NEWSLETTER

(2020-2021)

Issue on- January 2021

NIET Greater Noida
Estd.2001
GET FUTURE READY
AN AUTONOMOUS INSTITUTE

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

Message from HOD Desk

Technical Education is the most potential instrument for socio-economic change. Presently, the engineer is seen as a high-tech player in the global market. Distinct separation is visible in our education between concepts and applications. Noida Institute of Engineering and Technology (N.I.E.T.) is a leading, premium institution devoted to imparting quality engineering education in biotechnology since 2012. The sustained growth with constant academic brilliance achieved by NIET is due to a greater commitment from management, dynamic leadership of the president, academically distinctive and experienced faculty, disciplined students, and service oriented supporting staff. I sincerely advise the young engineers to face the major challenges of biotechnology industry and up grading the technology with optimum use of materials, equipment and human resources.

VISION

To become a prime influencer in the field of Biotechnology and provide a vibrant learning environment to the students that will have a trans-formative impact on the society in terms of academics, research, and entrepreneurship.

MISSION

M1: - To create educational experience targeted on a deep understanding of interdisciplinary sciences & engineering with the focus on development of industry aligned skills.

M2: - To expertise in research, innovation and entrepreneurship supporting the overall growth of the biotechnology academia and industry.

M3: - To inculcate leadership qualities in students to handle competitive edge, social & ethical challenges for a better world.

PEO's

PEO 1: Students will acquire knowledge and skills in the frontier areas of biotechnology and will be able to solve societal problems individually and in teams.

PEO 2: Students will be able to think creatively and ethically about the use of biotechnology to address local and global problems.

PEO 3: Students will be able to implement the engineering principles to biological systems for development of industrial applications, as well as entrepreneurship skills to start biotech industry.

PSO's

PSO1: To apply knowledge of basic sciences and biotechnological techniques to modify living organisms.

PSO2: To design, optimize, analyse & scale up bioprocesses to develop useful products with societal consideration.

PSO3: To generate, analyse & interpret biological data using Insilco & other relevant approaches.

DEPARTMENT HIGHLIGHTS

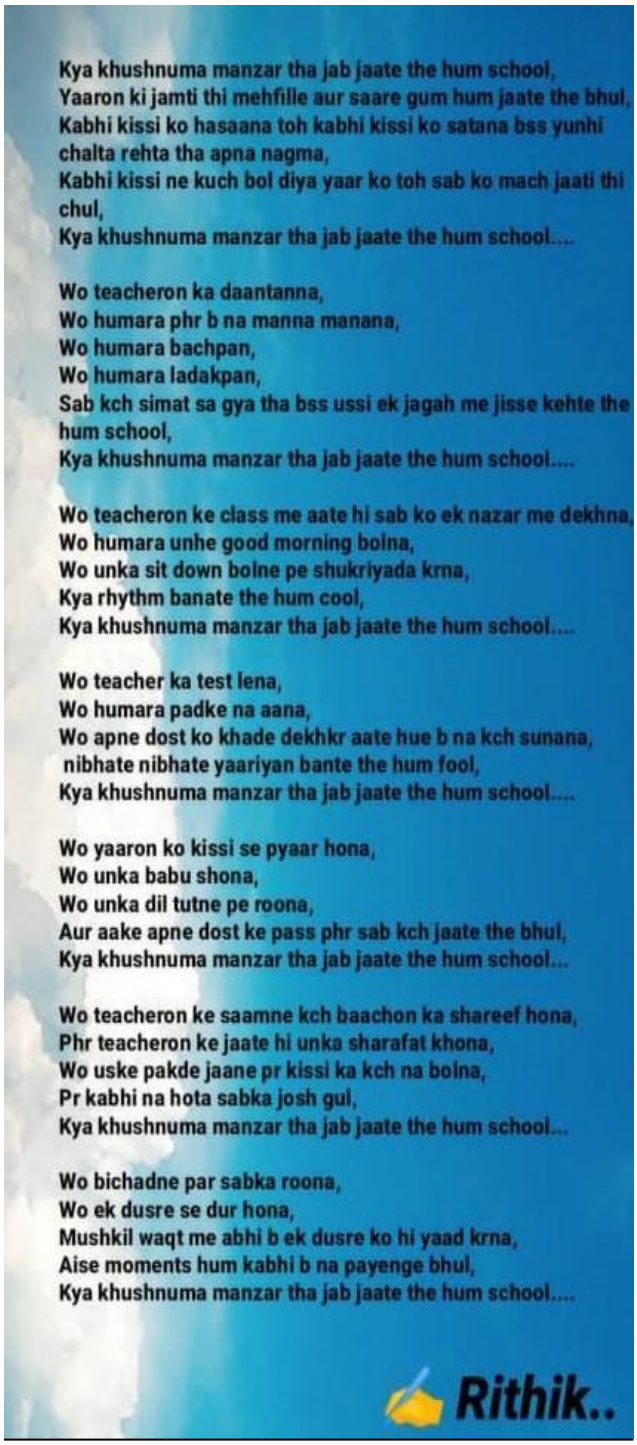
- Department organized a guest lecture on bioinformatics by Mr Rohit Satyam 25 august 2020. The topic was “Best practices in structural biology & Genomics: filling the potholes”. He discussed the importance of bioinformatics tools in the drug discovery and clinical disease management.
- Faculty Development programme on pedagogy (Effective Teaching and Learning for Faculty) was organized by department of biotechnology and sponsored by AKTU in December 2020

- A Non-Technical Event was organized by Ms Shweta Sharma on occasion of Christmas on 24th December 2020 which included Photography Contest, Cooking Competition and Greeting Card Making Competition.

- Students of the Department took part in online learning platform Career edge-Knockdown the Lockdown by TCSion from 1st may to 28th July 2020.
- Department of biotechnology organized a technical event “COVID-19: Poster Making Contest” coordinated by Dr. Ayushi Verma faculty coordinator of event.

- The Department of Biotechnology in association with Swadeshi Science Movement of India (SSMD) organized an INTERNATIONAL CONFERENCE (Virtual) On BioTrendz “Advancement & Challenges in Science and Technology” between 9th-10th, October 2020
- The department of biotechnology in association with Institute Innovation council (IIC)- NIET organized effective research writing by Dr. Pratibha Pandey, Assistant Professor, Department of biotechnology, NIET on 26th December 2020. The lecture helped the students, faculty, and researchers to understand the significance of research, research design, implementation and journal indexing.
- The department of biotechnology in association with Institute Innovation council (IIC) organized one day webinar on 3rd November 2020 through online portal on the topic “Taking charge of your health by Dr. Deena, Associate dean of student affairs college of health sciences Abu Dhabi university, United Arab Emirates. During the session Dr. Deena discussed about the current situation arises due to covid-19 pandemic and their effects on human beings.

STUDENT ARTICLES



The proximal origin of SARS-CoV-2

In India, 56,342 positive cases have been reported as of May 8th, 2020. With a population of over 1.34 billion people, India will encounter obstacles in limiting the spread of the severe acute respiratory syndrome coronavirus 2. To control the spread of the present outbreak, multiple strategies would be required, including computational methods, statistical tools, and quantitative analytics, as well as the speedy formation of a new therapy. This outbreak is intrinsically related to the country's economy, as it has severely hampered industrial sectors because people all over the world are currently wary of doing business in impacted areas. The coronavirus disease (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first identified in December 2019 in Wuhan, China, and has since spread to many provinces across the country. SARS-CoV-2 infection has been confirmed in over 212 countries and territories so far. On January 30th, 2020, the first SARS-CoV-2 positive case in India was reported in Kerala, Maharashtra, Delhi, and Gujarat were reported to be COVID-19 hotspots on May 8th, 2020, with 17,974, 5,980, and 7,012 confirmed cases, respectively.

By: Ashish Jha (2nd year)

NANOTECHNOLOGY

Nanotechnology is the part of science and technology which deals with control of matter on atomic, molecular and supra-molecular scale. Its products are used as electronic devices, catalyst, sensors etc. It helps to revolutionize many technologies and industrial sectors: information technologies, homeland security, medicine, transportation, energy, food safety and environmental science, and many others. Dry nanotechnology, Wet nanotechnology and computational nanotechnology are the types of nanotechnology. Nanotechnology has various applications nowadays as it offers the potential for new and faster kinds of computers, more efficient power sources and lifesaving medical treatments. Nonmaterial has several advantages over bulk materials such as the huge surface to volume ratio, very high porosity, and completely different physicochemical properties. Nanotechnology offers the potential for new and faster kinds of computers, more efficient power sources and lifesaving medical treatments. But apart from all the advantageous it has some *Potential* disadvantages that include economic disruption and possible threats to security, privacy, health and the environment. Another disadvantage of nanotechnology is the enormous financial costs associated with it. In addition, there are various applications of nanotechnology in commercial products, although most applications are limited to the use of passive non materials. Main use of nonmaterial is in industries such as automotive, health care, chemical industries, electronics, textiles, military, and environment.

By: Ravneet Kaur (3rdyear)

Artificial Skin

Skin, the largest organ of the human body, is organized into an elaborate layered structure consisting mainly of the outermost epidermis and the underlying dermis. A subcutaneous adipose-storing hypodermis layer and various appendages such as hair follicles, sweat glands, sebaceous glands, nerves, lymphatics, and blood vessels are also present in the skin. These multiple components of the skin ensure survival by carrying out critical functions such as protection, thermoregulation, excretion, absorption, metabolic functions, sensation, evaporation management, and aesthetics. The study of how these biological functions is performed is critical to our understanding of basic skin biology such as regulation of pigmentation and wound repair. Impairment of any of these functions may lead to pathogenic alterations, including skin cancers. Therefore, the development of genetically controlled and well characterized skin models can have important implications, not only for scientists and physicians, but also for manufacturers, consumers, governing regulatory boards and animal welfare organizations. As cells making up human skin tissue grow within an organized three-dimensional (3D) matrix surrounded by neighboring cells, standard monolayer (2D) cell cultures do not recapitulate the physiological architecture of the skin. Several types of human skin recombinants, also called artificial skin, that provide this critical 3D structure have now been reconstructed in vitro.

By: Aarohi Shukla (3rd Year)

Bioengineered lungs

Lung bio fabrication is a new tissue engineering and regenerative development aimed at providing organs for potential use in transplantation. Lung bio fabrication is based on seeding cells into an acellular organ scaffold and on culturing them in an especial purpose bioreactor. The acellular lung scaffold is obtained by decellularizing a non-transplantable donor lung by means of conventional procedures based on application of physical, enzymatic, and detergent agents. To avoid immune recipient's rejection of the transplanted bioengineered lung, autologous bone marrow/adipose tissue-derived mesenchymal stem cells, lung progenitor cells or induced pluripotent stem cells are used for bio fabricating the bioengineered lung. The bioreactor applies circulatory perfusion and mechanical ventilation with physiological parameters to the lung during bio fabrication. These physical stimuli to the organ are translated into the stem cell local microenvironment – e.g. shear stress and cyclic stretch – so that cells sense the physiological conditions in normally functioning mature lungs. After seminal proof of concept in a rodent model was published in 2010. The hypothesis that lungs can be bio fabricated is accepted and intense research efforts are being devoted to the topic. The current experimental evidence obtained so far in animal tests and in *ex vivo* human bioengineered lungs suggests that the date of first clinical tests, although not immediate, is coming. Lung bioengineering is a disrupting concept that poses a challenge for improving our basic science knowledge and is also an opportunity for facilitating lung transplantation in future clinical translation.

By: Tannu Singh (3rd Year)

3D Printing

In the manufacturing area a new technology has proven to be very promising and is called rapid prototyping also called as additive manufacturing technology. This technology has been substantially improved and has evolved into a useful tool for many fields like researchers, manufacturers, designers, engineers, and scientists. Collaborating different fields in single package formed 3D printer as it includes Design, manufacturing, electronics, materials, and business .3D printing is the process of creating an object with material layer by layer in three-dimension formations. The difference between traditional manufacturing and 3D printing is that the 3d printer involves additive approach but most of the traditional manufacturing processes involve subtractive approach that includes a combination of grinding, bending, forging, molding, cutting, gluing, welding, and assembling. At the beginning 3D printing was mostly seen as a tool to shape and bring it to the artistic or different designs, but in the last few years this technology is developing to a point where mechanical components and some required parts can be printed. It completely changes not only the industrial/manufacturing field, but also our entire way of life in the future as 3D printer makes possible to complete model in a single process.

By: Megha Misra (3rd Year)

Golden Rice

Golden Rice, the fruit of nine years of research, experimentation, and development. The “gold” was in fact beta carotene, a substance that is converted into vitamin A in the human body. Conventional rice plants already contained beta carotene, but only in their leaves and stems, not in the kernels. Golden Rice also carries the substance in the part of the plant that people eat. This small change made Golden Rice into a miracle of nutrition: The rice could combat vitamin A deficiency in areas of the world where the condition is endemic and could, thereby, “save a million kids a year.” Vitamin A deficiency is practically unknown in the Western world, where people take multivitamins or get sufficient micronutrients from ordinary foods, fortified cereals, and the like. But it is a life-and-death matter for people in developing countries.

Lack of vitamin A is responsible for a million deaths annually, most of them children, plus an additional 500,000 cases of blindness. In Bangladesh, China, India, and elsewhere in Asia, many children subsist on a few bowls of rice a day and almost nothing else. For them, a daily supply of Golden Rice could bring the gift of life and sight. The superfood thus seemed to have everything going for it: It would be the basis for a sea change in public health among the world's poorest people. It would be cheap to grow and indefinitely sustainable because low-income farmers could save the seeds from any given harvest and plant them the following season, without purchasing them new.

By: Kush Chauhan (2nd Year)

BIO-COMPUTERS

BIO-COMPUTERS use system of biologically derived molecules such as DNA and Protein to perform computational calculations involving storing, retrieving, and processing data. The development of Bio-computers has been made possible by the expanding new Science of Nano-biotechnology. The term Nano-biotechnology can be defined in multiple ways; in a more general sense, Nano-Biotechnology defined as any types of technology that uses both Nano-scale materials (1-100 nanometers) and biologically based materials. The implementation of Nano-Biotechnology to design and produce synthetically designed protein as well as the design and synthesis of artificial DNA molecules can allow the construction of functional Bio-computers. Bio-computers can also be designed with Cells as their basic components. Chemically induced dimerization system can be used to make logic gates from cells. These logic gates are activated by Chemical agents that induce interactions between previously non-interacting Proteins and trigger some observable change in the cells. Researchers have dreamed of molecular-scale computing devices could be embedded in our bodies to monitor health and treat diseases before they progress. The advantage of such computers, which would be made of biological materials, would lie in their ability to speak the biochemical language of life.

By: Devesh Raj (3rd Year)

Artificial Intelligence in healthcare

Artificial intelligence (AI) aims to mimic human cognitive functions. It is bringing a paradigm shift to he-

-althcare, powered by increasing availability of healthcare data and rapid progress of analytics techniques. AI can be applied to various types of healthcare data (structured and unstructured). Popular AI techniques include machine learning methods for structured data, such as the classical support vector machine and neural network, and the modern deep learning, as well as natural language processing for unstructured data. Major disease areas that use AI tools include cancer, neurology, and cardiology. Recently AI techniques have sent vast waves across healthcare, even fueling an active discussion of whether AI doctors will eventually replace human physicians in the future. We believe that human physicians will not be replaced by machines in the foreseeable future, but AI can assist physicians to make better clinical decisions or even replace human judgement in certain functional areas of healthcare (e.g., radiology). The increasing availability of healthcare data and rapid development of big data analytic methods has made possible the recent successful applications of AI in healthcare. Guided by relevant clinical questions, powerful AI techniques can unlock clinically relevant information hidden in the massive amount of data, which in turn can assist clinical decision making. Before AI systems can be deployed in healthcare applications, they need to be 'trained' through data that are generated from clinical activities, such as screening, diagnosis, treatment assignment and so on, so that they can learn similar groups of subjects, associations between subject features and outcomes of interest. These clinical data often exist in but not limited to the form of demographics, medical notes, electronic recordings from medical devices, physical examinations and clinical laboratory and images. Taking the advantage of large amount of data with rich information, AI is expected to help with studying much more complicated yet much closer to real-life clinical questions, which then leads to better decision making in stroke management.

By: Devanshi Gupta (2nd Year)

Biotechnology and Serendipity

Serendipity is the phenomenon by which an unexpected, yet rewarding or fortunate event occurs. In science, it takes the disguise of remarkable discoveries. The realization of the natural phenomenon by the earliest humans was serendipitous in many ways. To cite a few: the 'Eureka moment' of Archimedes that led to the discovery of buoyancy, the 'Newton's Apple' that bonked the legend's head leading to the formulation of the laws of gravity, etc. In the current scientific society, however, such an event is uncommon because the modern scientific methodologies are undertaken in a more focused, systematic, and controlled manner. A serendipi-

-tious discovery may thus happen when a deliberate change is made in the proposed protocol either knowingly or unknowingly. Such a pursuit is risky as it may lead to a failed experiment, but it is also what leads to a serendipitous discovery. The most popular and significant serendipitous discovery in the field of biotechnology is the Nobel Prize-winning discovery of 'Penicillin' by Alexander Fleming in 1928. At that time, Fleming was investigating *Staphylococcus aureus* which he cultured on Petri plates. He reportedly observed his plates to be contaminated with molds around which he also observed clear zones with no colonies. Instead of discarding the contaminated plates, he chose to investigate the clear zones. He discovered that it was due to an antibiotic secreted by the molds which were later identified to be *Penicillium notatum*. The antibiotic was thus named Penicillin. Fleming realized its potential to be used in the treatment of bacterial diseases and published his findings. Another praiseworthy serendipitous discovery in health science is the discovery of cisplatin as a chemotherapy drug. Cisplatin, also known as Peyrone's salt was first described by Michael Peyrone long back in 1845. However, its medicinal value remained unknown for over a century.

By: Vedant Gupta (2nd Year)

CRISPR Technology

A CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats which are the hallmark of a bacterial defense system that forms the basis for CRISPR-CAS9 genome editing technology. The term is often used loosely to refer to systems that can be programmed to target specific stretches of genetic code and to edit DNA at precise locations as well as for other purposes such as for new diagnostic tools. When a virus attack one of the bacteria, the CRISPR system captures a piece of the virus's DNA and slides it into a section of its DNA, which lets the bacteria's virus fighting machinery use it like a "wanted" poster to identify and destroy the virus it came from the next time it attacks. CRISPR “spacer” sequences are transcribed into short RNA sequences capable of guiding the system to match the sequences of DNA.Cas9 is one of the enzymes produced by the CRISPR system. When the target is found, Cas9 binds to the DNA and cuts it, shutting the targeted gene off. Using the modified version of Cas9, researchers can activate gene expression instead of cutting the DNA. It helps the researchers to correct the mutations at precise locations in the human genome to treat the genetic cause of disease. CRISPR genome editing allows scientists to quickly create cell and animal models which researchers can use to accelerate research into diseases like cancer and mental illness since it can be applied directly in the embryo. CRISPR reduces the time required to modify target genes compared to other gene targeting technologies. Other systems such as CRISPR-Cas13 that target RNA provides alternate avenues for use. Agricultural companies are interested in the technology's potential to edit crops to make them drought resistant and faster growing. Between 2014 and 2015, scientists reported the successful use of Cas9 in mice to eliminate muscular dystrophy and cure rare liver disease and to make human cells immune to HIV. Continued searches through bacterial DNA have revealed new enzymes that improve CRISPR'S performance. Summing it all up CRISPR has its advantages and disadvantages ranging from ethical concerns to being known as the fastest, cheapest, and most precise way of editing genes. This scientific breakthrough can eliminate the disease, solve world hunger, provide unlimited clean energy.

By: Utkarsh Porwal (2nd Year)

Plastic Eating Mushroom

Fascinating right? Have you ever thought that mushrooms break down plastic and turn into food? The secret is in the rare fungus called *Pestalotiopsismicrospora*. Designer Katharina Unger led such a study with Utrecht University in the Netherlands, in partnership with another designer Julia Kaisinger. This variety of mushroom was isolated from the Amazon rainforest by a group of researchers as part of Yale's annual rainforest expedition. It can consume the key component of plastic, polyurethane. These mushrooms can survive in anaerobic conditions. It kicked off the research exploring how fungi can degrade plastic without retaining the toxicity. Unger and Kaisinger came up with a setup that cultivates edible plastic digesting fungi, a striking combination of creativity, science, and design. You are right; you can eat mushrooms that eat plastic. They created a prototype called Fungi *Mutarium*, a means of growing food from plastic waste. They used mycelium, which is a threadlike, vegetative part of two mushrooms, *Pleurotusostreatus* (Oyster mushrooms) and *Schizophyllum* commune (Split gill mushrooms). To convert plastic into edible products, it is first placed in an activation chamber where UV light sterilizes the material and activates the plastic's degradation process making it easier to digest. The plastic is then placed in an egg-shaped pod made from agar-a jelly-like substance made from seaweed. These pods are called FUs. The diluted mycelium stored in a holding tank on one side is delivered into each FU via a large pipette. The growth process is thus initiated. These cultures develop over the agar, eventually consuming the plastic and growing into a fluffy mushroom-like structure. While the process takes place, the pods are left in a growth sphere covered by a transparent domed structure to regulate the humidity levels. It takes a couple of weeks to months (depending on the plastic material and

control settings) for the mycelium culture to consume the plastic. Researchers are working on accelerating the rate of fungal growth and plastic digestion. Once the samples are fully grown, the agar pods (FU) and their contents are removed. The product looks surprisingly like something you might want to consume. Unger says that the final product varies in flavor depending on the strain of the fungus.

By: Saumya Gupta (3rd Year)

Nanoparticles In Cancer Treatment

Several types of research have been undertaken by many scientists all over the world for cancer treatment but with limited progress regarding patient's survival especially for certain types of very aggressive cancer, so there is a need for some changes because what's been done so far has not been working. The major reason behind this is that over 99% percent of cancer drugs never make their way to the tumor because they lack transportation and tools to take them to the location they are aiming for. Thus, we need some tools to take them to the location of the tumor and for this purpose, the nanoparticles can be used as an effective tool to load the cancer drugs. Nanoparticles have specific receptors that recognize tumor cells and healthy cells and enter only into the tumor cells. Cancer drugs are too small so that they are easily washed up by the kidney and they don't reach the tumor. But if we conjugate them with nanoparticles, they can't be washed away from the body and these particles protect the drugs from being degraded by enzymes. They release cancer drugs at the target site which enables them to do their job effectively. Currently, there are 10 clinically approved nanoparticles for cancer that are given to patients all over the world like gold nanoparticles, etc. But even then, cancer isn't cured on administration because the major challenge against currently approved nanoparticles is the liver. As we know, the liver functions as the body's filtering system, it recognizes and destroys foreign particles such as bacteria, viruses, and nanoparticles. The immune cells in the liver will phagocytize the destroyed matters. Hence only some of the particles reach the tumor. So, the better strategy to improve the action of nanoparticles is to temporarily disarm the immune cells in the liver. Recently, the scientific fraternity has ended up with an idea of using the body's own nanoparticles to load the cancer drugs since they can't be labelled as foreign particles by the liver. These biological nanoparticles are present in saliva, in blood, in urine and even in pancreatic juices. But the major challenge behind this is to isolate them in large quantities without damaging them. Research is still in the process to produce highly concentrated and high-quality formulations of biological nanoparticles from a large quantity of liquids from the body. But this method is not yet in clinical use as it is only under laboratory trial. Therefore, in the coming years, these nanomedicines will save future cancer patients.

By: Muskan Yadav (3rd Year)

Solution To Antibiotic Resistance

We, humans, develop many diseases from day to day and found several methods to cure those infections. One of the aid is what we found accidentally - Antibiotics obtained from penicillin. But nowadays, we are developing resistance to such antibiotics. What if we leave the condition as such? It leads to an increase in mortality rate. Bacteria are habituated in most parts of our body. Most of the bacteria are good to us and even some help in our metabolism. But some bacteria cause deadly infections. We have done many types of research and found many antibiotics killing different bacteria with a variety of mechanisms like inhibiting cell wall synthesis, DNA synthesis, etc. Developed countries are using them without proper care and they are prescribed freely. It should be a last resort drug and not something you take because your cold is annoying. And many people in developing countries are not even getting access to it. Continuous consumption of antibiotics may lead to the development of a superbug - A bacteria that cannot be killed by any antibiotic. Hospitals may be a growing ground for these superbugs. So bacteria evolved against the action of antibiotics and they may transfer their new evolved plasmids through the process of transformation. Another reason is that since animals are sheltered in very unhygienic conditions, they may develop the disease very easily. For this, antibiotics are fed to the animals in their feed. Bacteria residing in animals got evolved and food products from those animals also have the same which ultimately spreads to humanity. Example: antibiotic - Colistin (Last resort drug to cure complex infections that occur in the hospital). Shortly death due to these superbugs' crosses death due to cancer.

By: Shipra Mishra (2nd Year)

Schizophrenia: Disorder affecting The Youth

This article would be focused on explaining what exactly schizophrenia is, its myths and facts, its symptoms, understanding its exact known cause and finally providing a piece of information about the continued drug discovery to help cure this condition. To understand the term schizophrenia, one needs to split the word into two i.e., 'schizo' which refers to split and 'phren' which refers to the mind in Greek terminology. Schizophrenia does not mean split personality, rather it refers to split off from reality. It is a brain disorder that can alter the thought process and behavior of a person.

Our society has come up with many myths associated with schizophrenia. Some of them include sidelining schizophrenics as violent people. To address these issues, we need to understand the symptoms associated with this disease. Hallucinations and delusions form a major part of the positive symptoms. Delusion refers to the thought of constantly being controlled by an external force. Lack of motivation and inability to feel sensations of pleasure come under the category of negative symptoms. We may now understand that schizophrenics are not violent people. Their reaction to hallucinations and delusions just makes people feel they are violent, but they are not. Many neuroscience professionals have tried finding out the exact cause of schizophrenia, but it remains unknown. However, certain findings help us understand that genetic and environmental factors play a major role in this chronic brain disorder. The causes of schizophrenia can be explained under many branches such as neuroanatomy, neurochemistry, and many more since all the branches are interrelated to each other. In this article, I would like to explain this disorder using neuroanatomy. This picture shows the dissected brains of both normal people and schizophrenics. Enlarged ventricles (excess fluid in the picture) are often observed in patients suffering from chronic schizophrenia. Such patients also have reduced sizes of the prefrontal cortex area of the brain. This results in the loss of non-myelinated axons and dendrites in those regions of the brain. The loss of grey matter of the brain is also observed. The genetic factors which are responsible for this chronic disorder are Neuregulin 1(NRG1) and Disrupted in Schizophrenia (DISC). The environmental factors include stress from family and complete isolation of a person from his or her surroundings. Both factors combine to cause schizophrenia.

By: Suryadeep Yadav (2nd Year)

Science and religion

"Science and religion, religion and science, put it as you may, they are the two sides of the same glass, through which we see darkly until these two foci together, reveal the truth". The above words by American Novelist Pearl S. Buck truly underline the propinquity between science and religion, i.e., Truly underlines notions essential for achieving the dual goals of advancement and enlightenment. Technology has time and again sensationalized humans with its noble application in sundry spheres. The unprecedented pace of conveyance, the radicalization in the medical field and the redefinition of interaction with social media; all can be regarded as an offspring of science. While most of these state-of–the – art mechanisms have been put to judicious use, certain people have resorted to unethical acts such as hijacking the aero planes, carrying out the unscrupulous organ trade and using the social media for stalking. This is where religion is required to take the role of mentor and steer an individual action to morally sound deeds. Science can be defined as the drawing of inference through practical experimentation and observations. Religion is a set of doctrines with devotion to a supernatural power. Religion not only serves as a medium to standardize the customs and behavioral traits of a community but affects its mental faculties as well. Science and religion are traditionally viewed as contrast concepts. Science is objective while religion is subjective; science relies on experiments while religion relies on experience; science focuses on the magnitude while religion focuses on magnanimity.

By: Kritya Gupta (2nd Year)

DNA Computing - A Hope for the Future

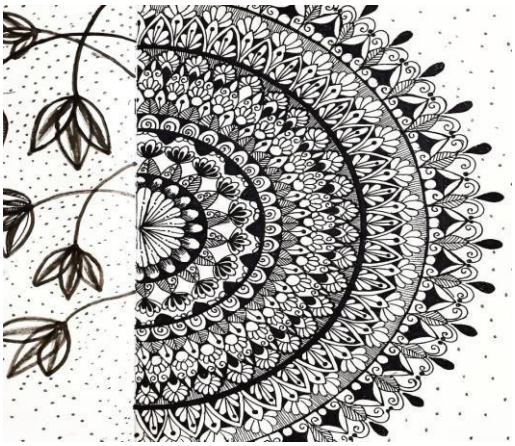
As already known, DNA, the genetic material in almost all living organisms, is a double stranded helix where the purine and pyrimidine bases in the two strands are hydrogen-bonded with each other in a complementary fashion. This Watson-Crick base pairing can be extensively utilized to implement logical calculation and solve complex mathematical problems. DNA computing, a field of applied biology that employs fundamental knowledge in biochemistry and molecular biology, has speedily progressed in the last three decades. In most existing research, multiple chemical reactions using different DNA sets need to be performed to solve of even a simple calculation. In each reaction, DNA is added manually into a single reaction tube, thus making the entire protocol inconvenient. Recently, scientists have brought to light a technique to automate DNA calculations by developing a computer controlled microfluidic chip. Scientists used 3D printing to fabricate the microfluidic chip to solve various DNA-based calculations of simple Boolean logic circuits. Boolean logic, one of the basic logics of computer programming, utilizes true-or-false logic that compares inputs and returns a value of either 'true' or 'false', depending on the type of logic gate operation performed. Here, the logic gate is comprised of different sets of single-stranded DNA templates used as inputs. The output was declared true or false based on the size of the final DNA. This microfluidic chip is an exceptional construction due to the introduction of a motor operated valve system that can be operated via PC or smartphone. The microfluidic chip and software set-up together form a microfluidic processing unit (MPU) which could perform a series of reactions to perform a combination of logic operations with ease. This technique also aims at replacing traditional electronic computing in the future because the former consumes less power, thus preventing global warming. Hence, future research should focus on a complete solution of DNA computing with both DNA algorithms and storage systems.

By: Ilma Sarfaraz (2nd Year)

BEYOND CLASSROOM

The students of biotechnology department showcase their talent beyond classroom in painting.

Swarnima 2nd Year



Anjali 2nd Year

Shristi 2nd Year

Gautam 2nd Year

EDITORIAL BOARD

Ms. Shweta Sharma

Shikha

Shivansh Verma