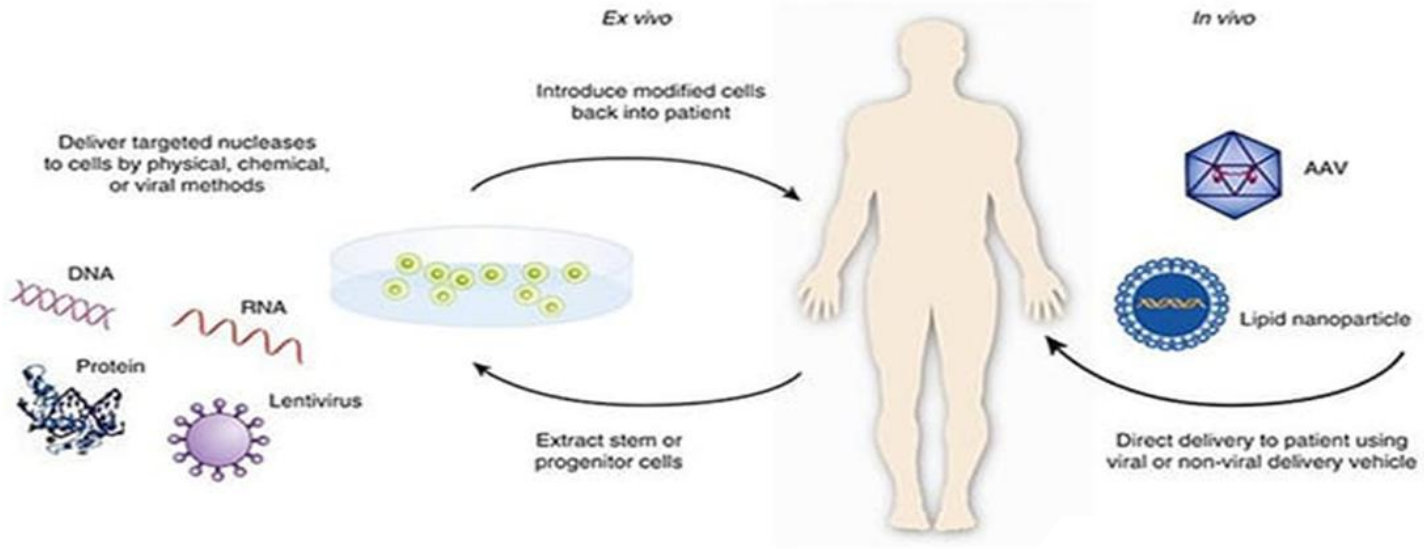
Twist Bioscience, for instance, manufacturers synthetic DNA that can be applied to silicon chips. The technology allows firms to store DNA for Next-Generation Sequencing (NGS). NGS profiles the genetics of various populations to help uncover the cause of diseases and streamline drug discovery.

With global interest in biotech development, the trends above are likely to continue as investments in the industry continue.

Riya
Batch 2019-23

Gene Therapy: The Future of Medicine

Human gene therapy is the process of treating a sickness or illness by introducing genetically modified materials into human cells, frequently through viral transduction.By replacing, deactivating, or introducing genes into cells, either inside the body (in vivo) or outside the body, gene therapies aim to treat disorders (ex vivo). Instead of utilising drugs or surgery, this method addresses a problem by replacing a damaged gene or introducing a new gene into the patient's cells. Gene therapies enable a patient to start making healthy cells on their own by changing their genetic makeup. Gene treatments aim to transform medicine from a practice based on treatment to one based on prevention. Researchers are looking to gene therapies as solutions for preventing and curing numerous hereditary illnesses that presently have only symptomatic treatment or no treatment standard thanks to new and constantly developing genetic engineering technology. Many different diseases, including cancer, cystic fibrosis, heart disease, diabetes, haemophilia, and AIDS, may be treated and even cured with the use of gene therapy.



Cells receive genetic material through viral vectors.The success of gene therapy depends in large part on the creation of viral vectors. A carrier, also known as a vector which is used to introduce a gene directly into cells. Viruses are the most typical gene treatment vectors. Certain cells are identified by viral vectors, which then insert genetic material into the cells' genes. These viral carriers actually serve as Trojan horses to get the genetic material to the cells. One significant advantage of using viral vectors for gene delivery is that they last longer than non-viral systems.

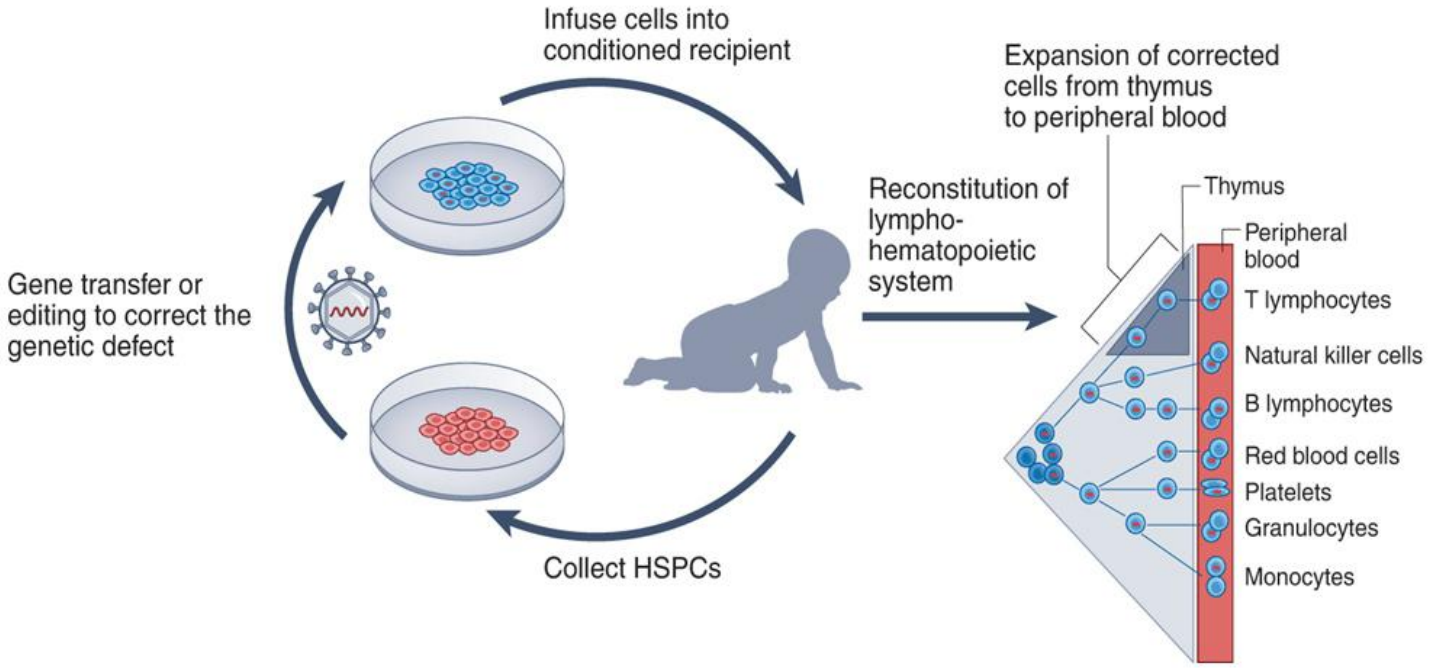
Additional Vector Types Used in Clinical Trials:

As the body develops, stem cells, from which all other cells with specialised roles are derived, supply the body with new cells. In gene therapy, stem cells can be reprogrammed in a lab to develop into disease-fighting cells.

Lipid particles known as liposomes are capable of transporting new, therapeutic genes to the target cells and integrating them into the DNA of those cells. By directing chemicals towards certain cells, liposome-based vectors are made to actively and safely target those cells.

Bacterial vectors delivers a gene from a plasmid to a new host cell. The bacteria that infiltrate the target cells convey the genetic material.

Plasmid vectors are the means by which recombinant, mutated DNA is introduced into a host cell, where it replicates, giving rise to a population of cells that share the same DNA strand.



It is also critical to ensure that the gene is expressed at the appropriate level in the affected cells; too much may result in side effects, while too little may render the treatment ineffective. Gene therapy is among the most expensive treatments that is not sustainable in the long run. For decades, the possibility of replacing or editing faulty genes has been obvious. How to do so safely has been less certain, and concerns on that front have set the field back several times. Current gene therapy treatment research has concentrated on targeting body (somatic) cells such as bone marrow or blood cells. This type of genetic change cannot be passed down to a person's offspring. However, gene therapy could be directed at egg and sperm cells (germ cells), allowing the genetic changes to be passed down to future generations. This method is referred to as germline gene therapy. The concept of germline alterations is contentious. While it may protect future generations in a family from a specific genetic disorder, it may affect foetal development in unexpected ways or have long-term adverse effects that are unknown. People who would be affected by germline gene therapy cannot choose whether or not to have the treatment because they have not yet been born. Because the genes must be delivered via a carrier or "vector," the body's immune system may perceive the new viruses as intruders and attack them.

It's also possible that the modified viruses will infect cells other than the ones with mutated genes. There may also be some concern that the viruses will regain their ability to cause disease, or that the new genes will be inserted incorrectly in a patient's DNA, resulting in tumour formation.

Gene therapy has the potential to be an effective treatment option for a wide range of diseases in the near future. Gene disorders are responsible for an estimated 4,000 medical conditions. If efficiency of gene therapy is increased and drawbacks are eliminated then Individuals suffering from these diseases may live longer, healthier lives free of symptoms and the associated medical costs if some of these genetic problems can be corrected through gene replacement or manipulation.

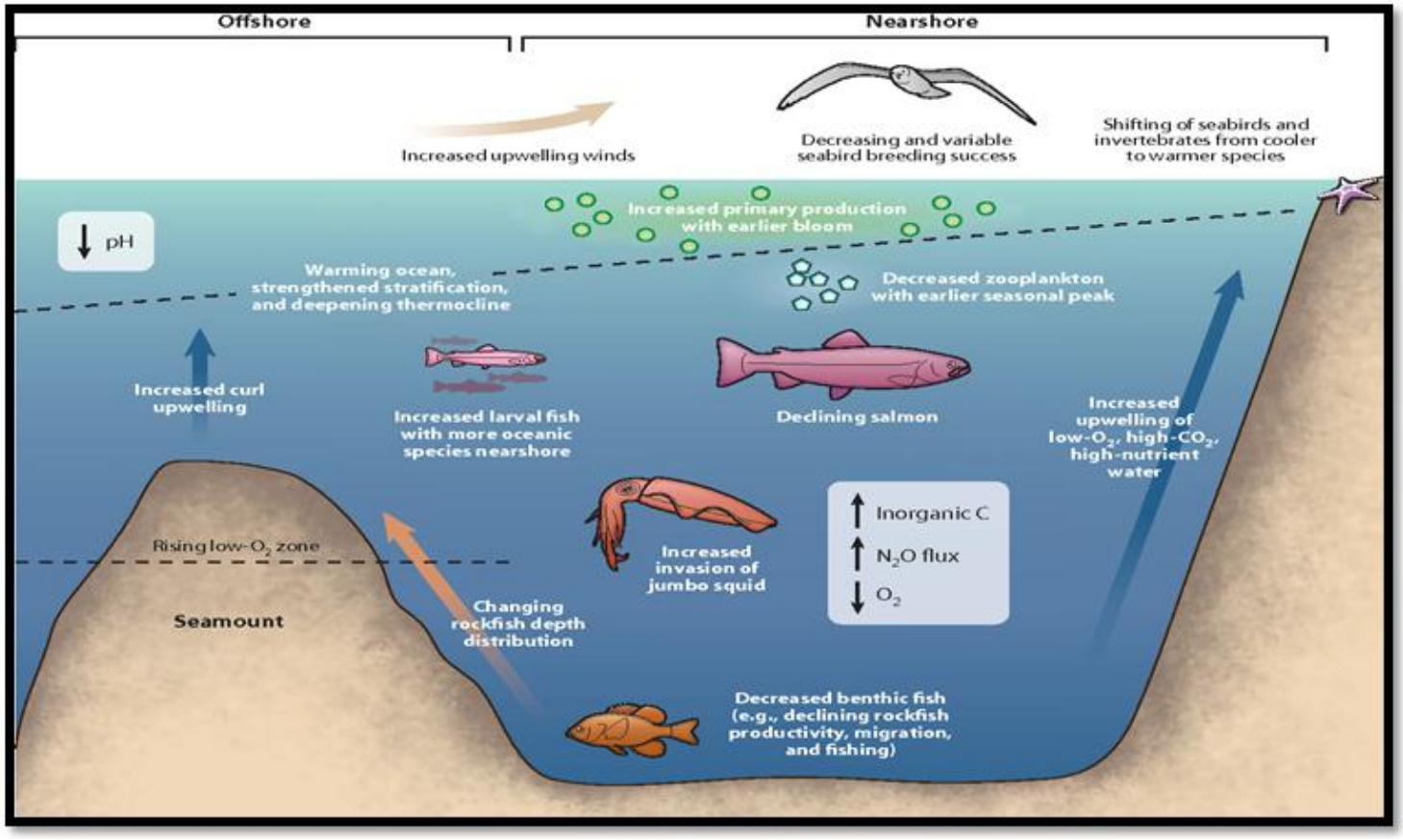
Saumya
Batch 2019-23

Impact of Climate Change on Marine Biodiversity

"The ocean stirs the heart, inspires the imagination and brings the eternal joy to the soul"

The ocean is home to millions of species. The life of oceans is totally depend on the marine biodiversity. Marine species are a major part of biological network which is directly or indirectly related to many interactions related to biology. Due to various climate change their has a direct impact on marine life. It changes their diversity, distribution and other activities related to their lifestyle. Climate change related to environmental changes such as warming, sea level rise, salinity change, Rising atmospheric carbon dioxide are some of the critical problems which is expected to impact marine organisms and fisheries associated with it. Sometimes the temperature of ocean get increases due to which there is a change in physiological functioning, behavior, leading to shifts in the size structure. These shifts in turn lead to altered in species interactions which may disturb the maintained biological network. Additional problems on ocean ecosystem including use of fertilizers, invasive species, increasing aquaculture production. This is not necessary that environmental changes always has a bad impact on marine species sometimes these changes may provide benefits to some species which leads to greater availability of food or nutrients, maintaining acid-base balance. Such species has a chance of higher survival, reproduction, growth and thus become a “winner” in a changing world. But in some cases, species may get highly affected with environmental condition which causes a very stressful condition and thus these species become “losers” of environmental world. These types of species have a higher mortality rate, reduced growth rate, and reduced reproduction rate. The loss of marine species is disturbing the ocean ecosystem. The emission of greenhouse effect into the atmosphere due to several human activities leads to change in ocean. Some fishes change their location from their origin place to deal with the challenges faced by them. They try to adapt themselves in new environment so that they can survive and live their normal life which does not include any problem which is affecting their survival chances. At commercial level fisheries is an important contributor to the economy. As it is a seafood in various places, it provide benefit to grocery store and many restaurants . So if the fisheries get exploit with time it directly impact on economy of the world. Ocean act as a best source for exporting goods and trade from one country to other country if the ocean get affected with these kind of environmental condition then also the world economy get affected as trade channel and exporting goods from country to country ,may not be possible. If we find a solution to

preserve our marine biodiversity and try to change the ocean condition from these climates change then hopefully we can save fishes life and other organisms life present in the ocean. Like climate changes can be reduce if somehow we can decrease the level of carbon dioxide emission in environment, during boating be careful not to damage any kind of fish, do not throw plastic bottles or any type of waste material into the ocean as these type of material is harmful for marine species, do not take a bath inside the ocean by using any kind of soap or chemical material as these chemicals affect the fishes and can kill them. So try to preserve the marine biodiversity from getting affecting by these climatical changes so that our ocean ecosystem remain balanced.

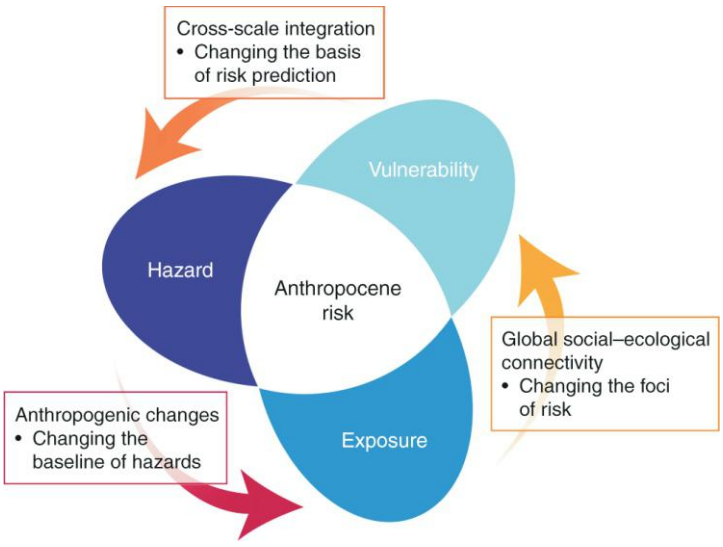


Harshi Jain
Batch 2020-24

Environmental Crisis: A Pure Human Ignorance

You might have surely read/heard about the latest movies releasing in the theaters, the latest dress manish malhotra designed, and the latest iphone launched. But wait, let me ask about the amazon rainforest fires that you might have mistakenly gotten to know about somewhere in 2019. Now you'd say how thinking about the mere matter of fire would help me find one of my socks missing. Sure, you're right, but that would definitely make your breathing difficult. Yeah, we know people talked about it; everyone was worried. The media coverage was high on showing fires in Paraguay, Peru, Brazil, and you too were busy in posting #prayforamazon But what next to that ?? Days passed...August came..then.. september..october..months passed.., Normal people forgot about the 906 thousand hectares of approx. of forest in amazon biome got burned to ashes, that the "lungs of the earth" was turning into savannah. But not to ignore those indigineous communities who stand still to protect their home, the few celebrities and activists who contributed in the donation and the G7 pact signed on 26th august, 2019 to work on the mission to save the immense biodiversity spread over the amazon biome.

Government of the country Brazil is not willing to work on enough to put off the fire, but just dragging all this life stacking crisis into politics. The president Bolsonaro himself declining the G7 offer to help save the amazon and claiming the 40% decrease in deforestation has been seen, is just distracting people off of the main discussion. The fact that amazon is being burnt and not burning on its own is hard to agree on for some great officials and politicians out there in ruling. This rainforest hasn't been smoking for all about 3 years now by its own, the slashing and burning , animal agriculture, the mining and the bridge & the road construction projects, clearing lands for setting up some big industries and all these anthropogenic activities are the reasons forcing amazon to smoke and choke everyone. We need to acknowledge that these fires are our problem, not just Brazilians. We are connected by this planet which we call our "home". Raising voices and standing for protecting the same is indeed our responsibility. All needs to be get aware through one another whether by raising voices, signing petitions,being part of the teams who are putting out the fires or standing at protests.



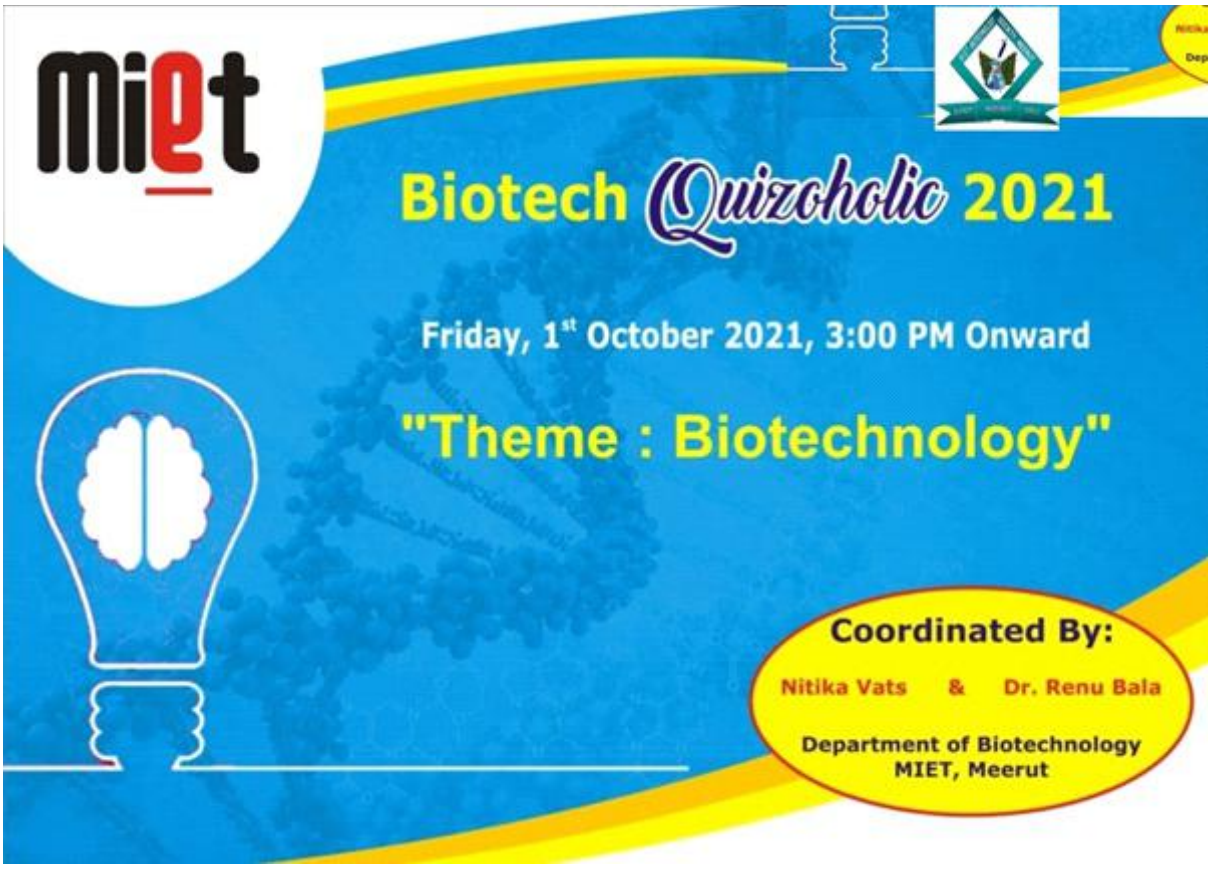
Istuti Gupta
Batch 2018-22

Forests Help Reduce Global Warming in More Ways Than One

When it comes to cooling the planet, forests have more than one trick up their trees. Tropical forests help cool the average global temperature by more than 1 degree Celsius, a new study finds. The effect stems largely from forests' capacity to capture and store atmospheric carbon . But around onethird of that tropical cooling effect comes from several other processes, such as the release of water vapor and aerosols, researchers report March 24 in Frontiers in Forests and Global Change. “We tend to focus on carbon dioxide and other greenhouse gases, but forests are not just carbon sponges,” says Deborah Lawrence, an environmental scientist at the University of Virginia in Charlottesville. “It's time to think about what else forests are doing for us besides just absorbing carbon dioxide.” Researchers already knew that forests influence their local climates through various physical and chemical processes. Trees release water vapor through pores in their leaves — a process called evapotranspiration — and, like human sweating, this cools the trees and their surroundings. Also, uneven forest canopies can have a cooling effect, as they provide an undulating surface that can bump hot, overpassing fronts of air upward and away. What's more, trees generate aerosols that can lower temperatures by reflecting sunlight and seeding clouds. But on a global scale, it wasn't clear how these other cooling benefits compared with the cooling provided by forests' capturing of carbon dioxide, Lawrence says. So she and her colleagues analyzed how the complete deforestation of different regions would impact global temperatures, using data gathered from other studies. For instance, the researchers used forest biomass data to determine how much the release of carbon stored by those forests would warm the global temperature. They then compared those results with other studies' estimates of how much the loss of other aspects of forests — such as evapotranspiration, uneven canopies and aerosol production — affected regional and global temperatures.

Manjari Agrawal
Batch 2019-23

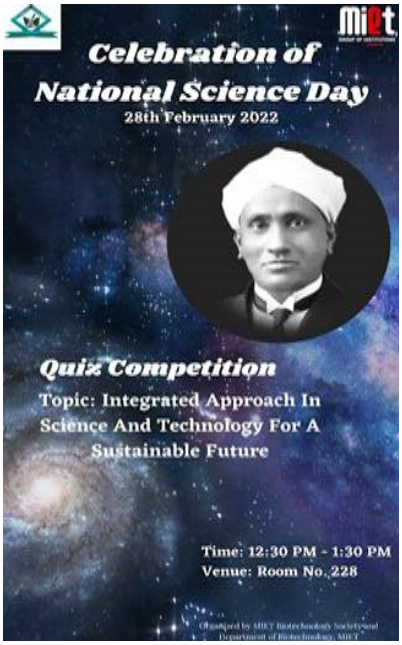
Events Organized



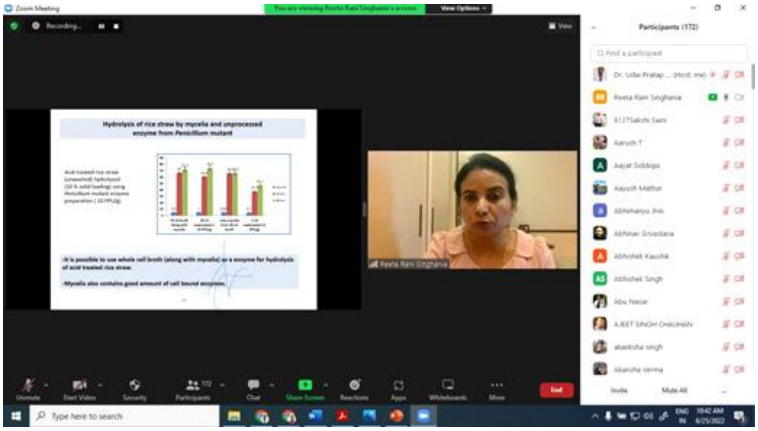
Events Organized

Career Guidance Lecture by
Dr. Eliza Chakraborty

Events Organized



Events Organized



Student Achievement

DR. ABDUL KALAM SPORTS FEST, 2021-22
(ZONAL LEVEL)
Organized By
Dr. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH, LUCKNOW
At Zonal Center
J.P. INSTITUTE OF ENGINEERING & TECHNOLOGY, MEERUT

CERTIFICATE

This is to certify that ~~Mr.~~ /Ms. ...Roshni....Bharti..... student of .....MIET, ...MEERUT..... has participated in .....Volleyball..... Event and secured ..First..... position at Dr. Abdul Kalam Sports Fest 2021-22 (Zonal Level) held on November 22-23, 2021 at J.P. Institute of Engineering & Technology, Meerut, affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow.

Dr. Sharad Mohan Mittal, Coordinator, JPIET Meerut
Dr. Abhinay Agarwal, Director, JPIET Meerut
Prof. O. P. Singh, Dean Student Welfare, Dr. APJ AKTU Lucknow
Prof. Vineet Kansal, Vice-Chancellor, Dr. APJ AKTU Lucknow

DR. ABDUL KALAM SPORTS FEST, 2021-22
(STATE LEVEL)
Organized By
Dr. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH, LUCKNOW
At
BABU SUNDER SINGH INSTITUTE OF TECHNOLOGY & MANAGEMENT, LUCKNOW

CERTIFICATE

This is to certify that Mr. /Ms. ...Roshni....Bharti..... student of .....MIET..... has participated in .....Volley Ball..... Event and secured ..... position at Dr. Abdul Kalam Sports Fest 2021-22 (State Level) held on December 03-04, 2021 at Babu Sunder Singh Institute of Technology & Management, Lucknow, affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow.

Mr. Abhishek Singh, Coordinator, BSSITM Lucknow
Dr. Simant, Director, BSSITM Lucknow
Prof. O. P. Singh, Dean Student Welfare, Dr. APJ AKTU Lucknow
Prof. Vineet Kansal, Vice-Chancellor, Dr. APJ AKTU Lucknow

Creative Corner

By : Riya Rajput

Ansh Aggarwal

By: Ritika Goswami

By: Ritika Goswami

Placements # 2021-22 (Batch Passed-out in 2022) 77% Placement

S. No.	AKTU Roll No	Name of the Student	Placement / Higher-studies / Entrepreneurship	Name of the Employer
1	180685413190	Akshat Agarwal	Placement	PULSUS
2	180685413191	Akshi Tyagi	Placement	QNQ DESIGN AND DEVELOPMENT PVT LTD
3	180685413192	Akshita Tyagi	Placement	PULSUS
4	180685413190	Amisha Grover	Placement	OCTAVUS CONSULTING
5	180685413191	Anjali Verma	Placement	HEALTHPLIX
6	180685413192	Aqsa Tanveer	Placement	TCS
7	180685413194	Avanish Malviya	Placement	CERTY BOX
8	180685413195	Avika	Placement	TCS
9	180685413200	Divya Prakash Ojha	Placement	COGNIZANT
10	180685413201	Drishti Maheshwari	Placement	HCL
11	180685413202	Fareen Masarrat	Placement	SARACA CONSULTING
12	180685413204	Hardik Jain	Placement	OCTAVUS CONSULTING
13	180685413205	Himang Gupta	Placement	SARACA CONSULTING
14	180685459630	Istuti Gupta	Placement	DELLOITE
15	180685413207	Himani Chaudhary	Placement	TCS
16	180685413210	Megha Singh	Placement	COLLEBRA
17	180685413211	Mubeena Noor	Placement	HEALTHPLIX
18	180685413212	Muskan Bansal	Placement	COGENT INFOTECH
19	180685413216	Nikita Gupta	Placement	SARACA CONSULTING
20	180685413217	Pradeep Sharma	Placement	EMONICS TECHNOLOGIES
21	180685413218	Prakhar Rastogi	Placement	Q1 TECH
22	180685413219	Priyanshu Sharma	Placement	PULSUS
23	180685413222	Ruchi	Placement	JUDGE
24	180685413223	Sakshi Kasana	Placement	SARACA CONSULTING
25	180685413224	Saurabh Rastogi	Placement	PULSUS
26	180685413227	Shalini Rana	Placement	WIPRO
27	180685413230	Shivangi Verma	Placement	PULSUS
28	180685413238	Shruti Singh	Placement	WIPRO
29	180685413234	Shweta Kushwaha	Placement	COGNIZANT
30	180685413236	Srashti Gangwar	Placement	LEARNING SHALA
31	180685413237	Tanishka Chauhan	Placement	PULSUS
32	180685413238	Tanzeela Naseem	Placement	INFOSYS
33	180685413239	Vishal Yadav	Placement	CERTY BOX
34	180685413245	Yugal Gupta	Placement	SARACA CONSULTING
35	180685413196	Ankit Singh	Higher-studies	PONDICHERRY UNIVERSITY
36	180685413199	Anukul Rudkiwal	Higher-studies	MNIT, BHOPAL
37	180685413203	Avnee Chauhan	Higher-studies	NSUT, NEW DELHI
38	180685413229	Sanyam Taneja	Higher-studies	INTERGRAL UNIVERSITY, LUCKNOW
39	180685413232	Shadab Choudhary	Higher-studies	INTERGRAL UNIVERSITY, LUCKNOW
40	1806854029	Kartikay Singh	Entrepreneurship	GREZO CLUB PRIVATE LIMITED
41	1806854030	Kumar Sahil	Entrepreneurship	GREZO CLUB PRIVATE LIMITED

About Department of Biotechnology

Courses Offered:

- B.Tech.
- M.Tech.

Approvals & Accreditations:

- Approved by AICTE
- Affiliated with AKTU
- NBA Accredited

Laboratory Facilities:

- DST-FIST Center
- Medical Translational Biotechnology Research Lab
- Nanotoxicity & *Drosophila* Research Lab
- Analytical Biochemistry Lab
- Cellular and Microbiology Lab
- Instrumentation Lab
- Bioinformatics Lab
- Bioprocess and Protein Engineering Lab
- Plant Tissue Culture Lab
- Genetics and Molecular Biology Lab

Extracurricular Activities:

- Sanskriti - The Tradition Goes On...
- Abhivyakti - The Literary Lore
- Odyssey, The Literati....
- Sports Committee
- The Land of Art
- RIM4.0
- AHIMSA- Quest for Peace and Change

Other Important Activities:

- Personality Development Programs
- Alumni Connect Sessions
- Mentoring Classes

Department Of Biotechnology

Meerut Institute of Engineering & Technology

NH-58, Delhi Roorkee Bypass Road, Baghpat Crossing,
Meerut-250005 Uttar Pradesh, India.

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Phone: 0121-2439019/2439057