



**St. Kuriakose Elias Chavara** Founder of CMI Congregation



# EDITORIAL TEAM ......

Siddhartha Debgoswami Nanduri Roma Swati Jovita V Mathew Jessica D'Cunha Aheli Biswas Avni Madan

Faculty Co-ordinators Dr. Indira M.N. Dr. Nathiya T. ynapse, the annual newsletter of Kristu Jayanti College's Department of Life Sciences, serves as a compilation of insightful articles and reflections crafted by the department's students. Within its pages, students endeavor to convey the latest developments in various research domains within Life Sciences. The collection stands as a source of pride, showcasing the valuable contributions of our students in disseminating highly informative content that highlights both current and ongoing research efforts. It underscores the dynamic nature of research, emphasizing that there are still numerous unexplored avenues in the field.

We anticipate that this newsletter will address a multitude of inquiries related to the technological advancements shaping the landscape of Life Sciences. Beyond research updates, 'Synapse' also offers a glimpse into the department's activities and the notable achievements of both students and faculty. It is our hope that this publication serves as a comprehensive resource, providing valuable insights into the progress and achievements within the Department of Life Sciences at Kristu Jayanti College.

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### FROM THE PRINCIPAL'S DESK

Propagation of science is very important for the global socio economic growth. I am extremely elated to know that the department of Life Sciences is bringing out its annual newsletter 'Synapse' for the academic year 2023-24. The department has been actively involved in organizing many student centric activities over the years in creating opportunities for students and faculty in their academic development. Dissemination of scientific knowledge through research papers, articles or book publications and conferences are few of the thrust areas of the department. With research being the main fulcrum, the department nurtures its students not only with recent scientific knowledge but also on the Indian knowledge system. I am certain that 'Synapse' has awakened the creativity and inquisitiveness of young minds. I congratulate and appreciate all the contributions from the faculty and students of the department and wish the editorial team the very best.

### **MESSAGE FROM THE DEAN**



Rev. Dr. Augustine George Principal, Kristu Jayanti College



Dr. Calistus Jude A. L. Dean, Faculty of Sciences

In the vast and intricate world of life sciences, information is as diverse as the ecosystems we study. From the microscopic intricacies of cellular processes to the macroscopic wonders of biodiversity, each snippet of knowledge adds a layer to our understanding of the natural world. I am filled with immense joy as the Department of Life Sciences brings out yet another edition of its annual newsletter 'Synapse'. This publication is evidence to the dedication, intellect and passion of our student contributors who have delved into the depths of scientific inquiry to produce insightful articles. Bringing interesting scientific information in small pieces, Synapse aims to spark the curiosity of readers and ignite a passion for discovery. I appreciate the commitment and willingness of the contributors as their articles have enriched this publication. I express my gratitude to the editorial team, comprising of both faculty members and students, who have worked tirelessly to curate and refine the content of this newsletter.

May Synapse serve as both a source of inspiration and a platform for further exploration and foster a community of curious minds.

### **MESSAGE FROM THE HEAD OF THE DEPARTMENT**

As we reflect on the past year's achievements and look forward to new opportunities, I am delighted to share the latest edition of Synapse, our annual newsletter highlighting the groundbreaking research, innovative discoveries, and impactful contributions from the Life Sciences Department. In the face of unprecedented challenges, our department has demonstrated resilience, creativity, and dedication to advancing knowledge and improving lives through our collective efforts in research, education, and outreach. I am immensely proud of the passion, expertise, and collaborative spirit exhibited by our faculty, staff, and students. From unraveling the complexities of the human genome to exploring the intricacies of ecosystems, our interdisciplinary approach continues to push the boundaries of scientific understanding.

Together, we will continue to inspire curiosity, drive discovery, and make a lasting impact on the world. Thank you for your dedication and contributions to the success of our department. I look forward to the continued growth and success of our vibrant scientific community.



Dr. Elcey C. D. Head, Department of Life Sciences

Articles by Tayantians

# From Hominids to Homo Sapiens

The evolution of intelligence spans millions of years, beginning with Homo habilis and their basic stone tools around 2.4 million years ago. Homo erectus, with a 25% larger brain, demonstrated increased versatility. Neanderthals, skilled hunters, and toolmakers, showed signs of symbolic thinking. Denisovans, identified through DNA analysis, present a challenge in determining the cognitive and technological due to limited archaeological evidence. The Upper Palaeolithic period 60,000 to 30,000 marked behavioural modernity that included hunting, art, dance, customary funerals and colonisation.

# So why and how did intelligence evolve?

Human intelligence likely evolved due to a combination of factors, contributing each to its development over millions of years. One major factor is the survival advantage that intelligence provided, facilitating problem-solving, adaptation to new environments, and complex decision-making. Skills like tool development, social cooperation, and future planning increased the chances of survival. The strong link between tool use and intelligence suggests that the ability to create and use tools played a crucial role driving the evolution in of intelligence.Another proposed explanation is sexual selection, where individuals with greater cognitive abilities may have been perceived as more desirable mates, creating a selection pressure for increased intelligence.



Cognitive flexibility, likely conferred advantages in unpredictable environments. Intelligence may have also evolved to support complex social interactions within large groups, involving the formation and maintenance of social bonds, resource provision and protection.

Additionally, the challenges posed by ecological difficulties, such as climate change, required intelligence for adaptation. The evolution of intellect also benefited from cultural evolution, involving social learning and the transmission of cultural information, knowledge, customs, and inventions.

The specific pressures and challenges faced by each species shape their unique paths of intelligence evolution. Human intelligence is a dynamic characteristic shaped by both biological and cultural causes, holds significant consequences for the future of our species and the planet.

> Tanvi Loharuka 2 <sup>nd</sup>Year B.Sc. BTBC

# The Brain-eating Amoeba



Primarily found in hot freshwater lakes and hot springs, this pathogen, known as Naegleria fowleri, has induced interest among the public due to its increase in the number of cases in recent years. The species was first identified and reported in 1965, with the first case in India being detected in 2016 in the district of Alappuzha, Kerala. Naegleria fowleri, a thermophile belonging to the genus Naegleria, is not a typical amoeba. It is rather a shape-shifting amoeboflagellate excavate. The disease is usually fatal due to its rapid onset and indefinite primary symptoms. N. fowleri enters the nasal cavity, following contact with water containing the pathogen, and gets attached to the nasal mucosa, after which it travels along the olfactory nerves into the olfactory bulb.

On penetrating into the brain, it leads to swelling of the brain and herniation of the cerebral artery, ultimately causing death. Though the pathogen is rare, it leads to PAM (Primary Amoebic Meningoencephalitis), which may be treated using drugs including fluconazole, rifampin,azithromycin, miltefosine, etc.

Keeping in mind the high fatality of the disease, various precautions were introduced by the government, a few of which were: not engaging in warm water, using a nose clip or keeping your nose above the water level, and avoiding water activities in case of any open wounds. The public is also encouraged to use boiled or sterile water instead of tap water for treatments like nasal irrigation.

> Diya Ragesh 2<sup>nd</sup> Year B.Sc. MBGE

# The Silent Inheritance

In the fascinating realm of transgenerational memory epigenetics, the intricate dance between genetics and experiences takes center stage. Unlike traditional inheritance, this phenomenon investigates how memories at the epigenetic level are passed on from one generation to the next. Epigenetics is the study of changes in gene function without changing the underlying DNA, demonstrating the interaction between genes and their environment. Epigenetic mechanisms establish stable gene expression patterns to ensure differentiation. Inheritance of genomic DNA is the basis of heredity in most organisms, but for others it has been clear for decades that additional epigenetic messages can be passed from generation to generation.

Memory can leave chemical marks in a person's genes that can be passed on to future generations.These memories do not cause genetic changes, but they do change the process by which genes are expressed, so this change is epigenetic in nature.



For memories to be transferred, they must first be stored as templates in the brain. However, for this to happen, the information stored in neurons must be transferred to the brain and encoded. If memories exist in the form of body remains, they can be passed on to the next generation.

But due to the influence of somatic cells and viruses, somatic cells cannot participate in DNA transfer, so cells are responsible for the change of DNA from one generation to the next. As researchers delve deeper into this silent legacy, understanding the impact of trauma, functional well-being, and the interplay between events and care has emerged, providing new insight into the evolution of our genetic inheritance.

Siddhartha Debgoswami 2<sup>nd</sup> Year B.Sc. BTBC

"The only limit to our realization of tomorrow will be our doubts of today." - Franklin D. Roosevelt

# Caterpillar Venom's Cell-Penetrating Compounds in Medical Advancements



The venom of the Asp caterpillar, known for causing severe pain upon contact, has been found to contain compounds with remarkable properties. Specifically, these compounds have the ability to create pores or holes in cell walls. This discovery opens up possibilities for various applications in the field of medical research.

One potential avenue is the development of targeted drug delivery systems. The ability of the venomous compounds to create pores in cell walls could be harnessed to deliver therapeutic agents directly into specific cells, enhancing the precision and effectiveness of treatments. This targeted approach may reduce side effects associated with conventional drug delivery methods.

Moreover, understanding the mechanisms behind these venomous properties could lead to the development of novel treatments for certain diseases. Researchers may explore how these compounds interact with cell membranes and whether they can be modified or synthesized for therapeutic purposes.

While these findings are promising, further in-depth studies are essential to fully comprehend the intricacies of the venom's impact on cellular structures. Additionally, researchers need to conduct extensive safety assessments before considering any practical applications in the medical field. The exploration of the Asp caterpillar venom's potential benefits underscores the continuous search for unique natural compounds that could inspire innovative solutions in medicine.

> Vismaya Biju 1<sup>st</sup> Year M.Sc. BT

# Our Mycobiome

In recent years, a surge of interest has been observed concerning the gut microbiome. However, most research that took place surrounding this topic focused primarily on the role of the bacteria. The role of bacteria in human health and physiology is still an ongoing project although it has been linked to various metabolic functions. Recently, the role of fungi in this microbiome has started to pique the curiosity of researchers. The results of various studies have proved the importance of fungi in the gut microbiome, the Mycobiome.

The mycobiome is the fungal component of the microbiome. It's also known as the fungal microbiome or mycobiota. The mycobiome consists of various fungal species that are dispersed across our bodies: Our skin, mouths, and of course our gut. Around 0.1% of the microbiome consists of fungal speciesNevertheless, after the onset of research into our gut bacteria, scientists decide to revisit the supposedly useless fungi. Now, after nearly decades of research, fungi have been linked to various diseases and intestinal homeostasis and most importantly are involved in the assembly of the gut microbiome.

The most interesting part of the mycobiome is the instability of it. The species of fungi that are found are ever-evolving and changing, especially concerning age. Infants receive the microbiome from their mothers, through their birth and by feeding. As the infant starts to feed on solid food, the mycobiome is dominated by Saccharomyces cerevisiae, Cystofilobasidium spp, Ascomycota spp, and Monographella spp. In adults, Candida, Saccharomyces, and Cladosporium sp. are the most abundantly found species.Finally, in the older population, Penicillium, Candida, Saccharomyces, and Aspergillus are more prominently observed.

The focus is primarily on the bacteria of the gut microbiome and the role of fungi is often overlooked. The intricate relationship of the fungi, bacteria, and other such organisms in the gut microbiome maintains and perpetuates various functions in our body. This relation has been linked to homeostasis and has even been pointed out as the root cause of various illnesses and disorders that were once considered irreversible. This relationship is still yet to be fully studied and understood, hence lies a major prospectus for future biologists.

> Sowmya Sivakumar 3<sup>rd</sup> Year Bsc.BTGE

# The Underwater Marvel: *Thíomargaríta magnífica*



In the hidden depths of the Guadeloupe archipelago in the Lesser Antilles, a fascinating discovery has emerged – *Thiomargarita magnifica*, a spectacular bacterium that graces the leaves of red mangroves underwater. Imagine a filament-shaped bacterium, the largest of its kind, with some individuals reaching a remarkable 10 mm in length, visible even without a microscope.

Olivier Gros, a researcher from the University of the French Antilles. stumbled upon this underwater wonder in the early 2010s. At first, he thought it was a fungus, but after five years of investigation, he and his team unveiled the true identity of this unique microbe. It was Jean-Marie Volland, a graduate student under Gros's guidance, who mysteries the finally unravelled surrounding its unusual properties.

Named "*Thiomargarita magnifica*," which translates to "sulphur pearl" in Latin, this bacterium boasts cells adorned with microscopic sulphur granules. When sunlight touches these granules, the bacterium shimmers with a captivating pearly glow.

This underwater marvel invites us to appreciate the beauty and uniqueness that thrive in the unseen corners of our oceans. *Thiomargarita magnifica*'s discovery not only adds a touch of wonder to the world of microbiology but also prompts ongoing exploration into the role it plays in its underwater ecosystem. As researchers continue to unlock the secrets of this magnificent bacterium, who knows what other marvels might be waiting to be discovered beneath the surface of our oceans?

> Thulasi S 1<sup>st</sup> Year M.Sc. BT



# Molecular Maze



### Across

4. What is the building block of nucleic acids such as DNA and RNA?

6. What enzyme is used to cut DNA at specific sequences?

7. What field of biotechnology focuses on the development of pharmaceutical drugs?

8. What is the term for an organism whose genetic material has been altered using genetic engineering techniques?

10. What is the study of viruses and viral diseases called?

12. What is the process by which bacteria reproduce by dividing into two identical cells?

13. What is the process by which genetic information is transcribed from DNA to RNA?

14. What is the branch of zoology that focuses on the study of birds?

### Down

1. What is the process by which cells convert glucose into pyruvate in the absence of oxygen?

2. What is the process of making multiple copies of a piece of DNA?

3. What is the study of genes and their function called?

5. What is the process by which plants bend or grow toward a light source?

9. What is the process by which bacteria move towards or away from chemical stimuli?

11. What is the branch of zoology that focuses on the study of fish?

# Pluripotent stem cells: a potential cure for Diabetes



characterized by elevated blood sugar groundbreaking approach, levels resulting from defective insulin potential for treating crucial role in regulating blood glucose between diabetes are Type 1, an autoimmune within destroy insulin-producing cells, and Type 2, inadequate insulin production. Achieving normal blood glucose levels is challenging without dynamic insulin and glucagon responses. While advanced insulin therapies and technologies like continuous glucose monitoring (CGM) and artificial pancreas show improved glycemic control, they are limited in accessibility and don't constitute a cure.

Diabetes, a chronic medical condition Islet Cell Transplantation (ICT) emerged as a demonstrating diabetes. Recent production or action, presents a significant protocol improvements indicate over 50% of health challenge. Insulin, a hormone ICT recipients achieve insulin independence produced by the pancreas's  $\beta$ -cells, plays a for up to five years. Comparative studies insulin injections, continuous levels. The two most common types of subcutaneous insulin infusion (CSII), and ICT the same individuals revealed disorder where immune cells attack and progressively improved glycemic control with ICT, demonstrating reduced glycemic resulting from insulin resistance and variability and fewer low blood sugar events.

> ICT revolutionized diabetes has care, extending beyond glycemic control. Optimizing transplantation processes, islet isolation, and addressing immune challenges have contributed to favorable outcomes. While ICT is considered a viable option for some with Type 1 diabetes, ongoing research enhance effectiveness aims to and accessibility, potentially offering a future without this challenging disorder.

> > Shambhavi Kumari 1<sup>st</sup> Year B.Sc. BTGE

# Brain controlling worm



Commonly known as the horsehair worm and scientifically called Nematomorpha, it has the ability to control the brains of insects. It is found in damp areas such as watering troughs, swimming pools, streams, and puddles. The name "horsehair worm" refers to the old belief that they came from horsehairs that fell into water and came to life.

The adult worms are free-living, while the larvae need a host for maturation. The larvae parasitize grasshoppers, crickets, cockroaches, and a variety of beetles. When they mature, they leave the host body to lay eggs.

This worm has the ability to turn the insects into suicidal maniacs. According to parasitologist Ben Hanelt of the University of New Mexico, once the worm larvae find themselves in the insect, "they will penetrate through the gut of the cricket and get into the body cavity, where they then grow from a tiny larva to something that is on average a foot long". The worm produces large amounts of neurotransmitters that allow the transmission of signals between neurons. This makes it possible for the infected insect to act in ways that it normally doesn't.

The horsehair worm is nothing more than a giant gonad wrapped in a thin sheath of muscles; they don't even have a mouth to eat with or chew their way through the cricket, so it remains unsure how they bore into the body cavity and then through the exoskeleton to escape.

Most insects are known to be incapable of swimming in water. However, these infected insects develop excellent swimming skills after harbouring the horsehair worm! The insect will jump into the water as soon as we bring it close to it. The worm will come out of the insect as soon as it touches the water and begin its search for a mate.

Horsehair worms are harmless to vertebrates because they can't parasitize people, livestock, pets, or birds. They also don't infect plants. If humans ingest the worms, they may encounter some mild discomfort in the intestinal tract, but infection never occurs.

> st Reshma Hegde 1 Year B.Sc. MBGE

# Revolutionary genetic "Memories" discovery

A theoretical model explaining how cells preserve their identity over generations is put forth by MIT researchers (Massachusetts Institute of Technology).

The model shows that a cell's 3D genomic structure controls the repair of epigenetic markers lost during cell division. Cells can remember their particular kind thanks to this mechanism, which has consequences for our knowledge of diseases and the ageing process.



Different modifications that histones can exhibit help regulate which genes are expressed in a particular cell. These changes provide "epigenetic memory," which aids in the preservation of a cell's identity. It is unclear, nevertheless, exactly how this memory is transferred to daughter cells.

After a cell copies its DNA, the marks are partially lost, but the 3D folding allows the cell to easily restore the chemical marks needed to maintain its identity.

Furthermore, chemical marks enable a cell to recover its genome's threedimensional folding each time it divides. This allows the memory to be maintained throughout hundreds of cell divisions by switching between 3D folding and the markings.

markings. Specialised enzymes referred to as "reader-writer" enzymes are responsible for adding these changes. Each of these enzymes is unique to a particular mark, and when they have "read" an existing mark, they "write" new markings in close proximity. Marks will accumulate in areas where alterations inherited from the parent cell have already occurred if the chromatin has already folded into a threedimensional form. This mechanism is similar to how infectious diseases spread since chromatin regions are more likely to be modified the more contacts they have with other regions, just as an individual's risk of infection grows with the number of connections they have.

> Rithika K. 2<sup>nd</sup> Year B.Sc. BTBC

# Unlocking the Medicinal Potential of Fungi

Fungi, once primarily associated with moldy bread and mushrooms on the forest floor, are now captivating the attention of the scientific and medical communities due to their incredible medicinal properties. This article explores the diverse applications of fungi in medicine, shedding light on their potential to revolutionize healthcare.

The Healing Power of Mushrooms: Mushrooms, a type of fungi, have a rich history in traditional medicine across different cultures. Certain species, like Reishi, Shiitake, and Cordyceps, have been valued for their medicinal benefits. These fungi contain bioactive compounds with anti-inflammatory, antioxidant, and immunomodulatory properties.



Anticancer Properties: Certain fungi exhibit promising anticancer properties. Compounds from mushrooms like Turkey Tail and Chaga have demonstrated anti-tumor effects in preclinical studies. Researchers are actively investigating these compounds for their potential role in cancer prevention and treatment, offering new avenues for therapeutic interventions.

Fungi and Metabolic Diseases: Metabolic diseases, such as diabetes and obesity, pose significant challenges globally. **Fungi-derived** health compounds show potential in managing these conditions. For instance, studies suggest that compounds from certain fungi can have hypoglycemic and anti-obesity effects, opening up possibilities for future therapeutic developments.

Rigorous research and clinical trials are essential to establish the safety and efficacy of fungalderived compounds. Collaborations between mycologists, pharmacologists, and medical researchers are crucial to overcoming these challenges and unlocking the full potential of fungi in medicine.

Fungi offer numerous medicinal possibilities, including antibiotics, immunosuppressants, and anticancer agents. As research advances, integrating fungal compounds into mainstream healthcare could offer innovative solutions to pressing health challenges.

Sejal Sandesh Nikam 1<sup>st</sup> Year M.Sc. BT

# FACTOIDS GALORE

Unlocking the Secrets of Fun and Quirky Facts

- Bananas are berries, but strawberries aren't: In botanical terms, berries are fruits produced from a single ovary, and bananas fit this definition. On the other hand, strawberries, despite their name, are not true berries.
- **Cows have best friends:** Research has shown that cows form close friendships and can become stressed when they are separated from their best buddies.
- A group of flamingos is called a "flamboyance": These vibrant birds are not just colorful in appearance but also have a fittingly flamboyant name for their social groups.
- Honey never spoils: Archaeologists have found pots of honey in ancient Egyptian tombs that are over 3,000 years old and still perfectly edible.
- A jiffy is an actual unit of time: It's defined as the time it takes for light to travel one centimeter in a vacuum, approximately 33.3564 picoseconds.
- The Eiffel Tower can be 15 cm taller during the summer: When a substance is heated up, its particles move more and it takes up a larger volume. The iron structure of the Eiffel Tower expands in the heat of the summer and contracts in the winter.

# Are bacteria cause of snow?

The genus Pseudomonas, which has a wide variety of bacterial species, includes *Pseudomonas syringae*. It is categorized as a rod-shaped, Gram-negative bacterium. Numerous plant species are known to be infected by *P. syringae*, leading to diseases in crops like tomatoes, beans, cucumbers, and many more. The bacterium enters plants through wounds or stomata, which are natural openings. It secretes toxins and other virulence factors, which aid in the development of disease symptoms.

*Pseudomonas syringae* produces highly efficient biological ice nuclei (IN) that are proposed to influence precipitation by freezing water in clouds. It has been found in rain, snow, and cloud water samples, suggesting that it may be able to spread throughout the sky. It was the first known organism to create biological ice nuclei (IN), which are extremely effective at freezing supercooled water at temperatures higher than -10 °C. This organism's IN activity originates from a big protein located on the outside membrane of the cell. This protein creates multimeric clusters which form water into an array resembling ice, hence facilitating its phase shift.

It is presumed that *P. syringae* and related organisms' unique capacity to form effective IN can modulate atmospheric processes. The freezing of the cloudforming droplets, or glaciation, is a significant process resulting in precipitation, including the generation of hail. It is mostly influenced by IN particles suspended in the atmosphere. Supercooled liquid water has a higher vapour pressure above ice crystals therefore, frozen particles can collect water and develop to sizes big enough to initiate precipitation. This is referred to as the Wegener-Bergeron-Findeisen process. Microbial cells can function as cloud condensation nuclei (CCN) in warm clouds in addition to glaciation. The condensation of water vapour into the liquid droplets that make up clouds depends on these aerosol particles.

Precipitation is an important means of escape from harsh environmental. IN activity allows cells to be selectively precipitated from clouds, more so than non-nucleating particles. Thus, ice nucleation allows the airborne bacteria to descend and resume their ability to proliferate.

InaZ, the protein responsible for ice nucleation, was discovered in 1986. But it was not until 2016 that scientists found out how *P. syringae* actually forms ice by zooming in to the bacterium-liquid interface. Through the use of interface-specific sum frequency generation (SFG) spectroscopy, the researchers demonstrated that InaZ may reposition neighboring water molecules to form a lattice structure similar to that found in ice. It also takes heat away from the surrounding water molecules.

> Eunice Achu Mathew 2<sup>nd</sup> Year B.Sc. MBGE

"Science is not only a disciple of reason but, also, one of romance and passion." - Stephen Hawking

# Engineered bacteria for skin acne treatment

Acne, a prevalent skin condition affecting people of all ages, has conventionally been treated with antibiotics or isotretinoin, both bearing significant side effects. A groundbreaking study by an international research team introduces a pioneering approach to acne treatment. Through genetic engineering of *Cutibacterium acnes*, a skin bacterium, scientists have successfully created a therapeutic molecule with the potential to transform acne treatment. This innovative technique utilizes the natural capabilities of a skin bacterium, departing from traditional treatments that often result in skin microbiome disruption and photosensitivity.



Validation of the engineered bacteria's efficacy in modulating sebum production has been conducted in cell lines and on mouse skin, the current animal model. Future applications involve developing alternative models resembling human skin, such as 3D skin models. The researchers anticipate a broader scope for the technology, envisioning engineered bacteria as a platform for treating various diseases. The 'SkinDev' European Project aims to engineer C. acnes for addressing atopic dermatitis.In parallel, a non-antibiotic approach for skin infections has been developed—a microneedle patch by a team led by Kelvin Yeung from the University of Hong Kong.

Targeting bacterial skin infections, the patch incorporates ultrasound-responsive zinc-based metal-organic framework (MOF) antibacterial nanoparticles. Upon ultrasound stimulation, these nanoparticles generate reactive oxygen species, effectively killing bacteria and promoting skin repair. This innovative patch provides advantages over traditional antibiotic treatments, offering a fresh solution to drug resistance issues. With its ability to address various skin infections, the microneedle patch stands as a promising candidate for diverse skin conditions, marking significant progress in biotechnology for improved skin treatments.

> Rashmi Kumari 1 <sup>st</sup> Year B.Sc. BTBC

"Science is not only a disciple of reason but, also, one of romance and passion." - Stephen Hawking

# Carnivorous Pitcher Plant: Nepenthes gracilis

*Nepenthes gracilis,* is a medium-sized, fast-growing carnivorous plant. It is a tropical pitcher with slender traps. The lower traps are slender light green below with red-speckled upper halves, and are about 4cm long. The upper pitchers are elongated, light green with dark red to brown speckles, and up to 8cm in length. The species prefers a tropical climate and their habitat is terrestrial, specifically in secondary rainforests.



Nepenthes gracilis requires a significant amount of light but must be kept away from direct sunlight. It should be given rainwater or distilled water regularly and sprayed with water at regular intervals so the pitchers continue to contain liquid. The gracilis, Nepenthes being plant, а carnivorous pitcher plant, employs a fascinating mechanism to lure ants into precarious positions under its rooflike trap lid. Raindrops turn the lid into a deadly springboard that catapults insects into the trap. The pitcher plant features a modified leaf that forms a pitcher-shaped structure with a lid. This lid secretes nectar, attracting ants. As an ant approaches, it may lose its footing on the slippery surface of the pitcher, causing it to slip and fall inside.

Once inside, the ant encounters a waxy zone that makes climbing out nearly impossible. The plant then releases digestive fluids, breaking down the trapped ant for nutrient absorption. This evolutionary adaptation allows *Nepenthes gracilis* to supplement its nutrient intake by trapping and consuming insects, showcasing the intricate interplay between plants and their environment.

Sanjay. V 1 <sup>st</sup> Year M.Sc. BT

"Science is not only a disciple of reason but, also, one of romance and passion." - Stephen Hawking

# **Biodiesel:** A Sustainable Alternative

In the ongoing quest for sustainable energy solutions, biodiesel has emerged as a promising alternative, particularly in the transportation sector. Derived from renewable sources such as vegetable oils, animal fats, and recycled cooking oil, biodiesel offers a compelling option that goes beyond the conventional electric energy paradigm. This article explores the production, properties, and advantages of biodiesel, shedding light on why it stands out as a superior choice in certain aspects compared to electric energy. Biodiesel, produced through a transesterification process, showcases its versatility by utilizing various feedstocks. This adaptability ensures that biodiesel production can be tailored to leverage local resources, contributing to its attractiveness as a sustainable fuel option. The reduced environmental impact of biodiesel, with lower carbon emissions during combustion compared to traditional diesel, positions it as a vital player in mitigating climate change and enhancing air quality.

One of the key advantages of biodiesel lies in its higher energy density compared to electric batteries. This characteristic translates into longer driving ranges without the need for frequent refueling, making biodiesel particularly suitable for heavy-duty vehicles like trucks and buses. Unlike electric alternatives that face challenges related to weight and energy storage, biodiesel presents itself as a feasible solution for applications requiring sustained power and efficiency.

Moreover, biodiesel seamlessly integrates with existing diesel fuel distribution networks, minimizing the need for extensive infrastructure changes. This sets biodiesel apart from electric energy, which often requires substantial investments in new charging infrastructure. Additionally, the liquid form of biodiesel facilitates straightforward storage and transportation, overcoming some of the logistical challenges associated with the transmission of electricity over long distances.

Beyond its technical merits, biodiesel contributes significantly to economic sustainability. The production of biodiesel stimulates job creation in agriculture, oil processing, and distribution. Furthermore, biodiesel's potential for local production reduces dependence on foreign oil imports, offering economic resilience and contributing to the vitality of rural economies.

In conclusion, while electric energy undoubtedly plays a crucial role in the broader transition to cleaner energy, biodiesel stands out as a compelling alternative in specific applications. Its higher energy density, ease of integration into existing infrastructure, and positive economic impact position biodiesel as a noteworthy contender in the pursuit of a sustainable and diversified energy landscape. As we navigate the complexities of addressing climate change and environmental degradation, biodiesel offers a tangible solution that merits further exploration and consideration in our energy transition endeavors.

> A. Froilanmark Chrishone 3<sup>rd</sup> Year B.Sc. BTGE

# Gene Therapy for Cancer Treatment

Gene therapy involves the replacement of a defective gene with a functional copy of that gene. It is potentially beneficial for cancer treatment due to its selectivity and non-specific toxicity. Researchers are hopeful that genetic engineering can develop an effective treatment plan for patients with single-gene disorders and complex acquired disorders.

Several strategies are being used to target cancer via gene therapy including:

(a) Inducing apoptosis or enhancing tumour by expressing appropriate gene;

(b) Inserting a wild-type tumour suppressor gene;

(c) Using an antisense (RNA/DNA) approach; and

(d) Stimulating immune cell recognition by enhancing the immunogenicity of tumours. Cancer can develop via inherited and somatic mutations in two classes of genes: protooncogenes and tumour suppressor genes.

A large number of tumour suppressor genes including p53, retinoblastoma gene Rb, p16INK/CDKN2 (which regulates cell cycle), PTEN (which regulates cell survival) etc. have been identified and attempts have been made to deliver these genes specifically to cancer cells to restore normal functions. Oncogenes can also be manipulated either at an RNA or DNA level to treat cancer.

Cancer occurs due to errors in the normal cell proliferation and apoptotic process. Several methods of gene therapy have been developed to manage cancer, including anti-angiogenic gene therapy, suicide gene therapy, immunotherapy, siRNA therapy, pro-apoptotic gene therapy, oncolytic virotherapy, and gene-directed enzyme prodrug therapy.

The use of autologous and allogeneic chimeric antigen receptor integrated T-lymphocytes to mediate adoptive immunotherapy improves the safety and efficacy of gene therapy. As biological research advances, more affordable gene vectors will become available on the market, making gene therapy more accessible to the majority of cancer patients. This will shift the future of cancer treatment toward individualized treatment based on the patient's unique genome, immunological condition, and tumour genetic profile.



Gene therapy is a unique treatment option for diseases that do not have a good solution. It has made significant progress in the field of cancer in the last three decades, with a few medications licensed and others still in studies. It has a higher level of safety and tolerability than chemotherapy. In the future, tumour genomic profiling and evaluation of host humoral and cellular immunity will aid in the selection of the most suitable patient for gene therapy. Recent advances in the development of safe and effective vectors for gene delivery, as well as understanding the action of nucleases, pave the way for future genome editing as a new therapy technique for incurable diseases such as cancer.

 $\begin{array}{c} \mbox{Pheba Paulose Abraham \& Riddhi Naik} \\ 2^{nd} \ \ \mbox{Year B.Sc. BTGE} \end{array}$ 

# tRNA 'Wobble' Helps Cells Boost Antibody Production

In the microscopic world of cellular functions, a tiny yet mighty phenomenon called tRNA 'wobble' is taking the spotlight. This intricate dance within cells plays a pivotal role in boosting antibody production, a key element of our immune system. Let's unravel the significance of tRNA 'wobble' and its crucial contribution to our body's defense mechanism.

The tRNA 'wobble' effect is a molecular intricacy that significantly enhances antibody production within cells. Transfer RNA (tRNA) typically translates genetic information into proteins, and the 'wobble' hypothesis allows a single tRNA molecule to recognize multiple codons, adapting to the genetic code's degeneracy. In the context of antibody production, this flexibility becomes accommodating paramount. Bv variations in the genetic code during translation, cells can rapidly generate a diverse range of antibodies crucial for defense. The 'wobble' immune mechanism thus acts as a fine-tuning tool, optimizing the immune response and providing a cellular strategy to combat a wide array of pathogens effectively.



In conclusion, the intricate dance of tRNA 'wobble' emerges as a crucial choreographer in the cellular ballet of antibody production. Its ability to navigate the genetic code's intricacies ensures a nuanced and rapid response to diverse pathogens. Understanding and harnessing the power of 'wobble' not only sheds light on the elegance of cellular processes but also holds promise for advancing immunological research and developing targeted interventions to fortify our body's defense mechanisms against a myriad of threats. The dance of tRNA 'wobble' reveals a symphony of adaptability that orchestrates a harmonious immune defense.

Pankaj Kumar Soni 2<sup>nd</sup> Year B.Sc. BTGE

# Unraveling the Microbial Tapestry

In the intricate world of human health, the spotlight is increasingly turning to an unexpected hero – the gut microbiome. Beyond its known role in gastrointestinal diseases, this microscopic community wields influence over the brain, immune system, liver, and beyond. As we dive into this microbial adventure, recent findings shed light on the evolving narrative of our gut microbiome, comparing it not only across diverse human populations but also with our closest living relatives, the great apes.

Scientists, with a keen eye on microbial nuances, have embarked on unraveling the mysteries of the human microbiome. Amidst this exploration, the diversity between individual microbiomes emerges as a captivating aspect, making each person's microbial landscape unique. A groundbreaking study, detailed in Nature Communications, delves into the gut microbiomes of various species, unveiling the stark differences between humans and great apes.



The human gut microbiome has composed a specific genetic symphony, a melody distinct from that of great apes. Notably, Prevotella, a gut bacterium, carries a gene absent in ape counterparts. While the function remains a mystery, clues from Escherichia coli hint at its role in surviving low-oxygen conditions, as explained by Dr. Corinna Bang.

The urban lifestyle, a prevalent backdrop of modern existence, leaves its mark on the gut microbiome. The study reveals a significant loss of microbial diversity in the gut microbiomes of urban dwellers, echoing previous observations. Professor Andre Franke underscores the study's importance, offering fresh insights into the intricate relationships between urban living, bacterial groups, and potential adaptations in the human microbiome. As we close this chapter on the microbial odyssey, the human gut microbiome emerges not just as a silent player in our health but as a storyteller of our evolutionary journey. The diverse melodies, the echoes of phylosymbiosis, and the impact of urban living weave a tapestry that beckons further exploration.

Mohammed Roshan 2<sup>nd</sup>Year B.Sc. BTGE

# The sleep cycle must be maintained

We spend about 32 years sleeping; predicting the time we exist for is 90 or 80 years, undoubtedly, sleep is paramount, right? Our forebears had an alternative perspective on this. However, for obvious reasons, there is a significant difference in lifestyle between then and now.

When we say the old maxim, "You can sleep when you are dead!", it is scientifically and mortally unwise advice, just like how Thomas Edison said, "Sleep is a criminal waste of time and a heritage from our cave days."



We recognize how crucial it is for our biology and health, yet ironically, we treat a vital part of our biology like an enemy. The CLOCK protein on chromosome 5 processes the circadian rhythm, which is connected to the sleep-wake cycle, and includes genes such as BMAL1/ARNTL, PER1, PER2, PER3, CRY1, and CRY2.

Our current understanding of the brain and its functions in terms of learning and memory is well established. We fundamentally hit the "save button", but without sleep, the memory circuits essentially become waterlogged. The PER3 gene variation is linked to these differences in sleep homeostasis markers and the effects of sleep deprivation. Studies reveal that a lack of sleep can diminish your capacity to acquire and retain new knowledge by up to 40%. This is the reality for up to 50 - 90 million people on this planet.

Lack of sleep can affect genes and the immune system and promote chronic inflammation, stress, and cardiovascular issues. It can decrease natural killer cell production by 70% and increase cardiovascular risk by 24%. Even though one hour of good sleep can reduce heart attack risk by 21%, many people struggle to get enough sleep due to the demands of modern lifestyle.

We confidently bask in our happiness, productivity, and focus, even as we disregard any accompanying side effects. The neurotransmitters- histamine, dopamine, acetylcholine, and norepinephrine—all of which stimulate wakefulness, and GABA (gamma-aminobutyric acid), which stimulates sleep, are affected by this consumption.

Aristotle claimed 2,300 years ago that certain genes activate at night and restore metabolic pathways. This supports the restoration hypothesis: sleep consolidates memories, strengthens synaptic connections, enhances creativity, and improves cognitive function, such are several sleep-regulating loci, including PKA and CREB.

Ryona Joji 3 <sup>rd</sup> Year B.Sc. BTGE

### The Immortal Journey of Turritopsis dohrnii

Ever heard of the Turritopsis dohrnii, aka the immortal jellyfish? This tiny sea creature holds a remarkable secret in its DNA.

When faced with stress or ageing, this jellyfish activates a process called trans-differentiation,

transforming its adult cells into specialised cells. It hits the reset button, reverting its cells back to their earliest form. Essentially, it defies the conventional ageing process and starts its life cycle anew.

Imagine the scene: while most creatures succumb to the relentless march of time, the immortal jellyfish turns back its biological clock with a precise genetic maneuver. This remarkable ability challenges our understanding of ageing and opens a window into the potential of genetic resilience. It's not just a genetic jellvfish; it's а marvel rewriting the rules





Mitochondria: How Obesity Rewrites Our Cellular Story

Ever wondered why the battle against obesity is so challenging? Here's а captivating insight: When mice indulged in a high-fat diet. their fat cell mitochondria, the cellular powerhouses. crumbled. impairing their fat-burning prowess.



Astonishingly, researchers discovered a game-changing strategy: by targeting a single gene, they reversed this effect, unveiling a potential key to treating obesity.

### Cancer Camouflage: The Stealthy Tactics of Malignancy Cells

Want to know how cancer cells manage to escape the immune system's radar?



PD-L1. Meet the molecular mastermind behind cancer's clever disguise! It throws on a deceptive cloak. making cancer cells look like harmless bystanders. Picture this: under the cover of PD-L1. cancer slips through undetected, plotting its next move. This stealthy operation unfolds when PD-L1 interacts with immune cells, sending a signal that all is well and there's no need for an attack. It's a strategic move that lets cancer thrive by dodging the defence bodv's mechanisms.

Tarun Kumar M. 2 Year B.Sc. BTBC

### **2023 - The International Year of MILLETS**

For centuries, millets were the staples in India, but gradually they were relegated to the background and marginalised post-green revolution as the emphasis shifted to increased food grain production and productivity using high-yielding varieties of wheat and rice in the identified GR geographies.

The International Year of Millets 2023 is an opportunity to raise awareness of the multiple benefits of millets, from nutrition and health to environmental sustainability and economic development. The year will strengthen science-policy interaction, facilitate partnerships, mobilise stakeholders to take action on promoting and producing millets, and encourage consumption of millets by the general public.

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### Interesting facts about millets

Millets are among the oldest cultivated grains in the world, with a history dating back over 7,000 years. They were staple crops for ancient civilizations in Asia and Africa, such as the Indus Valley Civilization and the Egyptians.

There are over 6,000 varieties of millets, each with its own unique flavour, texture, and nutritional profile. Some common types include kodo millet, finger millet, foxtail millet, and browntop millet. Millets are incredibly resilient to harsh environmental conditions, making them a crucial food source in regions with limited water resources.

The United Nations General Assembly at its 75th session in March 2021 declared 2023 the International Year of Millets (IYM 2023). FAO is the lead agency for celebrating the Year in collaboration with other relevant stakeholders.



, the different types of millets and their use

> foxtail millet contains blood-sugar balancing healthy carbohydrates.



Finger millet gluten free and rich in protein and amino acids. Used as a healthier cereal substitute.



Pearl millet

contains minerals such as calcium and magnesium. Helps you fight against Type II diabetes

Jovita V Mathew 2 <sup>nd</sup> Year B.Sc. BTBC

### **Resurrection Plants**

These are magnificent flora that might appear dead, but they are not... they're just really dry. These plants can survive for months or even years in extreme dehydration. Then, they spring back to life—seemingly miraculously—when provided with moisture. Resurrection plants are vascular rooted plants capable of surviving extreme desiccation, then resuming normal metabolic activity upon rehydration. An approximate of 135 species of resurrection plants are found around the world. Few rare resurrection plants are as follows:

#### Rose of Jericho (Selaginella lepidophylla)

Selaginella lepidophylla is a species of desert plant which belongs to the family Selaginellaceae. It is native to the Chihuahuan Desert of the United States and Mexico. The Plant is renowned for its ability to survive almost complete desiccation. Rose of Jericho evolved in the extreme heat and arid atmosphere of the Chihuahuan Desert, where water is scarce. It can survive for years, dried up and curled into a ball shape, roaming the desert like a tumbleweed until it finds water. As soon as this desert nomad senses moisture, it unfurls, rehydrates, and puts its fronds on display.

#### Resurrection Fern (Pleopeltis polypodioides)

Resurrection Fern is found to grow on oaks and other host trees all throughout the Southeast part of the United States. They are known as "epiphytic ferns,". Despite their need for a host, resurrection ferns are not parasitic—they don't harm their host or draw nutrients from the host trees. Under extreme drought conditions, resurrection ferns can lose up to 75% of their water without dying. They might look dead on those trees, but they're just conserving their resources, waiting for water. These ferns spring back to life, green and healthy in the availability of moisture.

#### Pyrenean Violet (Ramonda myconi)

Most resurrection plants are found in tropical and subtropical climates, but the rarest resurrection plants are found away in mountainous areas of Asia and Europe, where they're able to survive freezing. The Pyrenean violet is able to survive in extremely cold temperatures by using antioxidant compounds that protect it against osmotic stress. This plant has a lifespan of between 200 and 250 years. Even though it's found in these cold, mountainous regions today, it belongs to a tropical and subtropical family of plants. Over time, it has adapted to colder climates, an extremely rare feature in the plant kingdom.

#### Resurrection Lichen (Xanthoparmelia semiviridis)

Resurrection lichen too shrivels up to look like curled-up dry leaf litter, but after it rains, the lichen quickly unfurls and grows darker in color. Unlike other species in its lichen family, resurrection lichen doesn't require any kind of substrate to grow—it takes the same tumbleweed strategy as its (very distant) cousin, the Rose of Jericho, blowing about in a ball in dry conditions until it gets wet. It is currently found in Australia and on the southern island of New Zealand.



Dr. Indira M. N.



Department of Life Sciences Activities



### **Techniques in Cytogenetics**

Scope and importance of cytogenetics in today's scenario has become indispensable in the field of life sciences. It requires specific technical skills to carry out successfully. The resource persons for the FDP were Dr. Venkateshwarulu Raavi Ph.D, from Sri Devaraju Urs Medical college, and Dr. TPN Hariprasad from Department of Lifesciences, Bangalore University, Bengaluru. The primary aim in organising the FDP on Techniques in Cytogenetics is to guide faculty members through fundamental areas and to demonstrate an understanding of basic concepts of chromosome structure and karyotyping as well as to learn mosquito culturing and understand various stages of mosquitoes life cycle.

The faculty were trained to harvest blood cell culture, Cleaning, Sterilization, Aseptic Techniques, Revival of Cells, Media Banding Techniques, Karyotyping, isolation of mosquito larvae's, pupa, adults and to isolate and observe polytene chromosomes.



Dr. Venkateshwarulu Raavi and Dr. TPN Hariprasad training the faculty 10# to 13# July, 2023

### Training on Good Laboratory Practices and Instrumentation

The Department of Life Sciences organized a one -day training on "Good Laboratory practices and instrumentation" for the 2nd and 3rd year Life Sciences UG students. The training was organized to enrich the student's knowledge of the basic laboratory practices and handling of different instruments to generate high-quality, reliable and accurate data to enhance their technical skills.



Orientation on Basic Laboratory Instrumentation 25 July, 2023

### Special Lecture on Climate Change and Energy Transition

Climate change poses an existential threat to our planet, driven primarily by greenhouse gas emissions from burning fossil fuels. Embracing energy transition, is essential to mitigate these impacts and secure a sustainable future for generations to come. Ambassador Dinkar P. Srivastava, in his talk statistically represented the CO2 emissions and the noxious effect caused by different countries including India. His profound knowledge enhanced the understanding about climate change and ways to mitigate it.



Ambassador Dinkar P. Srivastava addressing the gathering 3 August, 2023

### Vignana Vicintana - Research Colloquium '24

A research colloquium was organised on January 10, 2024, with the primary objective of delineating the uncertainties surrounding the data collection, representing research findings that go beyond practitioners experiences, and providing a platform for staff to share their gained experiences and practices. The chief guest of the inaugural ceremony was Dr. Dasaradhi Palakodeti, who delivered a speech on the importance of starting a research project with curiosity and openness, insisting students to come up with research projects that will help mankind. This was also followed by a blend of research talks from Dr. Nibedita Pradhan, a faculty member, Dr. Cijo George Vazhappilly, an alumni, and Ms. Devi Vaishanvi, a student in IV semester M.Sc. Microbiology of the department.



Rev. Fr. Dr. Augustine George, Principal welcoming the Chief Guest Dr. Dasaradhi 10# January, 2024.

### Expert Lecture on 'Genomics of Human Diseases'

An expert lecture was organised on 'Genomics of Human Diseases' for the final year undergraduate students and postgraduate students. The lecture was delivered by Dr. N. Senthil Kumar, Dean of the School of Life Sciences at Mizoram University. The session aimed to introduce the students to the advanced application of genomics in human diseases.



Dr. Calistus Jude, Dean , offering a plant sapling to the resource person

### Workshop on Digitized Clinical Platform

The department organised a workshop on the Digitised Clinical Platform in collaboration with Cloudbyz. Cloudbyz is a software company that focuses on creating cloud-based software for biological sciences, especially concerning healthcare with respect to clinical trials and practices. The speakers from the company presented prospective roles and job opportunities within the Life Science stream. They also highlighted the implementation of technology and cloud-based platforms in life science.



Session on Digested Clinical Platform 3 February, 2024

### Connoisseur

Connoisseur is an intra-department biofest for undergraduate students. This year's theme was '70 years of the discovery of the DNA double helix'. A wide range of events and competitions, ranging from biopreneur, debate, and biospell bee, took place from September 21st to September 30th, with the finale taking place on October 3rd.

The fest provided the students with a platform to showcase their skills in speech, critical thinking, art, etc.



Winners of Connoisseur 2023 21<sup>th</sup> September to 3<sup>rd</sup> October

### Workshop on Science of Pipetting to Perfection



Mr. Bharath Kumar, Sr. Eppendorf Territory Manager, and Ms. Rashmi, Eppendorf Territory Manager addressing the students 22<sup>nd</sup> August, 2023

Eppendorf is a German-based company its headquarters is in Hamburg, and active since 1945. It is a leading life science company that manufactures and distributes equipment for laboratory use worldwide. A session on Understanding the importance of micro pipetting skills for achieving precise experimental results was conducted by Mr. Bharath Kumar and Ms. Rashmi. The workshop was conducted for the 3rd semester post graduate students.

The main key points discussed during the session was understanding the pipetting principles, mastering pipetting techniques, factors influencing pipetting results and best practices for decontamination procedure. Each student was provided hands on experience in forward and reverse pipetting of different types of solutions as well as handling equipments.

# Seminar on Fungal Mannanases in Generation of prebiotic Mannooligosaccharides

The department organized an interaction seminar on fungal mannase in generation of the production of probiotic mannooligossacharides. Dr. Naveen Kango who currently serves as a Professor, Department of Microbiology, Dr. Harisingh Gour Vishwavidyalaya, Sagar, Madhya Pradesh , delivered into a optimization of fungal mannase for biomass conversion reflecting a commitment to sustainable practices. The seminar provided the listeners with a comprehensive understanding of the innovative research conducted by Dr. Naveen Kango in the realm of fungai mannase and its application in probiotic mannooligosaccharides generation.



Dr. Naveen Kango, from Dr. Harisingh Gour Vishwavidyalaya, talking about probiotics 20<sup>th</sup>November, 2023

### Water Purification Awareness Camp



Microbiology Students creating awareness among the migrants about water purification 16th to 17th October, 2023

In a significant endeavor to tackle poverty-related issues, sixty graduate students from the Department of Life Science, in collaboration with UNAI (United Nation's Academic Impact) hub, undertook a mission to make a difference at the grassroots level. Committed to understanding, advocating, and initiating a meaningful dialogue on critical socioeconomic issues, these students have taken on the challenge of addressing the oftenoverlooked plight of internal migrants in India.

The portability of drinking water was examined and the studied showed that most of the water samples were contaminated. In the second phase of this project, the students designed awareness campaigns based on their own research findings. "In light of their extensive field observations, our students began a campaign with the theme #Sip Right, Live Bright, to empower internal migrants to access and effectively utilize safe and clean water sources. This initiative seeks to educate migrants on purifying water independently by employing the sand filtration method and boiling or solar disinfection," Dr. Augustine George, the Institution's Principal, said.

In addition, during the project's third phase, the students are designing adult literacy plans, understanding that when adults are equipped to read, write, and comprehend information, they can access a wide range of opportunities that can directly impact their economic well-being. This student's journey shows how perseverance, effective strategic plan, and vision can result in long-term transformation. As they progress, their stories serve as a beacon of hope, illustrating the potential of higher education institutions as a pathway to break the cycle of poverty.

### World Diabetes Day

To commemorate the World Diabetes Day, the Department of Life Sciences organised an expert talk on Diabetes and Prevention Healthcare on 10th November, 2023. Three eminent speakers, Dr.Sujay Ramprasad, Director, Dr.Ajith.K.N, Physician and Dr.Sunitha, Physician from Neuberg Anand Academy of Laboratory Medicine – NAALM, were invited to give an expert talk on Diabetes and Preventive Healthcare.



Dr.Sujay Ramprasad , Director, NAALN 11th November, 2023

Dr. Sujay Prasad gave insights on the importance of controlling our mind, emphasizing on the fact that our thoughts lead to destiny. Dr. Sunitha empowered us about the various effects of hormonal imbalance and gynaecological problems faced by adolescent women. Dr. Ajith.K.N illuminated us on the different types of diabetes, its causes and the necessary precautions to be taken in order to control diabetes. He also emphasized on the importance of spreading awareness about diabetes among the people. On the whole, the expert talk influenced us to maintain a healthy body and mind.

### World Alzheimer's Day

The Department of Life Sciences commemorated the World Alzheimer's Day 2023, 'Reminisce' by organizing two invited lecture for the I PG students. One International lecture by Dr. Brijesh K Singh, Postdoctoral Scientist, Centre for Neural Sciences and Medicine, Board of Governors Regenerative Medicine Institute, Departments of Biomedical Sciences and Neurology, Cedars-Sinai, USA. He spoke about 'Age related disease modelling using induced pluripotent stem cells'.



Students attending expert lecture by Dr. Brijesh K Singh, Centre for Neural Sciences and Medicine, Board of Governors Regenerative Medicine Institute 21<sup>st</sup> September, 2023

Dr. Dileep Vijayan, Scientist D, Jubilee Centre for Medical Research, Jubilee Mission Medical College & Research Institute, Thrissur, Kerala, India, spoke about 'Translational Research in Alzheimer's Drug Discovery'. The Brain Quiz was organised for the UG students of B. Sc. Life Sciences BTGE, MBGE, BTBO, BTBC. The Quiz was conducted by the Final year PG students of the department.



V semester MBGE students at Sinchana farm 9# November, 2023

Industrial visit - experimental learning on the importance of environmental protection and sustainability.

With the goal of instilling in the final-year M.Sc. students the values of sustainability and environmental conservation, they went on a three-day trip to Chikmagalur and Coorg. Students observed and learned about the wilderness while being exposed to various diversities of nature. This also provided them with the opportunity to understand the different sustainable practices used in those places.



Field visit - Sinchana Sheep and

Animal breeding is the selective mating of animals to increase the possibility of obtaining desired traits in their offspring. The goal of the field trip to the Sinchana Sheep and Goat Farm in Marenhalli, Bangalore, was to introduce the third-year BSC students to methods and approaches used in

Goat farm

animal rearing.

Studen<sup>™</sup>ts and faculty a# Chikamagalur 27 September to 1 October, 2023



Staff of TDU briefing the botany students on raw drugs 2 "November, 2023

### Field visit - Herbarium and Raw Drug Repository, TDU.

A field trip was organised with the goal of introducing students to indigenous plants and their economic utilisation in traditional systems of medicine at the University of Transdisciplinary Health Sciences and Technology's Herbarium and Raw Drug Repository. The significance of herbaria and its methods were taught to the students during their visit to the herbarium division. With the assistance of TDU staff who supported them during the trip, the students were able to comprehend the value of conservation and texonomic studies.

Student Achievement Congratulations!!!

SL.No.	Date	Name of the Student	Title of the Article	Details of Publisher, Month, Year of publication
1	10.08.2023	Ajith Kumar	Stearyl palmitate a multi-target inhibitor against breast cancer: insilico, invitro and invivo approach	Taylor 양 Francis Sep 2023
2	10.08.2023	Ajith Kumar	Phytochemicals based computer aided drug discovery for huntington disease to identify a potentila management	Medicinal plants, August 2023
3	10.09.2023	Ajith Kumar	Veratrum viride as a potential therapeutic source for the treatment of Bovine babesiosis	Medicinal plants, August 2023

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Synapse

Student Achievement Congratulations!!!

### **Priya Sharma of I year B.Sc. BTGE**

One of top 10 winner of Microbiocanvas in 22nd Microbio olympiad National Level a competition organised by **Microbiological Society India** 

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### International Conference on Transdisciplinary Research in Life Sciences: Perspectives and Prospects 2024

The Department of Life Sciences, Kristu Jayanti College Autonomous, in collaboration with The University of Trans-Disciplinary Health Sciences and Technology (TDU), Bengaluru, organized a two-day International Conference on Trans disciplinary Research in Life Sciences (ICTRLS-2024) on February 22 & 23, 2024. The two day conference, aimed at exploring new perspectives and prospects in the field of life sciences through transdisciplinary research. The chief guest for the occasion was Padma Shri Prof. Darshan Shankar, Vice Chancellor of TDU and Managing Trustee, FRLHT, Bengaluru. Dr S. Natesh, Honorary Fellow at ATREE and former Senior Advisor (Scientist -H), Department of Biotechnology, Government of India, was the guest of honour.

Fr. Dr Augustine George CMI, Principal, Jayanti College Autonomous, Kristu delivered the presidential address. He emphasized the importance of collaborative research in addressing complex global challenges, particularly in areas like agriculture and healthcare. During the inaugural speech, **Padmashree** Prof. Darshan Shankar underscored the intricate interconnections of life and the need for transdisciplinary approaches in research. e emphasized the role of Ayurveda in complementing modern medicine and highlighted India's leadership in this domain. Dr S. Natesh emphasized the importance of collaboration in education and research, stating that it is the key to success in the present-day world. A book of abstracts with papers received from students and researchers from institutions around the country and the world was released on the occasion. The two day international conference with more than 200 delegates witnessed seven plenary sessions spanning diverse domains with over 100 oral and poster presentations.



Inauguration of the International conference



Delegates at the conference

### STUDENT COORDINATORS FROM THE DEPARTMENT OF LIFE SCIENCES



Student secretaries of Life Science Department B S Pranav Rao- 21MBGE52 Sowmya Sivakumar- 21BTGE44

#### Centre for Environment and Sustainability

Swastik Basu- 21MBGE40 Sangili Keerthi- 21BOBT24

#### Writer's Association

A Froilanmark Chrishone- 21BTGE01

#### Quiz Club

Saptak Kumar Basu- 21BTGE37

#### LCA Department

Achsah Mariam Varghese- 21BTGE03

Kristu Jayanti Dance Academy Nathanael S- 21BTGE24

#### Soft Skill Training Committee

Rohan Kumar Bhardwaj-21MBGE45

#### Women Empowerment Cell Nithila S- 21MBGE26

#### Unnat Bharat Abhiyan

Geethika Vusurumarthy-21BTGE55

#### Hindi Literary Club Mayank Bharti- 22BTGE78







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