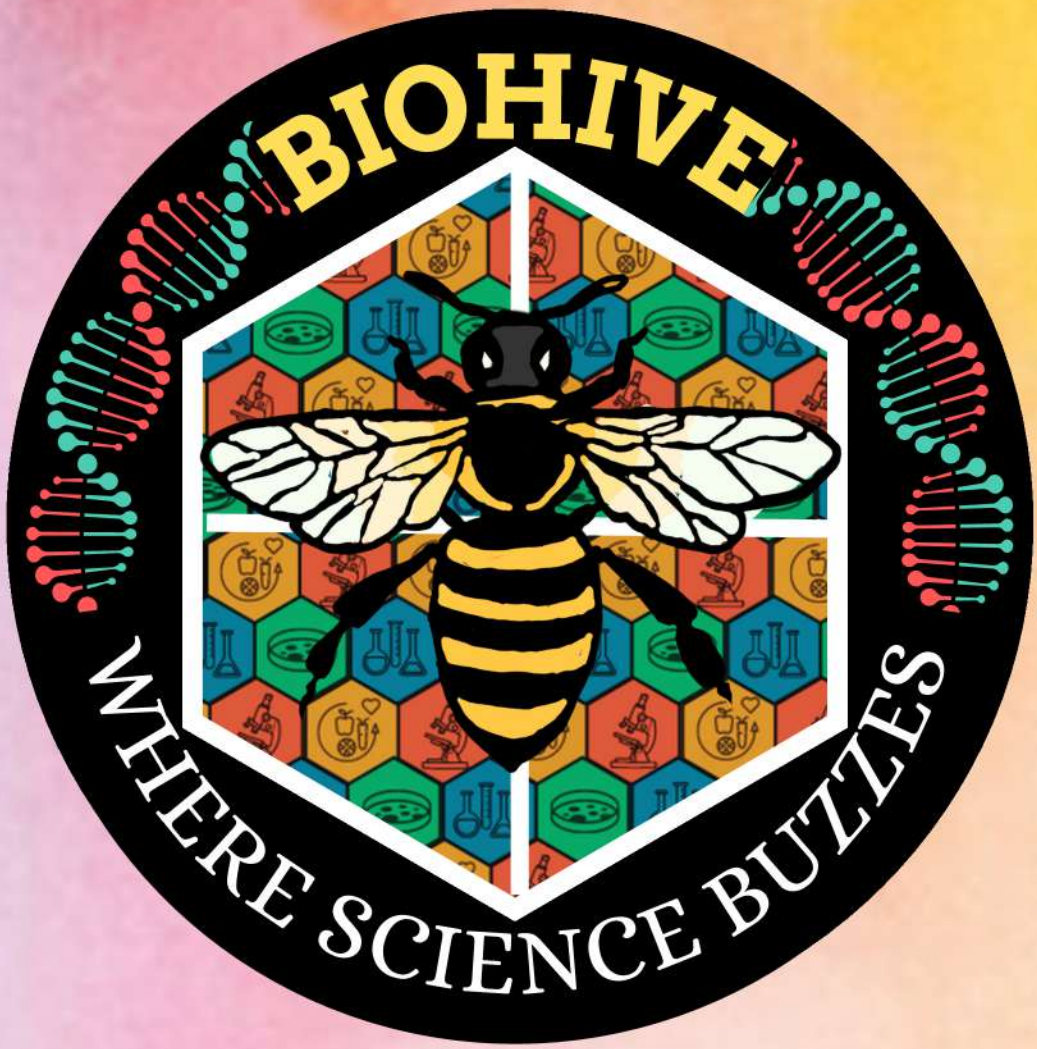
ISSUE 2

APRIL 2025

# BIOHIVE

*where science buzzes*




## SIGNIFICANCE AND SYMBOLISM OF THE LOGO:

The logo encapsulates everything we've dreamt of for Biohive. Bees are known for hardwork, sense of community and friendship. That is precisely the team we hope to build through this initiative.

A beehive symbolizes strength found in unity, as the hive members work together harmoniously, supporting each other's contributions.

It is the kind of environment we hope to build at Biohive.

The four colours in the logo represent the four departments with their apt elements.

# Principal's Message

It gives me immense pleasure to witness enriching 2nd edition of BioHive, the vibrant reflection of our Life Sciences departments' academic, co-curricular, and creative pursuits. This issue, in particular, captures the essence of the even semester with remarkable depth and diversity.

The **Events** section brings to light the dynamic academic calendar shaped by our four Life Sciences departments. From seminars to hands-on workshops, each event is a testimony to the dedication and intellectual curiosity of both faculty and students.

**Lab Chronicles** is especially poignant this year, as it celebrates the final-year students' journeys through their research projects. Their reflections mirror not only scientific growth but also personal transformation, teamwork, and resilience.

In the **Articles** section, our students and faculty dive into contemporary biology topics, making complex scientific ideas accessible and thought-provoking. This is where scientific thinking meets creative expression.

**Beyond the Books** showcases the outstanding accomplishments of our students beyond the classroom—from national conferences to international workshops. Their stories inspire and demonstrate how learning thrives in diverse settings.

Adding a lighter note, the **Fun of BioHive** section inviting readers to explore biology through puzzles and quirky facts—reminding us that science, too, has its moments of play and wonder.

Finally, the **Career Conundrum** feature offers valuable insights into international opportunities through the experiences of our alumni. Their journeys provide both guidance and motivation for students aspiring to take up global careers in life sciences.

My heartfelt congratulations to the editorial team, contributors, and faculty mentors who have curated this vibrant edition. May *BioHive* continue to grow as a platform that informs, inspires, and ignites curiosity.

With warm regards,
**Dr G S V R K CHOUDARY**
**Principal, BVC**

# Heads' of Departments Messages

It gives me immense pleasure to know that the students of Undergraduate Life Sciences have initiated a vibrant platform in the name of Biohive- an Undergraduate Life Sciences Digital Newsletter,which is designed to connect, inform, and celebrate the Life Sciences community of BVC. I am happy to know that second edition of Biohives featured various events like Events Round-up, Lab Chronicles, Feature Articles, Fun of Biohives and Career Conundrum

I am sure that our shared goal of spotlighting the diverse achievements, events like , and opportunities within our institution and beyond which are covered in this digital newsletter with a collaborative effort of the students and faculty across the four dynamic departments of Genetics and Biotechnology, Chemistry, Microbiology, and Biochemistry and Nutrition, will be achieved.

This newsletter is more than a publication—it's our collective voice, uniting students and faculty in celebrating discovery, learning, and innovation. I invite each and every studentto contribute your successes, and your insights. Together, let's make Biohive a vibrant hub that inspires, and connects our Life Sciences community.

With best wishes,

**Dr. K. Anuradha**

**Head, Department of Microbiology, BVC**

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I am extremely happy that students of Life Sciences have come up with the second edition of Biohive Newletter exclusive for Life Sciences. Biohive continues to be a good platform for students to express their views and exhibit their talents in the field of Life Sciences. This second edition of newsletter provides information about the various activities conducted by the four departments of Life Sciences, memories shared by the passing out final year students along with their experiences and achievements.

The first edition has definitely motivated students to take up projects in their final semester and share their experiences in the lab chronicles section of the news letter. Students have shared their views on popular books and writeups on Life Science topics .

The present edition has focused on career opportunities abroad by interacting with alumni students pursuing their higher education in various foreign universities.

I am extremely happy that the first edition of BioHive has inspired many students from second year and first year to work hard and carry on the newsletter in the coming years.

All the best.

Best Wishes,

**Dr. B. Kalpana**

**Head, Department of Genetics & Biotechnology,BVC**

# Heads' of Departments Messages

Greetings on bringing out the 2nd Edition of BIOHIVE- the newsletter exclusive for lifesciences, by the students of B.Sc life sciences. It is overwhelming to know that the newsletter is already into its 2ND edition in a very brief period. A newsletter of this magnitude that covers the events of all life sciences departments showcases the untiring efforts of the student editors and contributors in their efforts to highlight the importance of sciences in day to day life. The inclusion of fun activities in the newsletter would definitely be an attraction to the student community. In addition, this newsletter provides a forum for the students to share their experiences and achievements in national and International events. I congratulate the team and wish them all the best in their endeavors

**Dr. S. Padma,**
**Head, Department of Biochemistry and Nutrition, BVC**

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Congratulations dear students on your diligence, inquiry, and hard work. My heartfelt appreciation for your efforts. Your journey is influencing the direction of science whether you're delving into the realm of cellular biology, discovering the secrets of ecosystems, or unravelling the riddles of genetics or connecting state-of –the art chemical research.

As you proceed, keep in mind that every new finding, no matter how minor, advances our knowledge of life. Never stop asking questions, be persistent, and maintain your curiosity.

Exploration is the lifeblood of science, and your ideas have the potential to truly impact the field.

We're proud of every step you take on this amazing journey, so keep pushing the envelope.

With sincere appreciation and best wishes,

**Dr. Mary Nygi Kurian**
**Head, Dept of Chemistry**

# Faculty Coordinators' Messages

Heartfelt congratulations to the BioHive team for the successful launch of 2nd edition of BioHive. The newsletter showcases students' talent in efficiently compiling the data, sharing their views on science through articles and books and final years unforgettable lab experiences highlighting career options abroad through interactions with alumni. In coming years the newsletter will be taken to greater heights by the students carrying the legacy laid by current final years who are the pioneers for the BioHive.

**Dr S Nagamanju**
**Assistant Professor**
**Department Of Biotechnology**

**Dr. Shruthy D. Pattathil**
**Assistant Professor**
**Department of Chemistry**

Hearty congratulations to students and faculty of Life-Sciences for the second edition of BioHive. This issue like the previous one celebrates the vibrant spirit and hard work of our students — from exciting departmental events and unforgettable memories from lab to insights by alumni on career opportunities.
May this edition inspire you to keep exploring, learning, and reaching new heights!

The BioHive Newsletter continues to reflect the academic enthusiasm and creativity of our life sciences departments. The second edition highlights departmental events, research projects, student achievements beyond the classroom, and alumni insights on global career opportunities. I appreciate the team's efforts in presenting this enriching content and encourage all readers to engage actively with it. This spirit of collaboration, creativity, and dedication embodied in BioHive should be nurtured and passed on to the juniors, ensuring its legacy continues for years to come.

**Dr T Chaitanya**
**Assistant Professor**
**Department of Microbiology**

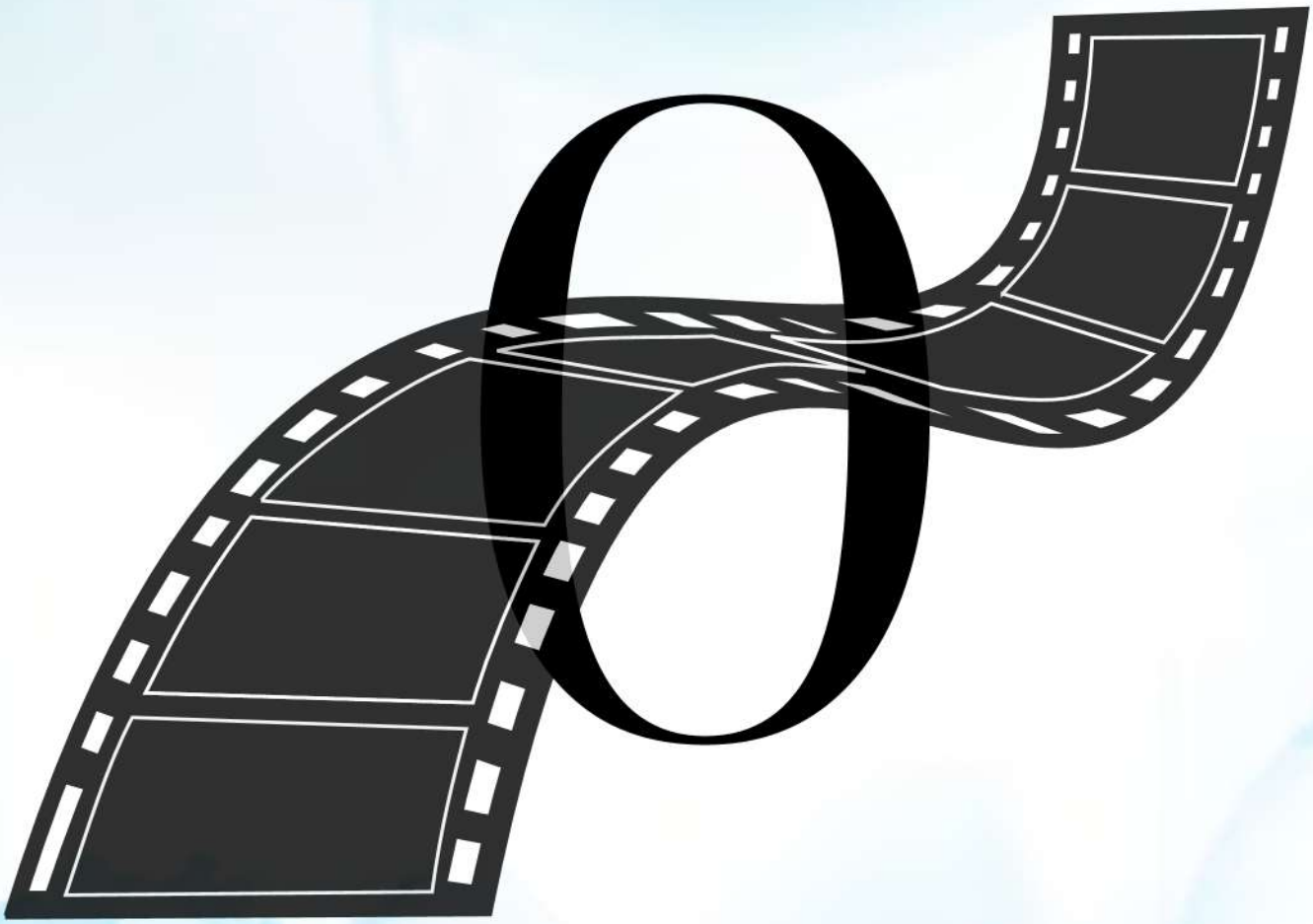
**Dr. S. Manju Devi**
**Assistant Professor**
**Department of Biochemistry**

Delighted to be a part of the second edition of Biohive newsletter. The overwhelming response received for the first edition is the hard work of the team, which will be continued in this edition too.
As the second edition encompasses the life sciences department activities , research project work experiences of the students, along with career opportunities abroad, this edition will also provide rich reading experience for the life sciences fraternity. Wishing the students only the best for the launch of the second edition.

# CONTENTS

IN THIS EDITION

# EVENT



# CLOCK

# Workshop on Techniques in Molecular Biology and Biotechnology

A workshop on "Techniques in Molecular Biology & Biotechnology" was held on the 13th and 16th of November 2024, drawing enthusiastic participation from 121 Intermediate second-year (12th standard) students. Designed to introduce young learners to foundational molecular biology techniques, the event successfully bridged classroom knowledge with hands-on laboratory experience.

On Day 1, students from Bhavan's Sri Aurobindo Junior College, Sainikpuri, actively engaged in the sessions, while Day 2 welcomed vibrant participation from Army Public School, Bolarum; Army Public School, Ramakrishnapuram; and PM Shri Kendriya Vidyalaya, Tirumalagiri. Through this initiative, the workshop fostered an early interest in the life sciences and biotechnology, inspiring the next generation of scientific minds.

# Bioblitz

The Department of Genetics & Biotechnology organized BioBlitz 2025 on January 30, 2025, under the theme "Sprint Through Life's Blueprint." Students from various streams participated enthusiastically in fun, knowledge-based activities like Image Merge and Finding the Fake Fact. The event, inaugurated by Dr. B. Kalpana, highlighted teamwork, quick thinking, and creativity. Winners were felicitated, and the event concluded with a lively spirit of competition and collaboration.


# Carnival of Colors

The greENERGY Club organized a vibrant event titled "Carnival of Colors," a painting competition that brought creativity and sustainability together. Open exclusively to undergraduate students across all academic disciplines, the competition challenged participants to artistically transform old tree branches into stunning artifacts.

"Carnival of Colors" celebrated the power of upcycling and creative expression, encouraging students to showcase their artistic talents while promoting environmental consciousness. The event successfully engaged the undergraduate community in a meaningful, eco-friendly initiative, reinforcing the importance of sustainability through art.


# Green Gold Drive

As a part of their project, students of the Department of Genetics and Biotechnology, organized a successful wheatgrass awareness program for faculty and students, demonstrating and selling wheatgrass and wheatgrass kits. The event raised awareness about wheatgrass's health benefits, impressed attendees with its sustainable cultivation in takeaway containers, and clarified doubts about its consumption. The program successfully promoted disease prevention and sustainable development, proving to be a joyful and profitable learning experience for the organizers. Organically grown plantlets were also sold as a part of this initiative.

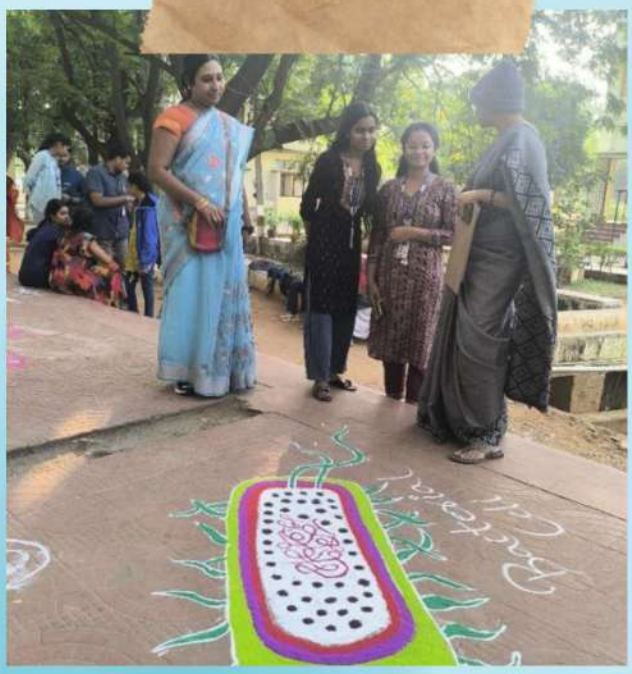
# Concept to Creation

The Department of Microbiology, Bhavan's Vivekananda College, in collaboration with the Microbiologists Society, India (MSI), organized a model-making competition titled "Concept to Creation" on February 15, 2025. Coordinated by Dr. K. Anuradha and Dr. S. Anju Nair, the event aimed to foster innovation, creativity, and problem-solving skills.

A total of five teams participated — three from Bhavan's Vivekananda College and two from other colleges — presenting innovative models on hydroponics and aquaponics, hemodialysis, fermented fruit wine, acid rain neutralization, and the internal structure of the heart. The event received excellent feedback and was a resounding success.


# Microbial Technology

The Department of Microbiology, BVC, in collaboration with the Microbiologists Society, India (MSI), organised a Rangoli Competition on 23rd November 2024. The event, themed "Morphology of Microorganisms or Microbial Technology", encouraged participants to creatively depict microbial forms through vibrant and artistic rangoli designs. With enthusiastic participation from 14 teams, the competition highlighted scientific understanding blended with aesthetic expression.

# Introduction to Indian Knowledge System: Applications in Culinary and Medical Sciences

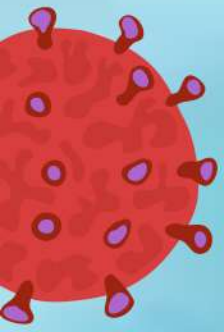
The Department of Biochemistry & Nutrition organized a guest lecture titled "Introduction to Indian Knowledge System: Applications in Culinary and Medical Sciences," delivered by Dr. Mohan Raghavan, Head (HST) and Associate Professor at IIT Hyderabad, on 23rd January.

Dr. Raghavan presented the Indian Knowledge System (IKS) as an integrated framework encompassing various disciplines. He emphasized foundational concepts such as Dharma, Atmanandam, and Sama Sthiti (homeostasis), while elaborating on key Ayurvedic principles, including Tri Dosha, Pancha Bhoota, Agni, Dhatus, and Malas.

The session, attended by 86 undergraduate and postgraduate students, was highly interactive and offered deep, valuable insights into the intersections of traditional knowledge with modern culinary and medical sciences.


# Take the Right Path: My Health, My Right!

A guest lecture and poster presentation on the theme "Take the Right Path: My Health, My Right!" was organized by the Department of Microbiology in collaboration with the Telangana state AIDS Control Society and Medical & Health Committee. The session focused on HIV/AIDS and STI awareness, stigma reduction, and prevention strategies. Students from UG and PG actively participated through impactful posters, highlighting several key issues and educating attendees on the nuances of the condition. The event emphasized the necessity for community support, education, and the importance of early detection.



# SCOPE AND CAREER ASPECTS OF MICROBIOLOGY

The Department of Microbiology, in collaboration with the Microbiologists Society, India, hosted an Outreach Program on January 4th, 2025, themed "Scope & Career Aspects of Microbiology." The event introduced students to the diverse academic and professional opportunities within the field of microbiology through interactive demonstrations on topics such as microbial staining, biofertilizers, probiotics, blood grouping, and vaccine development.

A special Career Guidance session further broadened their horizons by highlighting various career paths in research, healthcare, pharmaceuticals, and biotechnology. The program successfully inspired students by providing valuable insights and sparking new aspirations for their future careers in microbiology.


# Application of AI and ML in Drug discovery and Protein Design

The Department of Biochemistry & Nutrition, Bhavan's Vivekananda College, organized an insightful online guest lecture on "Application of AI and ML in Drug Discovery and Protein Design," delivered by Dr. Bipin Singh, Assistant Professor of Bioinformatics at the Centre for Life Sciences, Mahindra University, Hyderabad.

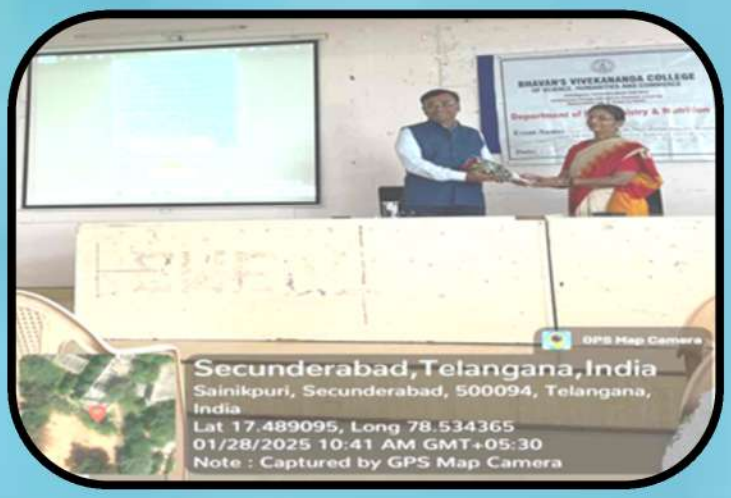
Targeted at students, faculty, and researchers with an interest in drug design and healthcare innovation, the lecture highlighted the rapidly expanding role of Artificial Intelligence (AI) and Machine Learning (ML) in drug discovery and protein design. Dr. Singh explained how AI tools are used to predict drug-protein interactions and to deepen our understanding of disease mechanisms. He also introduced participants to key resources such as the Protein Data Bank and demonstrated the application of AI-based simulation software.

The session was interactive with participation from 54 students, faculty, and researchers, and concluded with valuable discussions on ethical concerns, emerging trends, and career opportunities in the field of bioinformatics.


# Innovation Technology and Entrepreneurship in the Livestock Sector

The Department of Biochemistry & Nutrition, in collaboration with the Institution's Innovation Council, organized a guest lecture on 28th January 2025, delivered by Dr. Muthukumar from ICAR-NRC on livestock sector.

The session, titled "Innovation, Technology and Entrepreneurship in the Livestock Sector," highlighted advancements in ethical animal farming, embryo transfer techniques in pigs, the use of nanoparticles to enhance meat safety, and emerging trends in functional foods. Dr. Muthukumar emphasized the critical role of innovation in promoting sustainability, improving productivity, and enhancing nutrition for better health outcomes.



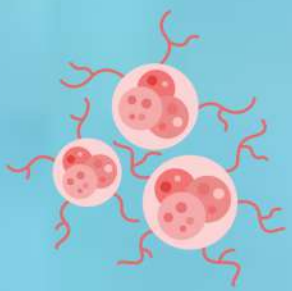

# United by Unique

The Department of Biochemistry & Nutrition organized a series of events to mark “World Cancer Day 2025,” observed globally on February 4th each year.

As part of the celebration, a sketching competition themed "United by Unique" was held, with 21 enthusiastic students showcasing their creativity. This was followed by an insightful guest lecture by Dr. Bushra Khan, who spoke on cancer prevention and screening. Dr. Khan covered important topics, including different types of cancer, available screening methods, optimal vaccine timing, and self-check techniques for breast cancer.

The session, attended by around 70 students, concluded with a lively and engaging Q&A, leaving the audience better informed and to adopt proactive health practices.





# Scope and Career Aspects in Biochemistry and Nutrition

The Department of Biochemistry & Nutrition organized an outreach program on the 4th of January, 2025, for Class 11 students of Kendriya Vidyalaya, Tirumalagiri. The session focused on the topic "Scope & Career Aspects in Biochemistry & Nutrition" with demonstration of techniques like PCR, Soxhlet extraction, SDS-PAGE, ELISA, etc. Nutrition topics like BMI and 'My Food Plate' were also introduced to the school students. A total of 24 students participated, engaging actively with the faculty and gaining valuable exposure to laboratory practices and career opportunities.





# Employability and Entrepreneurship in Chemical Sciences

The Department of Chemistry organized an inspiring guest lecture on "Employability and Entrepreneurship in Chemical Sciences" on November 20, 2024, at 10 A.M. in Room 208, MBA Block. The session was delivered by Dr. Hafeez Basha, Advisor at the Engineering Staff College of India (ESCI) and former CEO of the OU Technology Business Incubator.

The lecture saw enthusiastic participation from over 161 B.Sc. Life Sciences students. Dr. Basha shared valuable industry insights, explored the impact of market disruptions, and offered practical guidance on building successful businesses. Drawing from his extensive experience with IEEE, he motivated students to pursue entrepreneurial opportunities within the field of chemical sciences.

The event's success was made possible through the dedicated efforts of the Department of Chemistry, led by Dr. Mary Nygi Kurian, as part of its ongoing commitment to fostering innovation and entrepreneurship among students.



# Empowering Future Chemists – Hands-on Training in Sustainable Green Lab Practices

The Department of Chemistry organized a workshop titled "Empowering Future Chemists – Hands-on Training in Sustainable Green Lab Practices" on November 26, 2024, in the Chemistry Lab, Science Block. The event showcased the department's green lab initiatives to Class XI and XII students from Bhavan's Sri Aurobindo Junior College, Bhavan's Sri Ramakrishna Vidyalaya, and St. Andrews High School.

Student volunteers from the B.Sc. Life Sciences program conducted live demonstrations of sustainable experiments, offering an engaging and practical learning experience.

A total of 109 high school students actively participated in the workshop, gaining firsthand exposure to eco-friendly practices in chemistry.

To further foster interest in the subject, a quiz competition was organized during the second session, with certificates awarded to winners and participants at the valedictory ceremony. Dr. GSVRK Choudary, Principal, BVC, and Dr. Mary Nygi Kurian, Head of the Department of Chemistry, BVC, addressed the gathering, inspiring and encouraging the aspiring young chemists with their wisdom and support.

# Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat

'National Science Day' 2025 was celebrated with great enthusiasm at Bhavan's Vivekananda College, Sainikpuri, on February 28, 2025, under the theme "Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat."

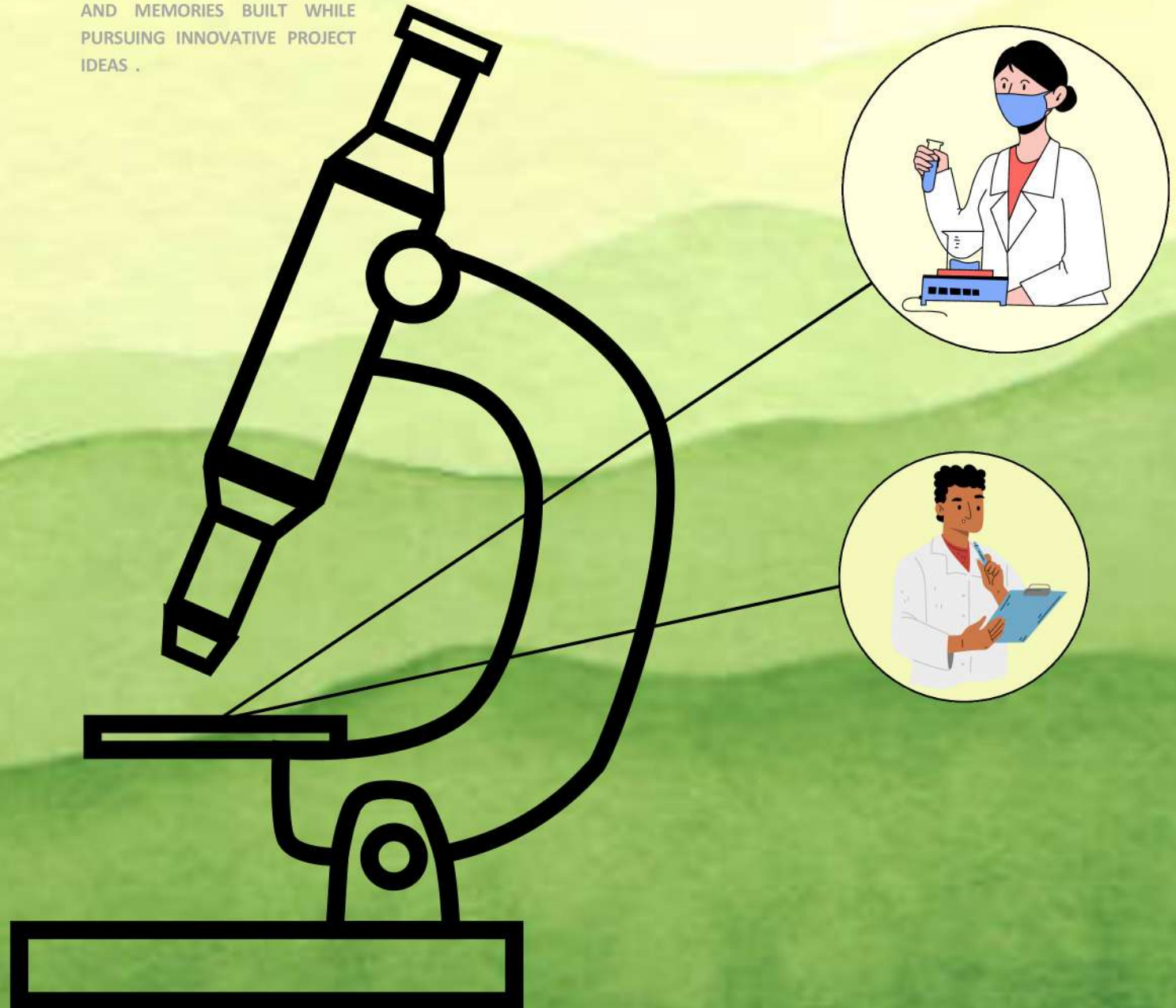
The celebrations began with the traditional lighting of the lamp, followed by inspiring addresses from Principal Dr. G. S. V. R. K. Choudary and Chief Guest Dr. S. Rajendra Prasad, who both emphasized the critical role of innovation and scientific thinking in driving national development.

The Faculty of Life Sciences and Physical Sciences organized a range of engaging competitions, including paper presentations, quizzes, project displays, and a reel-making contest. Students participated actively, showcasing their creativity, critical thinking, and scientific innovation.

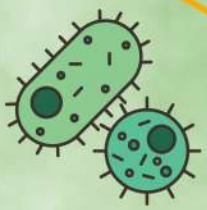
The event concluded with a valedictory session where the winners were felicitated by the Principal, marking a fitting end to a day dedicated to celebrating science and inspiring future leaders.


# Lab Chronicles

THIS EDITION'S LAB CHRONICLES ARE AN ODE TO THE EXPERIENCES AND MEMORIES BUILT WHILE PURSUING INNOVATIVE PROJECT IDEAS .



# Dept. of Microbiology

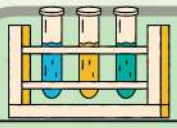


## Keeping the Good Gut Microbes Alive through a Stomach Acid Rollercoaster with Snacks and Tiny Spacesuits !

Dr. K. Deepak Raj

Anirban, Fareed, K. Varshini & Jaya Sahithi (MbGC)

Our journey as the AFSV Project Team began with one big question: How can we help probiotics survive the harsh acidic conditions of the stomach to reach the gut and make a real difference? We explored prebiotic stimulation combined with microencapsulation techniques, a beautiful blend of microbiology, biochemistry, biotechnology, and sheer perseverance. We tested various encapsulation materials, optimized bead formation, and subjected formulations to simulated gastric and intestinal fluids. But beyond all the Petri dishes and pH meters, this project became something more: Endless debates over which plates would finally work, inside jokes about how "pH is always the problem with these microbes," and spontaneous celebrations when cultures finally grew. From hiding autoclaved plates to borrowing M.Sc. students' media (oops), it was chaos, learning, and laughter. We didn't just conduct a study, we grew into young scientists.



## Got Milk ? We've got Microbes !


Dr. K. Mahalakshmi

Kalpanesh, Brijesh, Arka, Akshaya & Sravani (MbGC)

Our project focused on the Microbiological Analysis and Quality Testing of Different Milk Samples. The objective was to test six milk samples: four from commercial brands (Vijaya, Jersey, Amul, and Nandini) and two from local dairy farms (cow and buffalo). The interesting part? When we tested the buffalo milk from the local dairy farm, we got two results! In platform tests like resazurin and clot-on-boiling, it showed positive results (indicating inferior quality), but in laboratory tests, it showed negative results (indicating good quality). We repeated the tests twice, but the results remained the same. All other milk samples gave direct results, but the buffalo milk sample gave a mixed outcome — making it the most interesting part of our project!

## Biofilm Baddies vs. Cleaning Squad : Who wins in the Petri Dish Contest ?

Dr. S. Anju Nair
Gayatri, Sukeerthi, Ajay (MbGC) & Sai Kumar (BtMbC)

Our project on Environmental Biofilms explored the complex communities of microorganisms adhering to surfaces in both natural and engineered systems. We studied their roles in ecosystem functioning, water quality, and human health. By understanding biofilm dynamics, we can develop strategies to harness their benefits (like bioremediation) while minimizing their negative impacts (such as biofouling and pathogenic growth). This project deepened our understanding of sustainable practices and environmental management.


## Streptomyces Secrets : Digging for Nature's Tiny Chemical Weapons !

Dr. S. Shalini Devi
Mahesh, Ritwik, A. Sahithi, Vaahini & Shireesha (BtMbC)

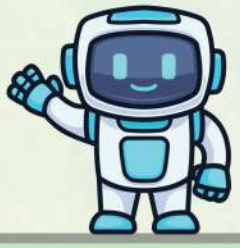
While working on our project, "A Study on Bioactive Compounds from *Streptomyces* sp.," one of the most satisfying moments was successfully extracting crude bioactive compounds and observing their distinct pigmentation and odor,signs of promising secondary metabolites. Running dual culture assays was exciting, especially when unexpected results came up with *Aspergillus flavus spp.* One unique challenge was optimizing growth conditions for stubborn *Streptomyces* strains! Teamwork was our backbone, brainstorming over lunch breaks and celebrating small wins together. Preparing for MIC and $IC_{50}$ tests pushed us to sharpen our precision and documentation skills. Overall, the project was a perfect mix of hands-on learning, teamwork, and discovery

## Teaching AI to Sniff Out the Flu before you do !

Dr. Y. Aparna

Charanya, Abhilash & Yashashwini (BtMbC)

We embarked on the project "Analysis of Influenza Datasets Using AI and ML" with excitement but zero coding experience. Thanks to Aparna Ma'am's encouragement, we overcame our doubts and turned them into determination. The journey culminated in winning first prize on National Science Day and preparing our research for a publication at the Convergence of Technology & Biology Conference, an achievement that sparked our passion for innovation in healthcare.



## From Bin to Bling : Nature's Palette gets a Second Life

Dr. T. Chaitanya Kumari

Naganjali, Yamuna & Chandana (BtMbC)

Working on my research project, "Extraction of Natural Dyes from Green Waste and its Applications", was an enriching journey filled with learning and memorable moments. One of the most interesting experiences was observing the vibrant color changes in beetroot and chrysanthemum dyes under different pH conditions, which felt almost magical!Synthesizing nanoparticles using natural dyes was both exciting and challenging, especially while optimizing the conditions for successful nanoparticle formation. Interpreting UV-Vis and FTIR results was a rewarding experience as it helped us connect theory with practical outcomes. A unique challenge I faced was maintaining the stability of natural dyes during experiments, which taught us patience and problem-solving skills. Overall, this project deepened our love for research and made us appreciate the beauty hidden in natural processes.

## Turning Agri - Waste into Germ - Fighting Glitter !

Dr. T. Chaitanya
Deepak & Dhanraj (BtMbC)

National Science Day preparations certainly brought unexpected moments! My friend's hilarious presentation style during our PPT creation added much-needed laughter amidst the deadlines. In a moment of absent-mindedness, we mistakenly performed disc diffusion instead of agar well diffusion for our antimicrobial assay - a true "close but no cigar" moment! These humorous detours, from collaborative quirks to experimental hiccups, made the project truly memorable. Thankfully, the methodological mix-up was caught and corrected, ensuring the integrity of our findings.

# Dept. of Genetics & Biotechnology

## Tracking Lipid Peroxidation through MDA : Test Tubes meet Text - based Tech !

Dr. I. Rachana Kumari
Indu, Mithula, Hasmitha & Shikha (BtGC)

Working on the MDA (Malondialdehyde) project was a valuable and insightful experience. It allowed us to deepen our understanding of oxidative stress and lipid peroxidation. We explored the biochemical significance of MDA as a biomarker and honed practical lab skills, including spectrophotometry and sample preparation.Extensive research, experimentation, and analysis contributed to a holistic learning experience. We faced challenges in standardizing the protocol and ensuring the accuracy of readings, but these hurdles taught us the importance of patience, precision, and critical thinking.Overall, the MDA project enriched our academic journey, fostering teamwork, analytical skills, and a greater appreciation for biochemistry's role in health and disease.

## Studying Serum's Split Personalities - One Protein Polymorphism at a Time !

Dr. I. Rachana Kumari
Nidish, Vishnu, Shivalalitha & Vepa Vaishnavi (BtGC)

How do we start expressing how fun yet hectic it was? We didn't know much about each other before this project, but working together brought us closer. In the beginning, we didn't even know how to navigate the lab or use the equipment properly. But eventually, the lab became our comfort place, where we knew exactly what to do. We cherished this learning process, not just knowing things but experiencing them. We failed many times, but our team members supported each other through every hurdle. There were mistakes, there were perfect experiments, and there was laughter, no matter what. Towards the end, it felt bittersweet. We were happy to complete the project, but sad to leave behind the lab, the teammates, Rachana Ma'am, and all the small, cute moments we shared. These memories will always hold a special place in our heart.

## Shrimp Shells and Pineapple Peels : Cooking up Eco - Friendly Polymer !

Dr. Sushma Patkar
Manaswi & Radha (BtGC)

Working on our project-"Preparation of Cellulose and Chitin-Based Degradable Biopolymer Using Pineapple Peel"-was a truly memorable and rewarding experience. We set out to create something sustainable and innovative by using waste materials like pineapple peels and prawn shells, extracting cellulose and chitin to form a biodegradable polymer. There were days when things didn't go as planned-the texture of the polymer was off, or the drying process took too long-but we learned to troubleshoot, stay patient, and support each other through trial and error. It was both tiring and exciting; even when we were drained, we were eager to see how the next batch would turn out.

The most memorable moment was when the biopolymer sheet finally formed-smooth, flexible, and fully dried. Holding that final product, made from kitchen waste and seafood shells, felt incredibly fulfilling. It wasn't just about getting results-it was about realizing that sustainable solutions can come from the simplest, most unexpected materials

## Rice in the Lab : Where *Oryza sativa* learns to Grow without Growing !

Dr. Sushma Patkar
Jaanvi & Velamanchi Vaishnavi (BtGC)

Working on our project- Callus induction in *Oryza sativa* indica —was an experience we'll never forget. We spent countless hours in the tissue culture lab, often staying late until 6 in the evening, completely absorbed in the process. It was both exhausting and exciting— there were moments we felt drained, but the anticipation of results kept us going. One of the most memorable parts was preparing the turmeric extract and wondering if something so natural, so simple, could really work in place of harsh chemicals. We laughed through the stains on our gloves, the failed sterilizations, and the trials where contamination ruined everything, but every small improvement gave us a boost of hope. When we finally saw those turmeric-treated seeds forming healthy callus, we looked at each other and smiled— it actually worked. That moment made all the long hours, careful pipetting, and troubleshooting worth it. It wasn't just a project— it was a journey of curiosity, patience, and discovering how even unconventional ideas can yield real, meaningful results.


## Ecoflora: Thinking of New Ways to Promote Sustainability !

Dr. S. Nagamanju
Abhilaya, Piyushitha, Rajiya, Reetu& Samyukta Vaishnavi (BtGC)

In Ecoflora, we embarked on a unique journey—transforming post-worship floral waste into bioethanol. What began as an ambitious idea soon became a series of meticulous experiments, unexpected challenges, and memorable teamwork. From repeating protocols to confirm our data, to carefully punching uniform wells in petri plates for our zone of inhibition tests—every step was hands-on and full of learning. Our efforts extended beyond the lab—we sold organically grown plantlets to promote sustainable practices and conducted a wheatgrass awareness program to highlight its health benefits. Ecoflora wasn't just a project; it was an experience that blended science, sustainability, and community impact.




## From Bush to Bottle : A Guide to Gooseberry Wine Making

Dr. S. Nagamanju
Keerthi, M. Varshitha, Shreya & Harshavardhan (BtMbC)

One of the most fun moments was the first tasting session after bottling and aging our wine. It was both exciting and nerve-wracking to see how it turned out!

To our surprise, the wine turned out well.

It was such a satisfying moment for all of us!


## Turning Fruit Salad into Fine Wine - The Microbial Way !

Ms. N. Shruti
Manaswini, Praneeth, Meghana, Y. Vaishnavi & Sumanjali (BtMbC)

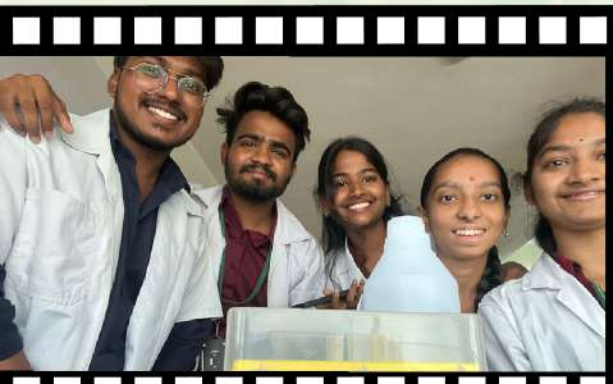
We started our wine-making project as a complete adventure.
We call it an adventure because we even got stuck outside the college gate while buying groceries and had to call the HOD to let us in!
We chopped fruits like pros, and everyone was so excited to taste our wine that it made us even more involved in the project work.
Two months felt like two weeks. I really enjoyed it, and if given the chance, we would 100% choose the same project mates again.
Gonna miss those weekly wine sample tests and sugar estimations!

## From Peel to Power : Fueling the Future with Yesterday's Leftovers !

Ms. N. Shruti
Akshitha, Narender, Rakshitha, Preethi & Kalyan (BtMbC)

This project was a rewarding journey completed under the guidance of Ms. N. Shruti ma'am, whose support and insights were invaluable. Teamwork helped us overcome challenges during fermentation and distillation. A memorable moment was observing the blue flame in the ethanol flame test, confirming our success. Despite minor setbacks, our coordination and ma'am's encouragement kept us going.

We also thank the faculty of the Department of Genetics and Biotechnology for their valuable guidance. Special thanks to Ms. Bharti, Ms. Bhagya, and Ms. Asha for their practical support. We're grateful to all who contributed to the successful completion of our project.

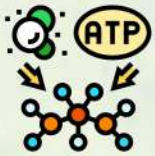


# Dept. of Biochemistry & Nutrition

## From Leaves to Healing : Trapping Magic in Liposomes and Microcapsules !

Dr. S. Vanitha
Antima, Nandini, Vamika & Arvind (BcNDC)

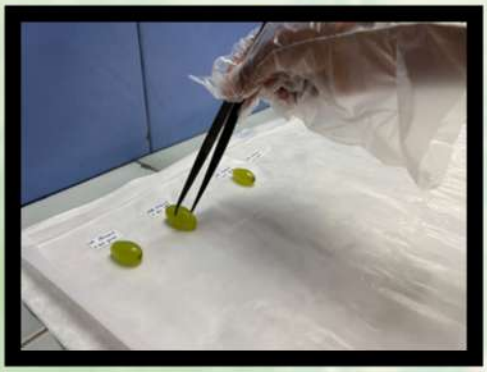
For our final year project, we, the Liposome Group, worked on the bioactive components of the Parijat plant, focusing on their characterization and entrapment methods using liposomes and microcapsules.But beyond the science, this project became truly unforgettable.We often gathered for potlucks, sharing meals and laughter, which brought us closer. Our lab sessions were filled with music and games, making even the most challenging experiments enjoyable. We even skipped a few classes to complete our project (oops!). We re-did experiments multiple times and sometimes because we used the wrong reagent, sometimes because the reagent expired, or because of silly calculation errors. And when everything was finally right, we spilled the solution!
These moments made us laugh till our stomachs hurt. This project didn't just make us colleagues, it made us friends for life.

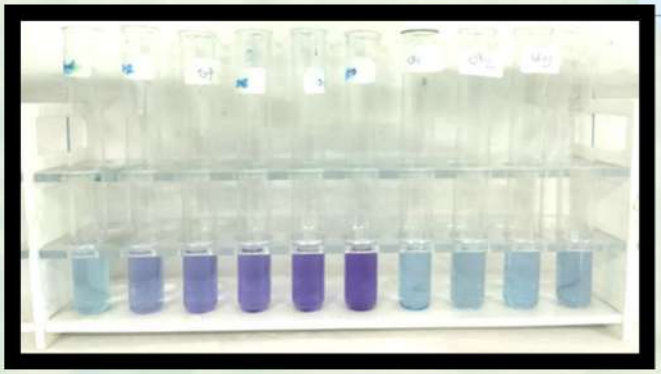



## Almond Gum : Nature's Sticky Solution to a Longer Fruit Life !

Dr. S. Vanitha
Taniya, Sreema & E. Harshitha (BcNDC)

Where do we begin? Our project's success was largely because of my team's seamless coordination — it's a miracle we didn't kill each other! Seriously though, it was a dream collaboration. Now, about those "aha" moments... or rather "oh no, not again" moments.
In science, precision is everything, and mistakes are inevitable (especially when your best friends are your team!). We lost count of how many times we repeated experiments, but our mentor's patience was the real MVP. She guided us through the chaos with calmness and humor. We are forever grateful for her guidance and to our chaotic, calm teammates who made this project unforgettable.



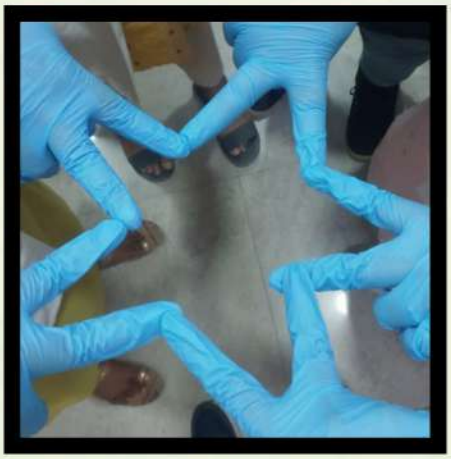


## ZnO NPs Made the Cumin Way - Green, Clean, and Optimized !

Dr. S. Vanitha

Taj, Esha & Prerna (BcNDC)

Our final year project was truly a thrilling scientific adventure! We explored the anti-diabetic potential of natural compounds by testing glucose uptake in yeast cells. From preparing samples and culturing yeast to analyzing results with eager anticipation, every step felt like solving a mystery. The lab became our second home. It was filled with teamwork, trial and error, and lots of chai breaks. Watching glucose levels change was oddly exciting, and interpreting the data felt like solving a biological puzzle. It wasn't just research, it was a journey of discovery, laughter, and unforgettable memories.



## When Groundnuts meet Millet - a Power - Packed Paneer Surprise !

Ms. Revathi Vedantam

Deepika, Keisha, Princy & Nimrah (BcNDC)

We embarked on a long journey to Vimta Labs to submit our samples. Initially, we misplaced the forms we needed,but thankfully, found out we could get them directly at the lab. Upon arrival, we were awestruck by the lab's impressive infrastructure and modern facilities. We even made some temporary friends among the staff! Despite the tiring journey, the experience was enriching, and the grandeur of the lab left a lasting impression on us.

## Millet - Fortified Tofu : When your Protein gets a Superfood Boost !

Ms. Revathi Vedantam
Samaja, Sameeksha, Anjali, Karthikeya & Sagarika (BcNDC)

Our project was about product development, specifically developing a different kind of paneer with enhanced nutrient content. we are thrilled to share my experience: We learned the importance of teamwork when developing the product. We faced many complications and had to try the product 4–5 times before finally succeeding. We even cooked the paneer in different ways; we made curry with it!The fun part was learning how to make a fiber-rich paneer. The biggest complication? Holidays! Because of them, we had to remake the paneer from scratch several times. After everything, we sent the paneer for analysis, and it was a truly great and fun experience. We loved it!


# Dept. of Chemistry

## Green Chemistry in Action : Pyrazolones and Esters with Nature's Help !

Dr. Mary Nygi Kurian
N. Harshitha (MbGC), Jyothi, Priscilla, Rishika, Afreen (BcNDC)

There was an incident that wasn't exactly funny, but definitely a major learning moment.
During our experiments, we faced obstacles,such as not obtaining the correct product we aimed to synthesize, and a lot of confusion regarding procedures (especially with instruments we hadn't used before).
But with the support of our guide, Nygi Ma'am, and the lab assistant, Srinivas Sir, we finally achieved the final results and completed our project successfully.
Every mistake taught us something valuable.



## Citrus Fruits go Hardcore : From Zest to Pyrimidinone with a Side of Antimicrobial Punch !

Dr. Mary Nygi Kurian
Sadhbhavana, Tanishq, Nihal (BtMbC)

Working on our project, "Comparative Study of Pyrimidinone Derivatives from Citrus Fruit Extracts: Green and Chemical Synthesis, Characterization, Antibacterial, and Antifungal Activity," was a rollercoaster of learning, challenges, and unexpected fun. The most hilarious part? When Nihal and Tanishq went full caveman mode, squeezing grapefruits, oranges, limes, and mosambi with their bare hands instead of using a mortar and pestle for proper extraction! Of course, we corrected it later, but watching them was absolutely hilarious and oddly wholesome. That moment kind of summed up the entire project, chaotic, full of learning curves, but weirdly memorable in the best ways


## When Chloroquine plays Molecular Tetris with Human HGPRTase !

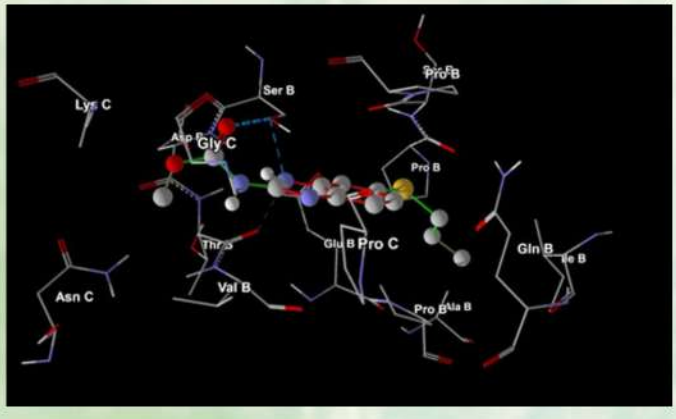
Dr. L. Arunapriya
Harsha, Nitya, Bhuvaneshwari & T. Varshitha (BtGC)

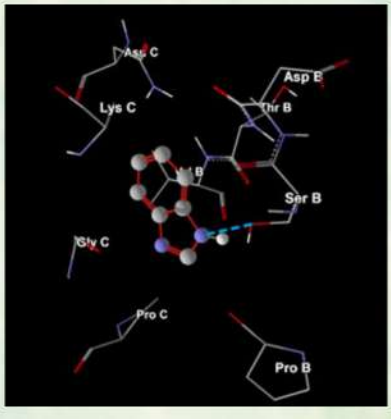
We always fantasized about our final year project, and it truly turned out to be an amazing experience. It was real-time work, and we definitely learned a lot throughout the process, including professionalism, team spirit, and more. The best part was all of us working together, coordinating with each other. The last-minute rushes and countless final drafts of the thesis were definitely a routine specialty of the project! It was real fun because we got to sit separately with our respective lecturers and have conversations about their UG and PG days, which was something unusual compared to regular classes. Another fun memory is us working on laptops while secretly playing songs on other tabs and somehow, our ma'am knew it and was chill about it. We can surely say we had the coolest and best project supervisor, Dr. Aruna Priya, who patiently guided us throughout.

## Molecular Matchmaking : Benzimidazole vs. Tubulin in the Colchicine Arena !

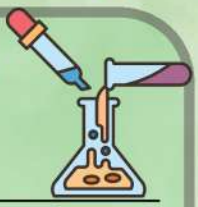
Dr. L. Arunapriya
Poorna, Sanjana, Bharath & Meghana (BtGC)

Our project titled "In Silico Studies of Benzimidazole Derivatives with Tubulin-Colchicine: SLD Complex" focused on computational drug discovery, specifically targeting parasitic infections caused by helminths. We explored binding interactions between benzimidazole derivatives and the Tubulin-Colchicine: Stathmin-Like Domain (SLD) protein complex using molecular docking. Using software like ChemDraw Ultra 12.0, HyperChem 8.0, and Molegro Virtual Docker, we designed, optimized, and docked molecules to the target protein (PDB ID: 1SA0). The docking results showed that mebendazole ($H_2$) exhibited the strongest binding affinity, followed by albendazole ($H_1$) and oxibendazole ($H_3$). These compounds formed significant hydrogen bonds with key residues like Gln-394, Glu-183, and Ser-178 in the active site. This project gave us hands-on experience in molecular modeling, structure-based drug design, and scientific analysis. It enriched our understanding of medicinal chemistry and modern drug discovery approaches.



## Catching the Right Dose of Apixaban under the UV Spotlight !



Ms. D. Rajeshwari

Yousuf, Wahed, Aman & Harika (MbGC)

We would say it was kind of fun because our teammates were our classmates, the ones we always joke around with. We had a nice time working on the project. For calculations, we had to roam all over campus looking for the Math or Stats sir (We honestly don't even know his name). There were fights, disagreements, and all that, but by the end of the semester, it was all good. We did well in our project, and that's what matters!


## When Zn and Cu go Nano, they don't just mix - *they flex !*


Ms. C. V. L. Shivani

Rahul, Lakshmi Prasanna, D. Varshitha (BtGC) & Harshini (BtMbC)

The interesting part of our project was learning new techniques and understanding their futuristic scope.
The fun part was constantly getting scolded by lecturers but then correcting our mistakes and moving forward.
Overall, it was a wonderful experience.

## When Camphor meets Chemistry : For a Silver - Lining Polymer !

Dr. Shruthy D. Patthathil
Prakruti, Nikhita, Havishmathi (MbGC) & Swetha (BcNDC)

This project taught us that chemistry isn't just theory - it's transformation. Synthesizing the CSA-doped PANI-Ag nanocomposite brought moments of genuine excitement, especially when we observed the silver solution shift in color, marking nanoparticle formation. UV-Vis and FTIR confirmed what our eyes saw - real, measurable interactions at the molecular level.
Testing antioxidant and antimicrobial properties wasn't just a checkbox; it revealed the functional potential of what we had created. The process was demanding, but deeply rewarding - a sharp, hands-on glimpse into real-world nanomaterial science.
We genuinely had so much fun. It was a dream come true to work with Shruthy ma'am.

## Cellulose just got Classy - Doped, Loaded, and Ready to shine with Silver !

Dr. Shruthy D. Pattathil
Isha, Poornima, K. Harshini (BtMbC) & Sadvika (BtGC)

One of the most noteworthy experiences during our chemistry project was, the Synthesis of Cellulose-Based CSA-Doped Polyaniline Nanosilver Composite, was mastering the precision needed during the synthesis process.
A particularly exciting moment was observing the distinct color change during in-situ polymerization of aniline, from colorless to emerald green, a visual confirmation that polyaniline was forming correctly. It felt like chemistry magic!
One major challenge we faced was stabilizing nanosilver particles within the polymer matrix.
Initially, significant agglomeration compromised the uniformity, but after several trials (adjusting doping concentration and reaction time), we finally achieved a stable, well-dispersed nanosilver structure.
Overall, the project was a mix of frustration, curiosity, and excitement.

## Metal meets Molecule : Crafting Co - based MOFs like Molecular LEGO !

Ms. Prerana Loomba
Supriya, Keerthana, Sejal, A. Varshini (MbGC), Sivankari & Jawad (BtGC)

Working on the project involving Schiff bases and cobalt-based MOFs was not only scientifically enriching but also full of unexpected fun. Watching the vivid color changes during Schiff base synthesis felt like molecular art!
Growing MOF crystals turned into an obsession. Celebrating that one perfect crystal after so many weirdly shaped ones was a victory in itself. We had wild moments too, like a reaction changing color mid-process (mini heart attacks included).
Lab days were also "scented adventures" thanks to aromatic amines.
Filter paper fails, unlabeled beaker mysteries, endless IR spectroscopy debates... chaotic but hilarious.
And yes, we totally gave our crystals nicknames like "MOFzilla" and "The Blue Beast."
Huge thanks to Ms. Prerana Ma'am for guiding us throughout!


## Conductive meets Catalytic : PANI - ZnO Nanocomposite in Action !

Ms. C. V. L. Shivani
Sowmya, Varsha, CH. Harshitha & Nagarajan (BtMbC)

Our most noteworthy experience was working with a great, knowledgeable team who came up with unique ideas.
The most fun moments were working together, especially during the synthesis phase of our project.
The unique challenge we faced was simply attending all the project hours consistently!

# What's On Your Mind

This section captures student perspectives on scientific breakthroughs, emerging questions, and the curiosity driving tomorrow's innovations.

# Breaking and Healing

## *The Technological Advancement of Bone Regeneration*

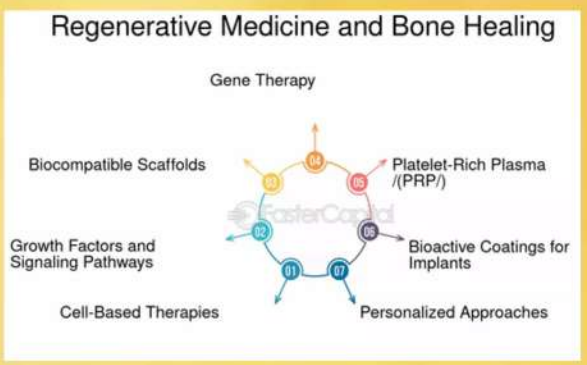
When you break a bone, your body naturally starts to repair itself. However, in cases of severe injuries, large fractures, infections, or bone diseases, healing does not always happen efficiently. Sometimes bones take months to heal, may form weaker structures, or fail to heal entirely. Traditional treatments like bone grafting, where bone is taken from another part of the body (autograft) or from a donor (allograft), have been used for decades. While they work, they often bring risks like infections, immune rejection, and limited bone availability. Scientists today are finding smarter, safer, and faster ways to support bone healing by combining biomaterials, regenerative medicine, and nerve biology.

### Smart Biomaterials for Bone Healing

One of the biggest advances in bone regeneration is the use of biomaterials — specially designed substances that can safely work inside the human body.

Natural bone is made of a combination of minerals like hydroxyapatite and proteins like collagen, and scientists have created synthetic materials that mimic these natural structures. Unlike traditional bone grafts, modern biomaterials are bioactive; they do not just sit passively in the body but interact with cells, encouraging bone formation, blood vessel growth, and tissue integration.

Materials like calcium phosphate ceramics, bioactive glasses, and hydrogels are widely used because they can enhance the bone healing process by providing both mechanical support and biological signals.




### Hydrogel Microspheres: Tiny Delivery Systems

A remarkable innovation in bone tissue engineering is the development of hydrogel microspheres. These are tiny, water-filled beads that can carry therapeutic agents such as stem cells, growth factors, and drugs directly to the injury site. By slowly releasing these substances over time, hydrogel microspheres create a healing-friendly environment that promotes continuous bone repair.

Their soft, injectable nature allows them to protect sensitive biological molecules during delivery and to fill irregularly shaped defects easily. Researchers have also designed these microspheres to respond to external stimuli-such as changes in temperature or pH-which means healing agents can be released exactly when needed, making bone regeneration more precise and effective.

**Supporting Growth with Biomimetic Scaffolds**

Another important tool scientists use is biomimetic scaffolds — structures that act like temporary bridges, supporting new bone cells as they grow and mature. These scaffolds are often made from biodegradable polymers like polylactic acid (PLA) or natural materials such as collagen nanofibers. Some scaffolds are loaded with important molecules like Bone Morphogenetic Protein-2 (BMP-2), which strongly encourages bone cells to multiply and form new tissue. The architecture and composition of these scaffolds are designed carefully to mimic the physical environment of real bone, helping to guide cells and stimulate natural healing processes. Over time, as the bone regrows, the scaffold slowly breaks down, leaving behind only healthy new bone tissue.

**The Vital Role of Nerves**

Beyond materials and structures, researchers have uncovered another powerful player in bone regeneration: the nervous system. After an injury, nerves at the fracture site release a variety of important chemicals, including Substance P, Nerve Growth Factor (NGF), and Calcitonin Gene-Related Peptide (CGRP). These molecules act as messengers, instructing bone cells to start rebuilding, promoting the growth of new blood vessels, and activating immune cells to clean up the damaged area. Without these nerve signals, bone healing becomes slower, weaker, and less organized.

Scientists are now developing therapies that enhance or mimic these nerve signals, hoping to speed up bone healing and improve the quality of regenerated tissue. This exciting area of research shows that healing bones is not just about fixing the skeleton - it's about communicating with the body's natural repair system at every level.

**The Road Ahead**

The future of bone healing lies in combining smart biomaterials, nerve-based therapies, and advanced delivery systems. Researchers are working on gene therapies and RNA- based treatments that can reprogram bone cells directly at the injury site, making healing even faster and more controlled. There is also growing interest in stimuli-responsive biomaterials, which can change their behavior in response to light, heat, or magnetic fields, allowing doctors to control the healing process more precisely.

Thanks to these breakthroughs, a bad fracture may soon become a much easier challenge to overcome. As science continues to blend material engineering, biology, and medicine, we are moving closer to a future where bone injuries heal faster, stronger, and smarter, giving people better outcomes and a quicker return to their lives.

**Velamanchi Vaishnavi**
**BSc BTGC III**

# *Resurrecting the Dire Wolf*

## *Can Genetic Engineering Bring Ice Age Icon Back?*

**Introduction**

The dire wolf (Aenocyon dirus), a legendary Ice Age predator, has long been extinct—but what if science could bring it back? Thanks to Game of Thrones, these beasts are cultural icons, yet recent genetic discoveries have revealed they weren't even true wolves. Now, advances in genetic engineering and de-extinction projects are sparking debate: Could—and should—we resurrect the dire wolf?

**Breaking Down Dire Wolf DNA**

In 2021, scientists successfully sequenced dire wolf DNA from 13,000-year-old fossils. The shocking finding? Dire wolves belonged to an entirely separate genus (Aenocyon), meaning they were as different from gray wolves as hyenas are from dogs. This genetic isolation is why they couldn't interbreed with other canids—and why they went extinct when their prey vanished.

**For de-extinction, this poses a challenge**

There's no close living relative to use as a genetic base. CRISPR editing of gray wolf DNA might not be enough—scientists would need to rebuild much of the genome from scratch.

**Science Brings a Legend (Partially) Back to Life**

Rather than true de-extinction, scientists have taken a different approach: genetically modifying gray wolves to mimic key dire wolf traits. Using CRISPR-Cas9 gene-editing technology, researchers:

- Extracted ancient DNA from dire wolf fossils and mapped their genome.
- Compared it to modern wolves, identifying genes responsible for unique traits-size, bone density, and even their iconic howl.
- Edited 14 key genes in gray wolf embryos, altering growth patterns, muscle development, and fur coloration.
- Implanted the modified embryos into surrogate dogs, resulting in the first "neo-dire wolf" pups.

The result? Larger, more muscular wolves with thick white coats and a haunting howl reminiscent of their prehistoric ancestors.

**Not a True Resurrection—But Close Enough?**

These animals are not pure dire wolves—they remain overwhelmingly gray wolf in their genetics. Without a complete dire wolf genome, scientists can only approximate the species. Think of them as "wolf 2.0"—enhanced versions rather than true Ice Age replicas.

**Where Will These Wolves Live?**

Unlike Jurassic Park fantasies, these genetically modified wolves won't be released into the wild. Instead, they'll reside in a controlled reserve, where researchers can study their behavior, health, and ecological impact. The company behind the project,which has also engineered a "woolly mouse" and plans more species—hopes to use this technology to restore lost biodiversity in carefully managed environments.

**Ethical Dilemmas: Should We Play "Ice Age Geneticist"?**

Proponents argue:

- Scientific value: Studying a resurrected dire wolf could reveal secrets of Ice Age adaptations.
- Conservation symbolism: A "poster species" for Pleistocene rewilding.

Critics counter:

- Resource drain: Funds might be better spent saving living endangered species.
- Unpredictable risks: Engineered animals could behave unexpectedly.

**The Future of De-Extinction**

This project marks a major step in genetic engineering, proving that we can reconstruct key traits of extinct species —even if we can't fully bring them back. As CRISPR technology advances, the line between extinct and "recreated" will continue to blur.



G.TARUNI SREE
BSc.BTGC II

# Stem Cells
## *The Superheroes Inside Us*

Imagine if your body had tiny superheroes that could transform into anything it needed like a heart cell, a brain cell, or even skin, or if our bodies could heal themselves completely after an injury or illness. Well, guess what? You already have them! They're called stem cells, which offer great hope for treating diseases and injuries and they're one of the coolest things in biology.

**What Are Stem Cells?**

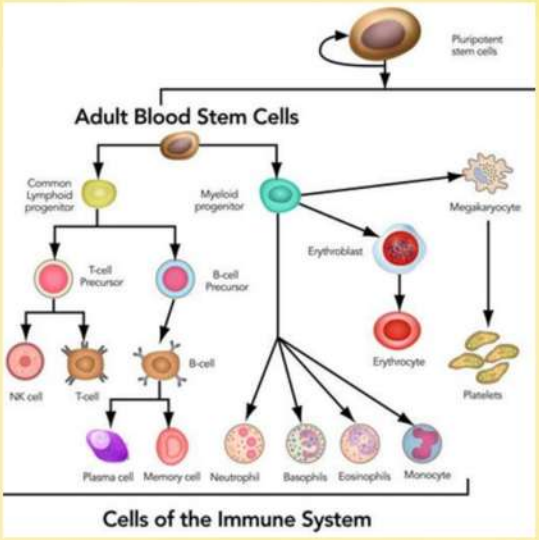
Stem cells are unique because they are unspecialized. This means they do not have a specific job yet, but they have the potential to become specialized cells like muscle cells, blood cells, or brain cells. Stem cells are like blank pages in a notebook; they can become anything the body needs. When you get a cut, stem cells jump into action to help heal it. If your body was a giant team, stem cells would be the players who can play any position!

**Types of Stem Cells:-**

There are different kinds of stem cells, like different superheroes with different powers:

**Embryonic Stem Cells:** The ultimate all-rounders! These are found in early-stage embryos and they can become any type of cell in the body.

**Adult Stem Cells:** These are found in different parts of the body like bone marrow or skin. They usually turn into the type of cells from where they came means these are more specialized and work in specific areas, like fixing blood or skin cells.

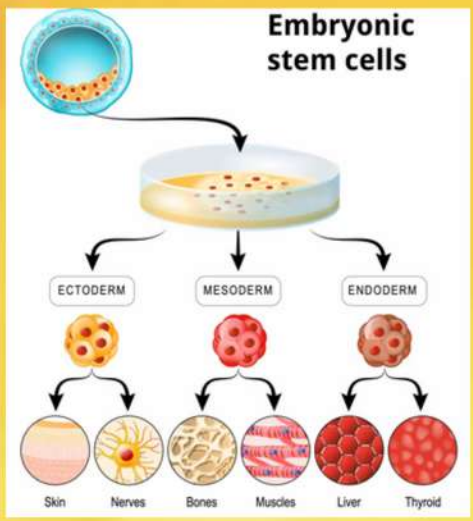


Cells of the Immune System

**Induced Pluripotent Stem Cells (iPSCs):**

Another exciting type is induced pluripotent stem cells (iPSCs), which scientists create by reprogramming adult cells to behave like - embryonic stem cells like giving them a second chance to be anything!

Menstrual blood-derived stem cells (MenSCs) are a promising source of stem cells, discovered in the early 2000s, with the potential for regenerative medicine. These cells are easily collected from menstrual blood, offering a non-invasive and ethical alternative to other stem cell sources. MenSCs have the ability to differentiate into various cell types, such as fat, bone, muscle, and nerve cells, making them valuable for potential therapies. Their use in personalized medicine could reduce the risk of immune rejection, as they come from the individual's own body. While research is still in early stages, the ability to harness these stem cells for medical treatments presents an exciting frontier in regenerative medicine.




Recent breakthroughs in stem cell research are showing great promise for medical treatments. Scientists at the Murdoch Children's Research Institute in Melbourne have developed lab-grown blood stem cells, which could lead to better treatments for leukemia and bone marrow failure, especially in children. Additionally, Stanford researchers have recreated a human brain circuit using stem cells, offering new insights into treating neurological diseases. These discoveries highlight the potential of stem cells in advancing personalized medicine and improving treatments for various health conditions.

**Why Are They Important?**

Stem cells have huge potential in medicine as they are already saving lives. They are used to treat diseases like leukemia through bone marrow transplants. And researchers are finding ways to use them to:

- Heal broken hearts (literally — after heart attacks!)
- Fix damaged nerves in the spine
- Help people with diseases like diabetes and Parkinson's

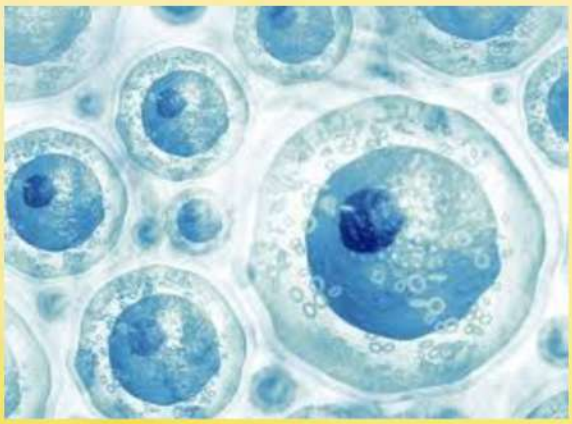
One day, we might even be able to grow new organs using stem cells!

**The Challenges?**

Like every superhero story, stem cells have challenges too. Sometimes it's hard to control how they grow (behave unpredictably) and research is expensive. Using embryonic stem cells brings ethical questions, because they come from early-stage embryos because it involves in the destruction of embryos.

**Conclusion**

Stem cells are like nature's magical repair kit. They're powerful, full of potential, and might just be the key to curing diseases we once thought were impossible. With more research and understanding, they could change the future of medicine, helping heal injuries and cure diseases that were once thought impossible. The journey of stem cell science is just beginning, and its possibilities are truly exciting. Who knows? Maybe one day, you could be the scientist who unlocks even more of their superpowers!



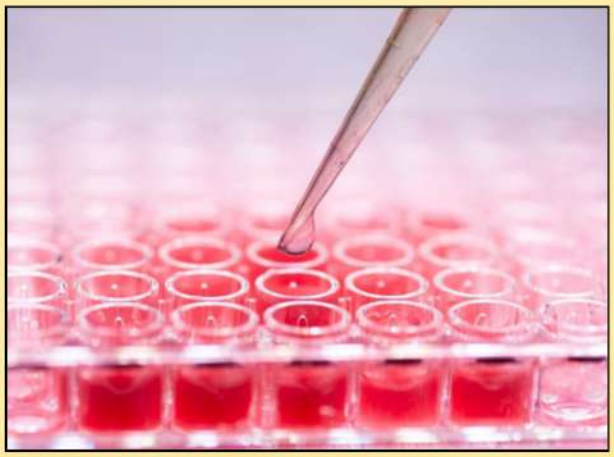
**G.SRI VAISHNAVI**
**BSc.BTGC I**

# Cellular Innovation Redefined

## *The Rise of Semma Cyte Technology*

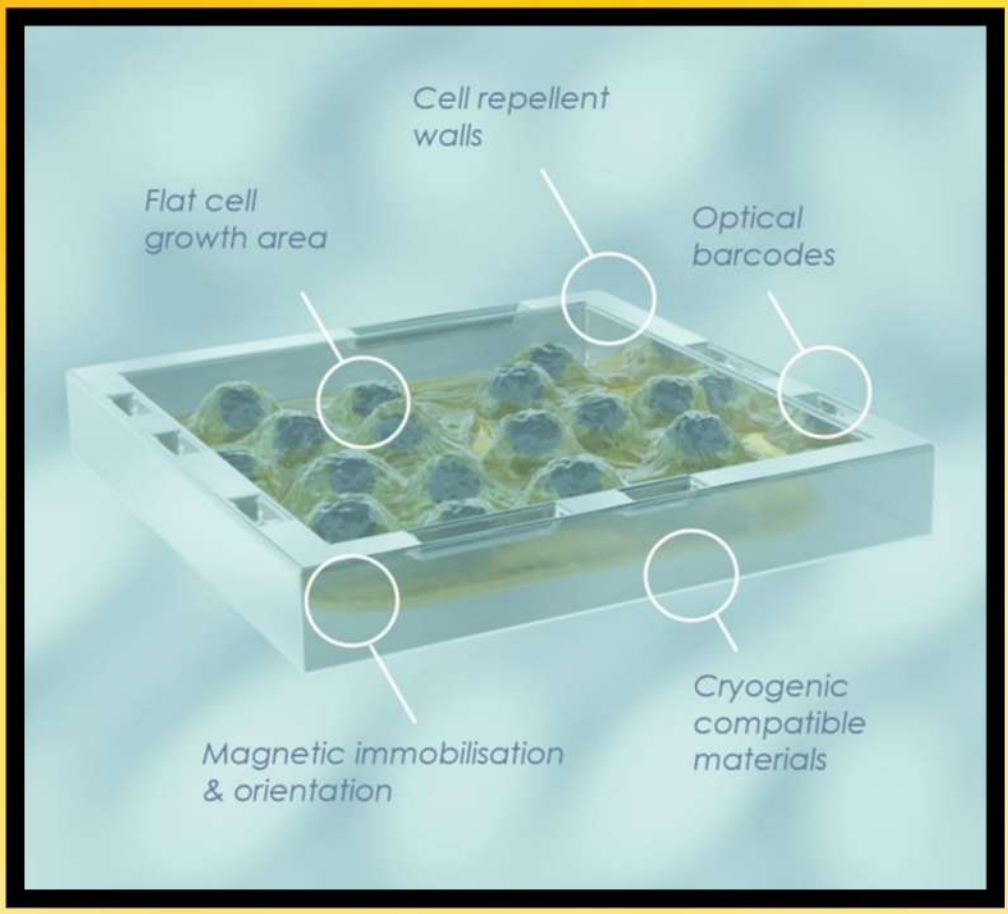
### Cellular Innovation Redefined

The Rise of Semma Cyte Technology
A recent breakthrough by Semarion—an advanced materials company spun out of the Cavendish Laboratory at the University of Cambridge—has redefined cell-adhering assays and drug discovery. Traditionally, researchers grew cells in flasks, plated them in multiwell plates, waited for them to adhere, and only then began the assays. This method is time-consuming, resource-intensive, and difficult to scale, particularly when working with transiently transfected cells, iPSC-derived models, or primary patient samples.



However, this platform addresses these limitations by rethinking the options available. Semma cytes are designed to integrate seamlessly into existing microplate-based workflows. They turn the adherent cells into barcoded, assay-ready reagents that can be frozen, stored, and dispensed into microplates as needed. Researchers simply dispense the microcarriers into standard 384- or 1,536-well plates using liquid handling systems. Since the cells are already attached, assays can begin immediately, eliminating the wait for cell attachment and reducing setup time from days to hours.

A remarkable feature of the Sema cyte microcarrier platform is the design of its microcarriers —
Ultra-miniaturized structures are just 140 x 140 microns in size and act as individual, self-contained environments for cells.
These microcarriers support healthy cell growth and maintain morphology, making them highly reliable. Moreover, the compatibility of SemaCytes with automated liquid handling systems and high-throughput screening (HTS) platforms enables researchers to easily scale up their experiments, process larger libraries of compounds, and even streamline AI-driven drug discovery workflows .




Moreover, the compatibility of SemaCytes with automated liquid handling systems and high-throughput screening (HTS) platforms enables researchers to easily scale up their experiments, process larger libraries of compounds, and even streamline AI-driven drug discovery workflows .
This innovation not only pools up to 10 different cell models in the same well and tracks each one using its unique optical barcode but also reduces costs up to 6-fold. Researchers now benefit from improved scalability, reduced variability, and increased reproducibility; crucial factors in earlystage drug discovery, where speed and consistency are key to success.

I feel this has a greater application in CRISPR screening, antibody binding studies, and DNA damage response assays, as well as in cell replacement and immune-evasive therapies. This is a remarkable fusion of cellular engineering and therapeutic delivery. By removing the traditional bottlenecks in adherent cell workflows and bringing unprecedented flexibility to assay setup, Semma Cyte technology is not just a treatment, it's a step toward a cure.

**C.S.SRINIDHI**
**BSc.BTGC II**

# *Subterranean Signals*

## *Earth's Fluorescent Caves and the Search for Alien Life*

In the dark, silent world beneath Earth's surface, something extraordinary happens when ultraviolet light is introduced—certain minerals begin to glow. These naturally fluorescent minerals, long overlooked, are turning out to be valuable scientific storytellers. They offer clues about our planet's past and, more intriguingly, about the possibility of life beyond it.

Scientists are now harnessing the unique properties of these glowing caves to answer one of the biggest questions in science: Could life exist elsewhere in the universe?

**Fluorescence as a Scientific Tool**

Certain substances emit visible light when exposed to UV radiation. In caves, this light reveals hidden chemical patterns formed by minerals and sometimes even microbes.

By analyzing these fluorescent signals, researchers can uncover information about past water activity, mineral composition, and chemical changes in the cave environment over time. These insights are vital because water is one of the essential ingredients for life.

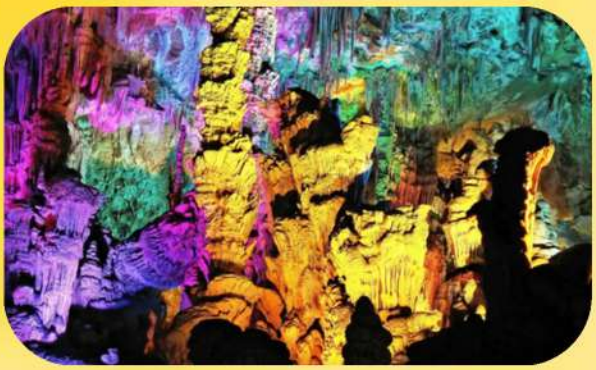
A section of South Dakota's Wind Cave seen under normal white light (left image) transforms into something otherworldly when placed under UV light (right image)

**Chemical Fingerprints Without Disturbance**

A key breakthrough in this field is the non-invasive technology scientists now use to collect this data. With portable UV spectrometers, researchers can read the "chemical fingerprints" of cave surfaces without having to chip away at the rock or disrupt the environment.

**Preparing for Life-Detection Missions Beyond Earth**

What makes this research so exciting is its direct connection to astrobiology. Subsurface environments on icy moons like Europa (Jupiter) or Enceladus (Saturn), or underground lava tubes on Mars, may harbor similar mineral and water-related chemistry.



**Could Life Be Lighting the Way?**

If fluorescence in cave waters is partially driven by microbial life, this could redefine how we search for biosignatures on other worlds.

It also means fluorescence could one day serve as a biosensor, helping scientists identify potential hotspots for life in otherwise inaccessible or lightless places.

**Empowering a New Generation of Scientists**

One inspiring aspect of this work is the involvement of students and early-career researchers, who are developing:

- Databases of fluorescent mineral signatures to enhance geological maps.
- Autonomous spectrometers capable of remote exploration—ideal for hard-to-reach places on Earth and other planets.
- Wearable biometric monitors to keep human explorers safe in extreme environments like deep caves or off-world habitats.

This isn't just theoretical science—it's hands-on innovation that blends geology, chemistry, biology, and space technology.

**M.Samyameendra**
**B.Sc BTGC-II**

# *Biology's Avengers*
## *10 Creatures with Insane Abilites*

Superheroes may belong to comic books and cinema screens, but nature has spent millions of years cultivating powers that even the boldest fiction cannot match. Across the planet, humble creatures wield abilities that could transform medicine, engineering, and even the very fabric of human life. Here, we explore ten of nature's finest - sometimes with awe, sometimes with laughter, and always with wonder.

***1. Axolotl -***
***Full Limb and Organ Regeneration - Deadpool who?***
***Ambystoma mexicanum***

In a world where most creatures accept that losing an arm is a permanent arrangement, the axolotl simply shrugs - or it would, if it had shoulders. This watery teenager of an amphibian nonchalantly regrows limbs, parts of its heart, spinal cord, and brain, as if life were just a casual Lego project. (for it, it may be). Scientists and doctors, naturally, would love to learn this jujitsu, preferably without having to live underwater and eat worms, so they have been studying these cutie pies for a significantly long time.

***2. Tardigrade -***
***Extreme Survival (Cryptobiosis) - Nature's own Bear Grills***
***Hypsibius dujardini***

In the quiet tapestry of moss and lichen, a creature smaller than a grain of sand prepares for eternity. The tardigrade, or 'water bear', can survive the crushing cold of deep space, lethal radiation, and decades without sustenance, all by entering a suspended animation. It is nature's most indomitable traveller - an explorer of extremes. It looks cute, too, but only under a strong microscope.

***3. Mantis Shrimp -***
***Hyper-Speed Punch - Inspired the One Punch Man***
***Odontodactylus scyllarus***

The mantis shrimp is what happens when evolution watches too many kung-fu films or anime. This glorified prawn doesn't just punch its prey-it obliterates it, moving its club faster than the speed of sound underwater, producing shockwaves and miniature explosions. This creature can definitely give masala South Indian movies a run for their money.

***4. Bombardier Beetle -***
***Chemical Defense System - AKA Chota packet Bada Dhamaka***
***Brachinus crepitans***

Hidden amongst the leaves, this small beetle prepares a most remarkable defense. The bombardier beetle mixes chemicals within its abdomen to produce a rapid-fire spray of boiling liquid. Perfectly timed and devastatingly effective, this natural alchemist has inspired scientists seeking safer, more efficient ways to deliver medicines with precision.

***5. Electric Eel -***
***Biological Electricity Generation - Yes, that Amazing Spiderman's Fan ->turned-> Fanatic one***
***Electrophorus electricus - coz why not?***

There's always that one creature that looks at the sensible biological options - teeth, claws, poison - and thinks: "Nah, I shall be... a living battery." The electric eel stuns its prey and defends itself by firing off 600 volts at a time, a sort of angry aquatic power station. Future engineers are naturally very keen to make everything from pacemakers to cities run on eel logic. BTW, Electra was an engineer too... just saying.

***6. Immortal Jellyfish -***
***Cellular Rejuvenation - No Horcruxes involved whatsoever (really) (LEARN VOLDEMORT, LEARN)***
***Turritopsis dohrnii***

In the shadowy depths of the sea drifts a creature that rewrites the very rules of life and death. The immortal jellyfish can revert its cells back to youth after maturity, effectively beginning its life cycle anew. Within its delicate form may lie secrets that could one day alter humanity's understanding of ageing itself. One day as in now, as biologists have already started unlocking the research potential of these beautiful, brainless creatures (and no, I don't mean my friends)

***7. African Spiny Mouse -***
***Skin Shedding and Rapid Healing - No Magic involved, probably (shrugs)***
***Acomys cahirinus***

The African spiny mouse has a refreshingly direct approach to danger: if caught, it simply leaves a chunk of itself behind and carries on. It sheds its skin with the casual abandon of someone discarding a too-tight jumper/cardigan/jacket, then regenerates it rapidly without a scar. Medical researchers, understandably, are desperate to get in on this nifty little life-saving trick.

***8. Gecko -***

***Wall-Climbing Ability - What do you mean by Van der Waals Forces? Gravity? Physics?***

***Gekko gecko, the Tokay gecko***

High above the forest floor, a gecko clings effortlessly to a sheer vertical surface. Its secret lies in millions of microscopic hairs on its toes, each one exploiting the subtlest forces of attraction. This marvel of natural engineering has already inspired adhesives that defy gravity, bringing the dream of climbing like a lizard ever closer to reality. (Again, not my fault that The Amazing Spider-Man has done that before. And no, I'm not obsessed with Andrew Garfield.)

***9. Planarian Flatworm -***

***Complete Body Regrowth from Fragments - Slime Alien? Eh.***

***Schmidtea mediterranea***

If you ever feel like you're falling apart, spare a thought for the planarian, who does exactly that - and then grows back. Chop it into pieces (please don't, unless you wish to be a serial killer), and each one may cheerfully sprout a new head, a new tail, and whatever else it needs. Biologists and Biology students are both horrified and delighted, depending largely on how recently they had breakfast or lunch or dinner, for that matter. (They probably haven't, the poor dears. They just remember the 5-kingdom classification.)

***10. Archerfish-***

***Precise Water Shooting to Hit Targets - Let's never play laser (or water) tag.***

***Toxotes jaculatrix***

In the shimmering waters of a tropical stream, the archerfish lines up its prey. With astonishing precision, it spits a jet of water to knock an unsuspecting insect from its perch. Its accuracy, honed by years of evolutionary perfection, is now helping scientists design smarter, faster robotic targeting systems for human use.

From explosive beetles to undying jellyfish, nature's ingenuity defies imagination. These creatures do not merely survive - they thrive, each mastering an art that human beings can only dream of. As science inches closer to understanding these living miracles, the line between nature and technology blurs, promising a future where today's superpowers might soon belong to all of us (no, not X - men style).

**K. Prakruti**
**BSc. MbGC III**

# Kingdom of Aqualorian

Beneath the waves, lives a mysterious creature older than the dinosaurs, the Octopus. So incredibly alien. Changing color in an instant. Shaping into anything. They are the planet's true masters of disguise. Think creatively. Communicate with other species. Maybe dreams. Let's discover one of the most intelligent beings on the planet.

**Queen of Camoflauge**

The Great Barrier Reef, Australia. The biggest Coral structure on the planet. Over twelve hundred miles long and home to more than nine thousand different species. Including her, the Day Octopus (Octopus cyanea). Her name, Becca.

Octopuses are so alien that it's hard to know what they are looking at. Becca and the three hundred other species share some similar quirks.

A siphon that propels her through water. A soft, boneless body conceals a razor-sharp beak for crushing fish and carbs. Two bulbous eyes sitting above a powerful brain that's capable of something extraordinary. She can transform the color, shape, and texture of her body in a fraction of a second, choosing when to hide and reveal themselves, making them hard to spot. Truly, these creatures are misleading and hard to spot. Her invisibility game is so strong, she's often mistaken for coral or algae though to a surprise, she's color-blind. The Ultimate Queen of camouflage.

All octopuses may not be shapeshifters, but some are amusingly incredible.

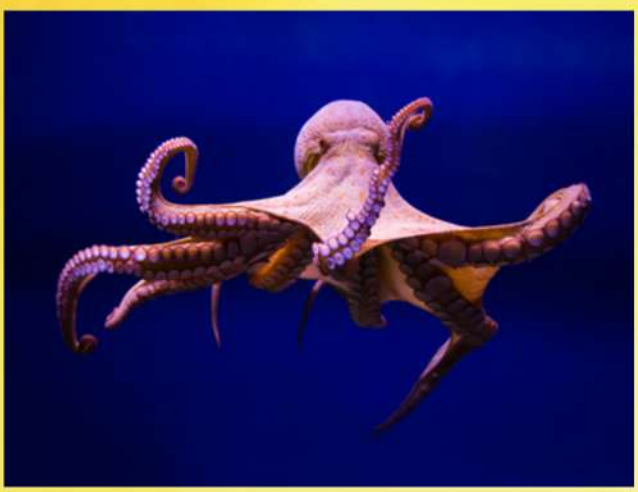
**Sovereign of Rings**

Reminds me of Ella. For some, survival depends not on blending in but standing out. Near the southern tip of Australia, the Port Phillip Bay. This pier is home to the weird and wonderful. Ella is one of the deadliest animals on Earth. But unlike the Day Octopus's, she comes when the sun goes down

This is a Blue-ringed octopus (Hapalochlaena Maculosa), Ella. She's small, the size of a golf ball. She can blend into the background if she wants to, but it's not her style. Her bright blue rings send a strong message, a Warning. A single bite from her hidden beak releases enough neurotoxin to kill a human being in minutes. Do not mess with her. Yet being one of the deadliest, in the gloom, the blue-ringed Octopuses lose their power. The blue ring vibrancy. So, she does something only blue-ringed Octopuses can do when the predator is spotted. Triggering muscles to reveal thousands of light-reflecting cells in her rings, she dials up the blue color. While also upping contrast by darkening the skin. This is one of the brightest warning displays on earth. Somewhere out of reach. To all but the most flexible. Octopuses combine their smart and shapeshifting skills to expertly decide when to hide and when to stand out. But some use this alien-like superpower in other ways.

**Duke of Impersonation**

Nicole, the cousin of Becca, the Queen of Camouflage (Ray Octopus), is a masterful shapeshifter. Nicole is the cousin who uses his intelligence to take it to the next level by creating the ultimate deception. Living in the lush tropical jungle, on the shores of the Lembeh Strait, beneath the water, but with a featureless floor of volcanic sand. A problem for Nicole, the octopus. There's nowhere to hide, surrounded by lots of hungry predators. Nora can change color, but due to the problem- the featureless floor of volcanic sand, Nicole will be exposed. .



Therefore, it's time to transcend mere color-changing and unlock the secrets of next-level shapeshifting. Transforming into a near-perfect likeness of an enemy, blurring the lines between prey and predator. Mastering the art of deception, seamlessly disguising itself as a formidable foe to outsmart predators enough to deceive a real flounder when threatened. Applicable to scare the prey by transforming into predators of the depth, a Lionfish or a Rattlesnake. Mimicking the shape, pattern, color, and movement. The impersonation is so good it's earned him his name, the Mimic (Thumocropus mimicus). Nicole is too smart. The mimic isn't just copying. This kind of shapeshifting hints at something unique. He knows how the other creatures see him, and he's aware of the fears of the prey, and he exploits their fear. A strategist. Sure enough, if he were a human, his MBTI would be INTJ. Shapeshifting is an art that the octopuses have perfected. Transforming themselves to find food and avoid becoming someone else's. Indeed, The Most intelligent creatures of the deep ocean.

**Taniya Sadhineni**
**BSc BcNDC III**

# *Life, Science and Everything in Between*


Life used to be simple once.
The sun rose. People lived. Stars twinkled at night.
I admired it all blindly, marveling at the magic without needing an explanation.
But scien°ce took me by the hand and pulled me under the surface. It showed me that everything, from the food I eat to the galaxies overhead, is stitched together by invisible, breathtaking threads.
Take something as everyday as food.
When I learned about mutagenicity, how pan-cooked foods, fried meats, and rich gravies can create chemicals that damage DNA, my perspective shattered. The thought that something as Okay casual as a meal could stealthily plant the seeds of mutations inside my body was chilling.
And then came Helicobacter pylori, a tiny bacterium hiding in the stomach lining, sabotaging DNA repair mechanisms and leading to gastric cancer.
Science didn't just teach me fear. It taught me awe.
Because even as every cell in my body suffers around 10^6 mutations every single day, the body, this magnificent, silent machine, fights back. Repairing, replacing, renewing.
Each day we survive is an unseen miracle of molecular resilience.
When I gaze upward now, it's not just stars I see.
I think of the Cosmic Microwave Background, the faint afterglow of the Big Bang, still whispering across the universe.
180 million years after that first explosion, the first stars were born, giant masses of hydrogen and helium, fusing atoms into heavier elements, birthing the very materials that would one day form planets, life, me.
Their deaths, through violent supernovae, scattered these elements across space, seeding the universe with potential. Some of these massive first stars may have collapsed into supermassive black holes, laying the foundation for galaxies.
In 2019, scientists finally detected hints of these first stars by studying radio waves, noticing that hydrogen was much colder than expected.
The sky needed to be perfectly radio-clear to catch the faint signals from the beginning of everything.
Science taught me that light travels with delay, four minutes from Mars to Earth, eight minutes from the Sun.
It's like time travel, glimpsing the past in every photon.
And suddenly, "now" didn't feel so absolute anymore.
Sound, too, became more magical after science.
I learned how tiny cilia on cells, which once sensed the motion of the surrounding environment, evolved into complex ears that could detect sound.
270 million years ago, organisms began to communicate with sound. Fossils like Permostriligus, discovered in the south of France, hint at early cricket-like creatures creating noises amid flowering plants.
150 million years ago, insects diversified alongside plants, weaving a symphony of life.
Birds, lacking the complex sound-making structure called the syrinx at first, eventually evolved it, becoming the first true singers.
Mammals inherited the larynx from reptiles. Evolution of lactation and suckling shaped mammalian jaws, enabling vocalization.
Somewhere down the line, great apes emerged. But unlike chimpanzees who learn by observation, humans learned by vocal learning, possibly inherited from the bird's genetic imprint.

Even frogs in New Zealand, branched away from other frogs for 200 million years, once sang before silence took over.
500,000 years ago, our ancestors started making deliberate sounds, and 40,000 years ago, the first musical instrument was carved in Germany.
The spiny lobster even makes squicking sounds today with its antennae, another reminder that the need to express, to communicate, spans across species and epochs.
Charles Darwin, a titan of biology, still carried cultural biases.
He couldn't fully escape the limitations of his era, questioning the intellectual capacity of women.
Yet today, science acknowledges that female choice significantly shapes male evolution, turning Darwin's original theories richer, more complex, and more inclusive.
DNA fingerprinting and genetic studies reveal stories Darwin never could have imagined.
Ironically, Darwin himself married his first cousin, despite studying and warning against the negative impacts of inbreeding.
Looking at ancient life through a scientific lens changed my relationship with time itself.
Tyrannosaurus rex is closer to us today than to Brontosaurus.
Velociraptors weren't scaly beasts but feathered creatures, and the Bumblebee Hummingbird is a living dinosaur descendant.
Gigantic dinosaurs once spanned the skies and earth, some reaching sizes comparable to airplanes.
The line between monsters of the past and creatures of today blurred, and my awe deepened.
Life under the oceans offered another jolt.
Around 3.5 billion years ago, algae evolved in oceans with no oxygen, constantly bombarded by UV radiation.
To survive, they developed protective, slimy coatings and eventually, photosynthesis, an act

that flooded the atmosphere with oxygen and changed the course of evolution forever.
Today, 600 feet of ocean is layered with algae.
Seaweed provides nutrients, but when algae grow uncontrollably in ponds, algal blooms, they choke ecosystems and create dead zones, suffocating aquatic life.
Mosses evolved from algae, and lichens formed symbiotic bonds with them.
Even inside animals, algae find homes: three-toed sloths grow algae in their fur and even feed on it.
On land, ruminant animals like cows produce greenhouse gases such as methane.
But nature offers solutions too.
Asparagopsis taxiformis, a pink seaweed, can interrupt methane production when fed to cattle, hinting at ways to combat climate change using biology.
Sometimes, algae even blooms in snow.
In Antarctica, "watermelon snow" stained pink by the pigment astaxanthin, spreads across warming ice fields.
And deep within coral reefs, zooxanthellae (coral algae) turn sunlight into sugar, creating the breathtaking colors of coral gardens.
Life, death, rebirth - all interconnected cycles.
Science revealed to me creatures that defy death itself.
Turritopsis dohrnii, the "immortal jellyfish," can revert its cells to earlier stages of life, essentially starting over.
It doesn't just survive. It resets.
And science also unmasked the hidden contradictions in great minds.
Darwin's marriage to his cousin after writing extensively about the perils of inbreeding reminds me that humans, even the brilliant ones, are deeply flawed.
Today, my mind doesn't just wander. It spirals through molecules, stars, ancient oceans, bird songs, blooming algae, immortal jellies, and the distant echoes of the Big Bang.
Science didn't strip the magic away.
It gave me a backstage pass to the universe.
It made me realize that life isn't about easy answers. It's about sitting inside the chaos and complexity, and still finding wonder.
It's about knowing that in every meal, in every sunset, in every heartbeat, ancient secrets hum quietly beneath the surface.
And somehow, that feels more magical than anything I could have ever imagined.

**BazaruSadhbhavana**
**BSc.Bt.M.C III**

# *The Silent Transformation: How Biology Awakens the Soul*

Studying science, especially biology, has a way of quietly reshaping how you see the world. At first, it feels like you're just learning facts: the parts of a cell, the stages of evolution, how ecosystems work. But over time, without even realizing it, your entire way of thinking about life, nature, and even yourself begins to shift.

Where once you might have seen a tree as just a piece of scenery, now you see a living organism carrying out an ancient and beautiful process. You understand that inside each leaf, millions of microscopic reactions are happening every second — pulling in sunlight, producing oxygen, and fueling life not just for the tree, but for all creatures around it, including you. A simple blade of grass becomes part of a vast system of interactions, a piece of a much larger story that stretches across continents and back through millions of years of evolution.

Biology teaches you that life is deeply interconnected. No living thing survives entirely on its own. The flowers need bees; the bees need flowers. Wolves shape the rivers by controlling the deer population. Tiny bacteria in the soil make it possible for plants to grow. Even humans, who often act like we're separate from nature, are completely dependent on it — for our food, our water, even the air we breathe. Studying science makes you realize how fragile these connections are and how much damage can happen when even one small part of the web is disturbed. You begin to feel a deeper sense of responsibility, a kind of quiet respect for the complexity and balance that keeps everything alive.

Another powerful change that comes from studying science is how it transforms your approach to knowledge itself. You stop taking things at face value. You become more curious, more questioning. You learn to ask, "How do we know this?" instead of just accepting what you're told. You begin to appreciate the importance of evidence, observation, and open-mindedness. In a world full of quick opinions and misinformation, this way of thinking becomes incredibly valuable. It makes you patient with uncertainty and comfortable with complexity, because you know that real understanding often takes time, and sometimes there are no simple answers.

What might surprise many people is that studying biology doesn't take away the magic of the world — it actually deepens it. When you learn about how the human heart beats, about how neurons fire to create thought and memory, or about how a single fertilized egg can grow into a human being, you don't feel like life is mechanical or boring. You feel awe. You see miracles not as things that defy explanation, but as things that are so beautifully and perfectly complex that they inspire even more wonder. Every living thing becomes a kind of miracle — not because we don't understand it, but because understanding it reveals just how extraordinary it truly is.

Science also teaches humility. The more you learn, the more you realize how much remains unknown. Even today, with all our technology and discoveries, there are vast mysteries left in the ocean, in the human brain, and in the deep past of life on Earth. This sense of mystery doesn't frustrate you — it invites you. It reminds you that curiosity is endless and that being part of life's story means being part of an ongoing adventure of discovery.

In the end, studying science and biology doesn't just fill your head with information. It gives you new eyes. It changes your relationship with the world around you. It makes you notice, wonder, question, and care. It makes you part of something bigger than yourself — part of a living, breathing planet that is far more complex and beautiful than it seems at first glance. And perhaps most importantly, it teaches you that learning never really ends. The more you see, the more you realize there's always more to discover.

**Bhuvaneshwari**
**BSc. BtGC III**

# *The Development of the First Synthetic Bacteria*

## *Life by Design*

Imagine a world in which we could modify lines of code to build completely new things, much the way we can with software. Although it might sound like science fiction, this idea was realized in 2010 by J. Craig Venter and his colleagues at the J. Craig Venter Institute (JCVI). They produced Mycoplasma mycoides JCVI-syn1.0, or Syn 1.0, the first synthetic bacterium in history. Scientists demonstrated that life itself could not only be comprehended but also created from scratch when they were able to successfully create a living entity with a completely synthetic genome for the first time. Although it may seem like something from a Frankenstein book, creating life from nothing actually required years of meticulous preparation and advanced scientific methods. Following are the steps which contributed to this remarkable accomplishment:

**DNA Mapping:** Mycoplasma mycoides, a bacterium with a very basic genetic coding, was the first organism whose genome was mapped. To figure out the biological recepie that allowed it to function as a living being, the scientists examined its genetic material. Developing the Code: Venter's group took the innovative step of creating the DNA from scratch rather than only altering pre-existing genes. They created a 1.08 million base pair synthetic genome using a computer model. After that, real genetic code was created from this digital blueprint.

**DNA transplantation:** After the synthetic genome was prepared, it was introduced into a bacterial cell whose natural genome had been eliminated. Upon its introduction, the synthetic DNA took over the operations of the cell, transforming it into a self-replicating creature with a completely synthetic genetic framework.

Replication Success: The bacterium's ability to replicate served as a crucial test, demonstrating that the synthetic genome was both functional and able to support life. The group had used digital code to create life itself.

**The Possibility of Artificial Life**

The potential of synthetic biology has fundamentally changed as a result of this discovery. Scientists can now create new creatures with certain functions rather than only altering already existing ones. Addressing urgent environmental issues like decomposing pollutants, cleaning up oil spills, or repairing damaged ecosystems could be accomplished with specially created microorganisms. Therapeutic proteins could be produced on-demand by synthetic organisms in the medical industry, increasing the accessibility and efficiency of medication manufacture.

Furthermore, artificial organisms might serve as environmental agents by detoxifying contaminants, absorbing carbon dioxide, or aiding in the rehabilitation of ecosystems. However, there are significant ecological and ethical issues with such advancements.

We must consider whether we should create living forms when we develop the ability to do so. Could unexpected harm result from these artificial organisms escaping into the wild? Will these organisms exhibit unexpected behaviors or perhaps consciousness as their complexity increases?

Handling the Dangers

Although the development of synthetic life offers enormous potential, there are also serious concerns involved:

Ecological Impact: Unpredictable consequences may arise from introducing artificial species into natural ecosystems. These organisms could displace native species, spread illnesses, or cause ecological imbalances if they are allowed to roam free. We do not yet know the long- term effects.

Threats to Biosecurity: This field is susceptible to abuse, including the production of artificial creatures for malevolent ends. This calls into question biosecurity and the necessity of strict regulation and oversight to stop destructive uses like biological warfare.

Unpredictability: Life is incredibly complex, even synthetic life. Even though Syn 1.0 was a huge success, we still don't fully understand how synthetic creatures behave in the long run. As a result, the possibility of unintended consequences is still a serious concern.

**A Sneak Peek at the Future**

Industries could be revolutionized by synthetic biology. Organisms created by bioengineering could be used to create food, pharmaceuticals, biofuels, and biodegradable polymers. These developments could change the way we think about manufacturing and resource management by making industries more ecologically friendly and sustainable.

Synthetic organisms may be essential to space exploration. Consider microbes that have been modified to create food, oxygen, or other essential resources for astronauts going to Mars or beyond. Long-term human life in space might become possible as a result. The opportunities in medicine are just as fascinating. Engineers may design germs that administer customized medications, heal injured tissues, or track medical problems in real time. There is enormous potential for medical advancements, especially in the field of regenerative medicine.

Even though Syn 1.0 was a rather primitive organism, more sophisticated life forms with numerous roles may be the focus of future research. These might include creatures made to endure harsh conditions, both on Earth and in space, ultimately stretching the limits of what is possible for life.

In conclusion, Syn 1.0, developed by J. Craig Venter, is not only a significant scientific advance but also a glimpse into a future in which life itself is designed.

The possibilities are endless as we continue to investigate synthetic biology's enormous potential. However, these potentials also present security, ethical, and environmental issues that need to be resolved. Being able to produce life brings with it both great potential and significant responsibilities. We must proceed cautiously as we go forward, carefully weighing the risks and rewards.

**Jaanvi Dayal**
**BSc.BtGC III**

# *From Fiction to Foundation:*
## *The Real Magic of Genetics*

In silver screens and bright screen's light,
Genes mutate in a single night.
A spider's bite, a laser beam,
Unleashes powers from a dream.
They leap into DNA with magic ease,
Cure every ailment, every disease.
A serum glows, a clone awakes,
No ethics board, no small mistakes.
But step inside a real-life lab,
No glowing tubes, no flashy powers,
Just microscopes and rows of flies.
And patient minds with searching eyes.
Where data hums and cells divide,
And answers take their time to rise.
A single gene...a world to know,
Through silent steps and steady flow.
No heroes born from DNA,
But children saved, diseases held at bay.
No mutant powers, no instant fame...
But lives rebuilt, and hope reclaimed.
So dream with sci-fi, let it spark,
But honor too the quiet hardwork in labs,
Of real discovery, inch by inch,
Where every fact is earned, but not caught in fantasy.
The future's shaped not in a flash,
But with every question that we ask.
So hold your pipette, wear your coat,
You're writing science, note by note.

**Chinmai Varada**
**BSc.BtGC III**

# Beyond *the* BOOKS

BEYOND THE BOOKS DIVES INTO STUDENT REVIEWS OF SCIENTIFIC BOOKS AND ARTICLES, BRIDGING ACADEMIC KNOWLEDGE WITH REAL-WORLD INSIGHTS.

# VALUE ADDED COURSE (2024-25)

## Resource Persons

Dr. S. Padma
HEAD, Dept. of Biochemistry & Nutrition

Dr.S. Vanita
Asst. Prof, Dept. of Biochemistry & Nutrition

Dr. S. Manju Devi
Asst. Prof, Dept. of Biochemistry & Nutrition

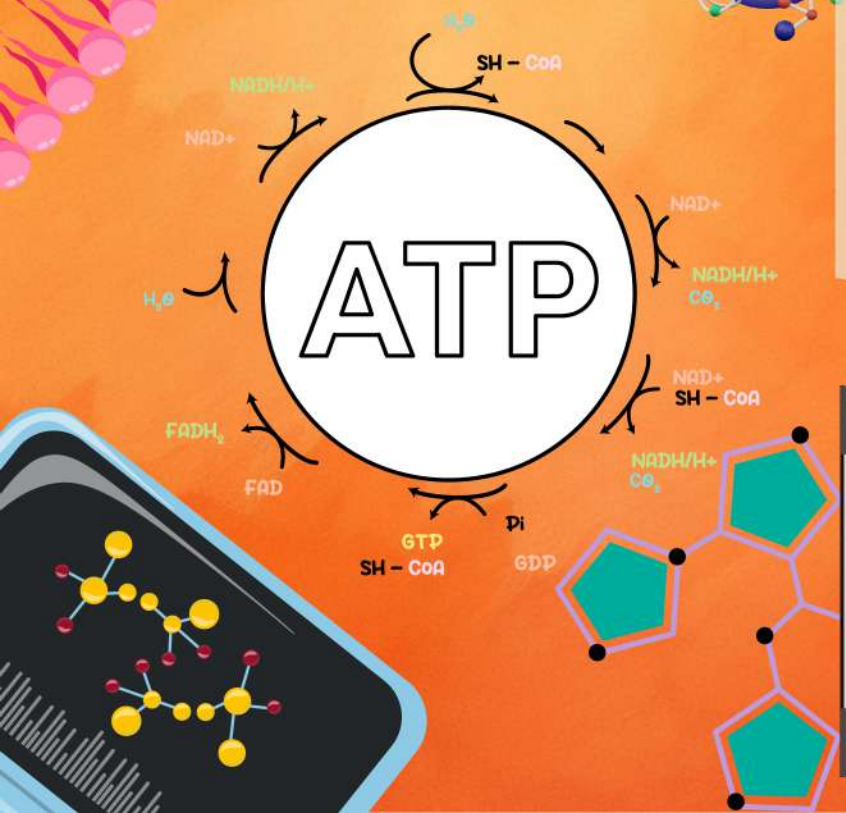
Dr. G. Kamala
Asst. Prof, Dept. of Biochemistry & Nutrition

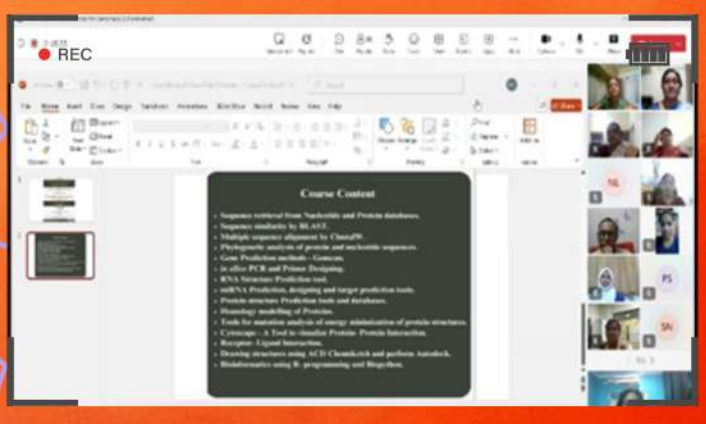
Dr. Bipin Singh
Asst. Prof, Mahindra University

## Department of Biochemistry & Nutrition

The Department of Biochemistry & Nutrition, Bhavan's Vivekananda College (BVC), conducted a 30-hour online value-added course on "Bioinformatics Tools for Genomics and Proteomics Study" from 20th January to 5th February 2025. A total of 57 participants, including undergraduate and postgraduate students, research scholars, and faculty members from 18 institutions, attended the course. The program was inaugurated by Dr. G.S.V.R.K. Choudary and Dr. S. Padma.

The course offered comprehensive training on key bioinformatics tools such as NCBI, BLAST, GENSCAN, CLUSTALW, RNA structure prediction, and in silico PCR. Practical sessions further enriched the learning experience with hands-on training in protein structure prediction, Cytoscape, STRING, Chem Sketch, AutoDock, Galaxy, and Biopython. A major highlight of the course was a guest lecture by Dr. Bipin Singh on "AI and ML in Drug Discovery and Protein Design," which provided participants with insights into cutting-edge developments in the field. Overall, the course delivered a rich, practical learning experience, equipping participants with valuable bioinformatics skills.



# VALUE ADDED COURSE (2024-25)

## Department of Microbiology

The Department of Microbiology organized a value-added course titled "Artificial Intelligence in Biology and Its Applications" from 9th to 28th December 2024.

This 30-hour course, open to undergraduate, postgraduate, and research scholars from biology-related disciplines, was coordinated by Dr. K. Anuradha, Dr. Y. Aparna, and Dr. T. Chaitanya. The course seamlessly integrated theoretical knowledge with hands-on learning in areas such as AI in medicine, genomics, and ethical considerations in AI applications.

Participants worked on capstone projects that demonstrated the practical use of AI tools in biological research. The course received positive feedback for its interactive format and insightful sessions, equipping students with valuable knowledge in the emerging field of AI-driven biology.

## Resource Persons

Dr. K. Anuradha
HEAD, Dept. of Microbiology

Dr. S. Padma
HEAD, Dept. of Biochemistry & Nutrition

Dr.S. Anju
Asst. Prof, Dept. of Microbiology

Dr. Y. Aparna
Asst. Prof, Dept. of Microbiology

Dr. S. Shalini Devi
Asst. Prof, Dept. of Microbiology

Dr. T. Chaitanya
Asst. Prof, Dept. of Microbiology

Dr. K. Deepak Raj
Asst. Prof, Dept. of Microbiology

Dr. K. Mahalakshmi
Asst. Prof, Dept. of Microbiology

Dr. G. Mahesh Kumar
Asst. Prof, Dept. of Computer Science

Dr. S. Jayalakshmi
Asst. Prof, Dept. of Computer Science

Dr. P. Rajini
Asst. Prof, Dept. of Mathematics & Statistics

Dr. K. Suvarchala Rani
Asst. Prof, Dept. of Management Studies

# Field trip to EPTRI


Third-year B.Sc. students from Bt.G.C and Mb.G.C visited the Environment Protection Training and Research Institute (EPTRI) as part of an educational tour organized by the Department of Genetics and Biotechnology. The visit aimed at deepening their understanding of environmental protection and ongoing research initiatives.

This hands-on experience provided students with practical learning opportunities beyond their regular curriculum, exposing them to the development and implementation of sustainable practices. Interactions with experts offered valuable perspectives on current environmental challenges and innovative solutions.

The visit ultimately fostered a greater appreciation for environmental sustainability and inspired students to think critically about their role in promoting a greener future.

# Field trip to Raaga Foundation

Third-year B.Sc. Bt.G.C students embarked on a field trip to The Raaga Foundation in Annaram, Hyderabad, organized by the Department of Genetics and Biotechnology. They gained direct exposure to the foundation's grassroots initiatives.

During the visit, students observed the foundation's efforts in environmental conservation and learned about the impactful social projects being carried out. This hands-on experience complemented their academic learning by providing real-world examples of how environmental and social causes can be effectively integrated. The field trip aimed to inspire and educate the students, offering them a holistic perspective on sustainability and social responsibility.


# Industrial Visit


An industrial visit to Crown Beers India Pvt. Ltd. was organized by the Department of Microbiology, BVC, on 6th January 2025 for 3rd-year Mb.G.C and Bt.Mb.C students. Accompanied by Dr. S. Shalini Devi and Dr. K. Mahalakshmi, the visit aimed to bridge classroom knowledge with industry practices. Students explored every stage of the beer manufacturing process and interacted with experts on brewing, quality control, and packaging. The visit offered valuable real-world insights and deepened their understanding of the beverage industry.

# VISIT TO ANGANWADI

The Department of Biochemistry & Nutrition organized a visit to Anganwadi, Nirmal Nagar, Sainikpuri, for third-year B.Sc. BCNDC students. During the visit, students examined the charts, equipment, and records maintained at the center, gaining insight into the nutritional services provided. They had the opportunity to observe the quality of the nutritious food distributed to vulnerable groups, including pregnant and lactating women, infants, and children under six years of age. Students also calculated the Body Mass Index (BMI) of children using height (stadiometer) and weight (weighing scale) measurements. The data was then used to plot growth patterns and assess children's nutritional status. The overall experience was highly informative and practical, helping students understand the significance of anthropometric measurements in evaluating nutrition. A total of 22 B.Sc. students attended the visit, which was accompanied by Assistant Professor-Mrs. V. Revathi.


# VISIT TO RK MUTT


Second-year B.SC. Life Sciences students attended an orientation program at Ramakrishna Math, Hyderabad, on 4th December 2024.

The program focused on enhancing students' physical, mental, and spiritual well-being. It began with a session by Swamy Bodhmayananda, who introduced the rich legacy and service-oriented activities of the Ramakrishna Math. Students visited the Divine Shrine and were guided around the campus by dedicated volunteers. Dr. Vivek Modi led a session on prioritization and wellness, offering practical insights on maintaining balance in life. Students also participated in serving food during the Anna Prasadam, further engaging with the community. The final session, conducted by Mr. B.S.N. Murthy, was an insightful talk on psychology and life skills, making the overall experience both enriching and transformative.

# YASHODA HOSPITAL VISIT

On January 2nd, 2025, final-year BCNDC students visited Yashoda Hospital, Secunderabad, for an enriching educational experience. A group of 24 students, accompanied by lecturer- Mrs. Revathi V, gained practical insights into the field of clinical nutrition.

During the visit, Mrs. Swetha A., the Chief Dietician, shared valuable information about the roles, responsibilities, and challenges faced by dietitians. Students were given the opportunity to tour the hospital kitchen, cafeteria, and various wards, including oncology, post-surgical, and dialysis units. They observed food quality, quantity control, and learned about special feeding methods tailored to patients' needs. The visit provided highly informative, hands-on experience that enhanced students' understanding of real-world dietetics and its application in clinical settings.

# WORKSHOP IOG- CELL CULTURE


The Department of Biochemistry & Nutrition, in collaboration with IGHGD, organized a three-day workshop on “Cell Culture Techniques” from 5th to 7th February 2025. Aimed at B. Sc students, the workshop blended theory with practical lab sessions on cell culture, types of media and cryopreservation. Experts demonstrated staining, counting, and FISH techniques, with hands-on training for all participants. The workshop enhanced students' research skills, and certificates were awarded upon completion.

# POSTER PRESENTATION

Winning the first prize for our Poster presentation on "AI in Microbiology" at Shiv Chhatrapati College in Maharashtra was an unforgettable and exhilarating milestone in my academic journey. When our name was announced as the winners, a wave of excitement, gratitude, and intense accomplishment washed over us, making all the countless hours spent researching complex concepts, drafting and redrafting our paper, and meticulously rehearsing the presentation--felt deeply worthwhile. The journey had not been easy—immersing ourselves in the intersection of Artificial Intelligence and microbiology demanded late nights of studying scientific journals, AI case studies, and emerging research to create a narrative that was both informative and visionary, highlighting how AI technologies like machine learning, neural networks, and predictive models could revolutionize the study and combat of microbial life.



During the presentation, we felt a strong sense of focus and connection with the audience as we illustrated how AI could advance diagnostics, treatment strategies, drug discovery, and predictive analysis of microbial behavior, and their growing engagement fueled our enthusiasm even further. However, what made the experience truly enriching, was the insightful discussion that followed, where the esteemed judges challenged us with thought-provoking questions about ethical concerns, data privacy, and practical limitations, pushing us to think even more critically about real-world applications. Interactions with the audience, including students, faculty, and fellow participants, turned the event into a vibrant exchange of ideas rather than just a competition, affirming the vast potential of AI in microbiology. While winning was a proud moment, the experience reaffirmed our passion for this interdisciplinary field and strengthened our resolve to contribute meaningfully to it through further research studies, and innovations. In retrospect, the event was more than just an achievement; it was a celebration of ideas, a validation of our hard work, and a stepping stone toward a future that we are deeply passionate about.

V.SESHI DEEPAK,
YEDURLA VENKATA TANISHQ
B.Sc Bt.Mb.C 3

# IICT WORKSHOP (ISBS-2025)

## Innovative and Sustainable Business Strategies for Science and Technology (ISBS-2025)



Attending the Workshop on Innovative and Sustainable Business Strategies for Science and Technology (ISBS-2025) was an incredibly rewarding and transformative experience for us. The workshop offered a comprehensive overview of how science and technology can be effectively integrated into sustainable business practices, highlighting the urgent need for innovation-driven, yet, environmentally conscious solutions in today's rapidly evolving world. Through a series of engaging lectures, panel discussions, and interactive sessions led by industry experts, entrepreneurs, and academicians, we gained valuable insights into emerging trends, challenges, and opportunities at the intersection of business, science, and sustainability. One of the key takeaways from the workshop was the importance of adopting a holistic approach towards business strategy—one that not only focuses on profitability but also considers long-term environmental and societal impacts. The sessions on technological innovation, ethical entrepreneurship, circular economy models, and digital transformation were particularly enlightening, offering practical frameworks and real-world examples of successful sustainable ventures. We also had the opportunity to participate in group activities and case study analyses, which encouraged critical thinking, creativity, and collaboration, helping us apply theoretical knowledge to practical scenarios. Another highlight of ISBS-2025 was the vibrant networking environment. Interacting with a diverse group of participants—students, researchers, business leaders, and sustainability advocates—broadened our perspective and sparked meaningful conversations about the future of business and technology. These exchanges not only deepened our understanding of the subject matter but also inspired new ideas for research and potential future projects.

V.SESHI DEEPAK,
YEDURLA VENKATA TANISHQ
B.Sc Bt.Mb.C 3

# SCI CONNECT, @ St. Mary's College

Participating in the SCIconnect competitions at St. Mary's College, Yousufguda, was truly a transformative and enriching experience. The atmosphere throughout the event was charged with energy, curiosity, and a spirit of innovation, as students from a wide range of disciplines came together to celebrate their passion for science and technology. Being amidst such a vibrant gathering of talented individuals was both inspiring and motivating, offering a unique opportunity for us to witness the creativity and depth of thought emerging from diverse academic backgrounds. The competition provided a valuable platform for us to showcase our understanding of scientific concepts and apply them in a dynamic, real-world context. Preparing our submissions demanded not just academic knowledge, but also creativity, critical thinking, and effective communication skills. It challenged us to break down complex scientific ideas into accessible and engaging formats, which, in turn, deepened our own understanding of the subjects we presented.

One of the most rewarding aspects of the experience was interacting with fellow participants and judges, all of whom brought different perspectives, experiences, and expertise to the table. Observing the wide variety of innovative projects and presentations broadened our horizons significantly, allowing us to appreciate the power of interdisciplinary collaboration in scientific exploration.


V.Seshi Deepak ,Y. V Tanishq
Sadhbhavana ,Nihal
K.Prakruti, Anirban Dash, Mirza Fareed
B.Sc. Bt.Mb.C, B.Sc. Mb.G.C. 3

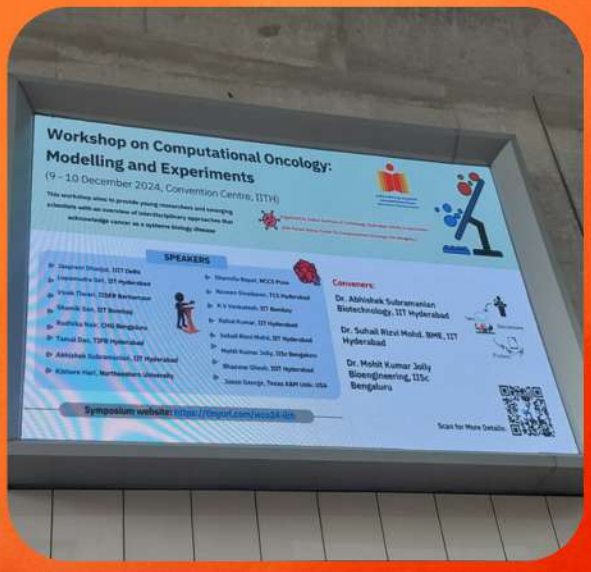
The discussions that followed each presentation were particularly enlightening, as they encouraged critical analysis, constructive feedback, and the sharing of ideas that extended well beyond the boundaries of individual disciplines.

Although we did not win an award, the experience itself was far more valuable than any prize. It taught us the importance of perseverance, adaptability, and open-mindedness when working within a competitive and intellectually stimulating environment. The challenges we encountered pushed us to think quickly, refine our problem-solving skills, and communicate effectively under pressure—all essential qualities for any aspiring scientists or researchers.

Overall, participating in SCI connect at St. Mary's College has had a profound impact on our academic journey. It reinforced our passion for scientific inquiry, emphasized the significance of collaboration across disciplines, and inspired us to continue seeking opportunities for growth, innovation, and meaningful contribution to the scientific community. We are grateful for the experience and look forward to applying the lessons learned in our future endeavors.

# Workshop on Computational Oncology: Modelling and Experimental @ IIT Hyd

Two Days That Changed Everything Workshop on Computational Oncology: Modelling and Experimental (9–10 December, 2024), Jointly organised by IIT Hyderabad and the Param Hamsa Center for Computational Oncology If you had asked me why I signed up for this workshop at first, I would've probably said, "Well, we get to stay at IIT Hyderabad for two days!" But little did I know that those two days would shift something within me, something big. I've been passionate about cancer research for a while now, but this experience helped me understand why. Why I need to pursue it, why it's important, and why every bit of effort will be worth it. The workshop pushed me to think beyond the obvious, to ask strange and fascinating questions. What does it mean to be a Hodgkin lymphoma cell? Why does a normal cell feel the need to rewrite its destiny? The speakers with brilliant minds like Dr. Vivek Tiwari (AI in Gliomas and Brain Metastasis), Dr. Radhika Nair (Intratumoral Heterogeneity in Metastasis), and Dr. Lopamudra Giri (Quantitative Microscopy and ML in Cancer) weren't just presenting facts. They were sharing stories, challenges, ideas, and most importantly, perspectives that left me wondering and inspired. Being an undergraduate surrounded by PhD scholars, postdoctorates, and lifelong researchers made me feel both small and infinite at once. It reminded me that sometimes, it's not about finding the answers. It's about daring to ask the right questions. And maybe, just maybe those two days were the beginning of something far greater.




Bazaru Sadhbhavana,
Makkuva Abhilaya
B.Sc BT.Mb.C 3,
B.Sc BT.G.C 3

# MICROMANIA, @ St. Pious College




Stepping into St. Pious College's Micromania, the energy surrounding the meme and video-making competitions is immediately infectious. The meme competition space buzzes with digital wit, screens flashing with clever image-caption combinations and absurd humor, eliciting bursts of laughter and knowing nods from the engaged audience. Presenters guide the showcase, highlighting particularly brilliant entries that spark both admiration and perhaps a touch of competitive spirit. Moving to the video-making area, a more focused atmosphere prevails as diverse short films, skits, and montages captivate viewers. From polished productions to raw DIY creations, the storytelling prowess and imaginative execution on display are truly impressive, fostering a sense of appreciation for the varied talents within the college community.

Throughout the event, a strong sense of camaraderie flourishes as participants connect over shared comedic sensibilities and filmmaking passions, exchanging tips and appreciating each other's creative efforts. Judges offer valuable feedback, fostering growth and learning. Participating in these competitions at Mictomania offers a vibrant platform to unleash creativity, test skills, and celebrate digital storytelling and humor. Whether a seasoned meme enthusiast or a budding filmmaker, the experience promises to be engaging and rewarding, potentially leaving you with new ideas, memorable laughs, and perhaps even the sweet taste of victory.

V.Seshi Deepak
Y.V.Tanishq
K.Mahesh
B.Sc BT.Mb.C 3

# RECOGNITION AS BEST STUDENTS BY MICROBIOLOGISTS SOCIETY, INDIA

It was truly an exhilarating moment for us to be recognized by the Microbiologists Society India with the Best Student Award on National Science Day. The feeling of accomplishment washed over us as we stood there, a culmination of a year filled with passion and dedication to the field of microbiology. Looking back, the journey to this recognition was incredibly enriching for us. Spearheading and actively participating in 7-10 events throughout the year provided invaluable hands-on experience that went far beyond the classroom. Organizing seminars allowed us to connect with leading researchers and gain insights into cutting-edge advancements. Coordinating workshops honed our leadership and teamwork skills, as we collaborated to create engaging learning opportunities for fellow students. Presenting research findings at student symposia sharpened our communication abilities and fostered a deeper understanding of our own work.

Each event, from awareness campaigns to lab skills training, contributed to a vibrant and intellectually stimulating environment within our department. Witnessing the enthusiasm and engagement of our peers was incredibly rewarding and fueled our own drive to contribute meaningfully to the microbiological community. Receiving the award on National Science Day added a special significance to the honor for us. It felt like a validation of the importance of scientific inquiry and the impact that dedicated individuals can have on advancing knowledge. This recognition has not only boosted our confidence but has also inspired us to pursue our passion for microbiology with even greater zeal. It serves as a powerful reminder of the impact of hard work, collaboration, and a genuine love for the subject. We are deeply grateful to the Microbiologists Society India and our department for this incredible honor, which will undoubtedly serve as a guiding light in our future endeavors.





V.Seshi Deepak, Y.V.Tanishq
K.Mahesh, Anirban Dash
B.Sc BT.Mb.C, B.Sc. Mb.G.C. 3

# PAPER PRESENTATION IN INTERNATIONAL SEMINAR, MAPUSA, GOA




From 23-24 January 2025, we had the amazing opportunity to present our research paper titled "Comparative Study on Green Synthesis of Silver, Iron, and Copper Nanoparticles, Their Characterization, and Antibacterial Activity" at the International Seminar on Exploring New Frontiers in Biosciences at St. Xavier's College, Mapusa, Goa along with our professor Dr.T. Chaitanya. It was an exciting experience to not just share our work, but also to listen to inspiring discussions from experts across different fields like microbiology, nanotechnology, and environmental sciences.

One highlight of the trip was attending a talk by Professor Momna Hejmadi, Associate Pro-Vice-Chancellor (Education Quality & Enhancement) at the University of Bath. Her passionate words about the beauty and importance of scientific discovery really stayed with us, reminding us why we chose this path in the first place.

Along with all the learning, we soaked in Goa's energy — the peaceful views at Dona Paula Jetty, the vibrant atmosphere of Panjim Beach, and the timeless charm of Old Goa. The seminar gave us new ideas to think about, while Goa's spirit gave us memories to carry forward.

Yedurla Venkata Tanishq
Bazaru Sadhbhavana
B.Sc BT.Mb.C 3

# PUBLICATIONS

## PAPER PUBLICATIONS

Comparative Study of the Synthesis of Silver, Copper, and Iron oxide Nanoparticles via Chemical and Green Methods Using Corn Bract for Enhanced Antibacterial Activity


South Asian Journal of Experimental Biology

CURRENT ARCHIVES ABOUT ANNOUNCEMENTS ACCEPTED ARTICLES MAKE A SUBMISSION

HOME / ARCHIVES / VOL. 14 NO. 3 (2024) / Research Articles

**Comparative Study of the Synthesis of Silver, Copper, and Iron oxide Nanoparticles via Chemical and Green Methods Using Corn Bract for Enhanced Antibacterial Activity**

B. Sadhbhavana
Y.V. Tanishq
Isha Deep
K. Deepak Raj
Chaitanya Kumari Samala
Osmania University

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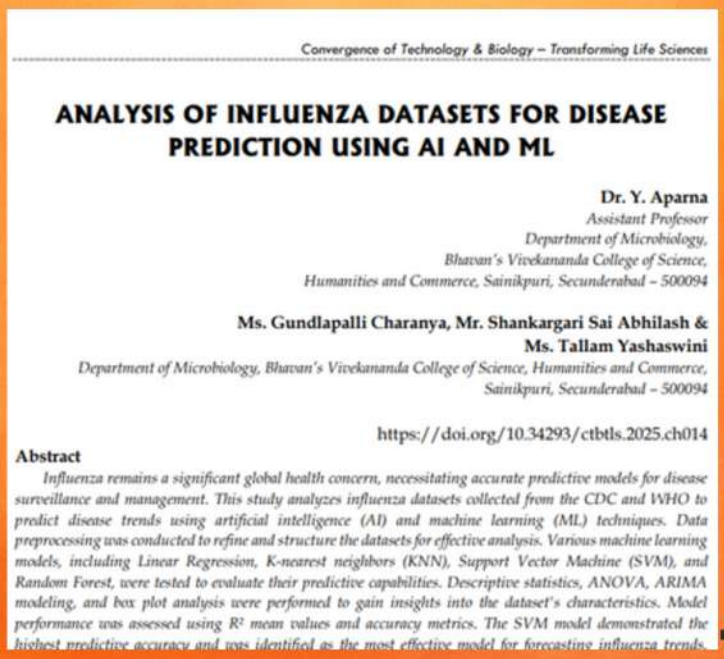
Dr. T. Chaitanya, Dr .K. Deepak Raj
Asst.Prof's. Dept of Microbiology

Analysis of Influenza Datasets Using AI and ML


*Convergence of Technology & Biology – Transforming Life Sciences*

**ANALYSIS OF INFLUENZA DATASETS FOR DISEASE PREDICTION USING AI AND ML**

**Dr. Y. Aparna**
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*Humanities and Commerce, Sainikpuri, Secunderabad – 500094*

**Ms. Gundlapalli Charanya, Mr. Shankargari Sai Abhilash & Ms. Tallam Yashaswini**
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https://doi.org/10.34293/ctbtls.2025.ch014

**Abstract**

*Influenza remains a significant global health concern, necessitating accurate predictive models for disease surveillance and management. This study analyzes influenza datasets collected from the CDC and WHO to predict disease trends using artificial intelligence (AI) and machine learning (ML) techniques. Data preprocessing was conducted to refine and structure the datasets for effective analysis. Various machine learning models, including Linear Regression, K-nearest neighbors (KNN), Support Vector Machine (SVM), and Random Forest, were tested to evaluate their predictive capabilities. Descriptive statistics, ANOVA, ARIMA modeling, and box plot analysis were performed to gain insights into the dataset's characteristics. Model performance was assessed using $R^2$ mean values and accuracy metrics. The SVM model demonstrated the highest predictive accuracy and was identified as the most effective model for forecasting influenza trends.*

G.Charanya, S. Sai Abhilash,
T.Yashaswini
B.Sc Bt.Mb.C 3
Dr. Y. Aparna
Asst. Prof.Dept of Microbiology

# PAPER PUBLICATIONS

*Convergence of Technology & Biology – Transforming Life Sciences*

## CALLUS INDUCTION AND CHARACTERIZATION IN *ORYZA SATIVA INDICA*

**Ms. Jaanvi Dayal & Ms. Velamanchi Vaishnavi**
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https://doi.org/10.34293/ctbtls.2025.ch001

**Abstract**

*In rice tissue culture, optimizing plant growth regulators (PGRs) is crucial for effective callus induction. The present study investigates the induction of rice callus in Murashige and Skoog (MS) media supplemented with varying concentrations of 6-Benzylaminopurine (BAP) and Indole-3-acetic acid (IAA), namely, in concentrations of 3:1 ratio, 2:1 ratio and 1:1 ratio respectively. The goal was to identify the most effective PGR combination and concentration that promotes optimal callus growth. Callus fresh and dry weight were measured to assess the growth response under different conditions. Highest mean fresh weight of callus was obtained for 3:1 ratio of BAP to IAA (0.55 ± 0.38 gram). The present study provides valuable insights into optimizing rice tissue culture protocols for improved callus induction, offering potential applications in plant propagation and genetic improvement.*

***Keywords:*** *Rice tissue culture, Callus induction, Plant growth regulators (PGRs), 6-Benzylaminopurine (BAP), Indole-3-acetic acid (IAA)*

**Introduction**

Rice is a critical crop for India. It serves as the staple food for most of the population and supports the livelihoods of millions of rural households. India is one of the top five rice exporters globally, the second-largest producer after China, producing 175.58 million tonnes of rice. Asia accounts for 87% of the world's rice consumption (Bhandari Humnath, 2019).

Callus Induction and Characterization in Oryza Sativa Indica by Jaanvi Dayal,

Jaanvi Dayal, Velamanchi Vaishnavi
B.Sc Bt.G.C 3
Dr. Sushma Patkar
Asst Professor
Department of Genetics & Biotechnology

*Convergence of Technology & Biology – Transforming Life Sciences*

## PREPARATION OF CELLULOSE-BASED DEGRADABLE BIOPOLYMER USING PINEAPPLE WASTE

**Ms. Turaga Radha Prasannam & Ms. Gouda Manaswi**
*BtGC 3rd year*
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https://doi.org/10.34293/ctbtls.2025.ch006

**Abstract**

*The growing environmental challenges posed by plastic waste has prompted the search for sustainable alternatives that can reduce ecological impact. The present study explores the development of a biodegradable plastic from pineapple peel, an agricultural waste product that is often discarded. By utilizing the natural polysaccharides present in the peel, a strong and completely degradable biopolymer is created, offering a sustainable alternative to conventional plastics. The procedure incorporates glycerol as a plasticizer, enhancing the material's flexibility and durability. This approach not only addresses plastic pollution but also contributes to waste valorization, turning pineapple peel into a high-value product. The use of agricultural byproducts for bioplastic production offers a promising solution for environmental applications, mitigating plastic pollution and promoting sustainable materials for a healthier planet.*

***Keywords:*** *Bioplastic Polymer, Glycerol, Degradation, Environment, Waste Management*

**Introduction**

Plastics have become an integral part of modern life. They are widely used in daily activities, including packaging, cosmetics, pharmaceuticals, food, and brewing industries. The term plastic is derived from the word 'pliable,' meaning 'easily shaped.' Plastics can be reshaped based on their intended function. They are also referred to as polymers, which consist of long chains of monomers that bond together to form a polymer (Evode Niyitanga, et al., 2021). Due to their exceptional physical and chemical properties, plastics have become a widely used commodity globally, serving various industrial and commercial purposes. This growing demand has contributed to an increase in large-scale plastic production worldwide (Frienkel, Susan, 2020).

Preparation of Cellulose-Based Degradable Biopolymer using Pineapple Waste

Ms. Turaga Radha Prasannam & Ms. Gouda Manaswi
B.Sc Bt.G.C 3
Dr. Sushma Patkar
Asst. Professor
Department of Genetics & Biotechnology

# PAPER PUBLICATIONS

## Biofortification: A Solution to micro nutrient deficiency.

**Bio-fortification: A Solution to Micronutrient Deficiency**

Mrs. Bajjuri Sahithi and Mr. Neela Vamshi, Bhavans Vivekananda College, Sainikpuri, Sec'bad

**Abstract:**
Micronutrient deficiencies, often referred to as "hidden hunger," are a pervasive public health challenge, particularly in low- and middle-income countries where diets are dominated by staple crops with limited nutritional diversity. Bio-fortification, the enhancement of nutrient content in staple crops through conventional breeding, genetic modification, or agronomic practices, has emerged as a promising solution to address these deficiencies. This research paper evaluates the potential of bio-fortification to combat micronutrient deficiencies, focusing on key nutrients such as iron, zinc, and vitamin A, which are essential for immune function, cognitive development, and overall health. Through case studies of bio-fortified crops such as Golden Rice, zinc-enriched wheat, and iron-fortified beans, the paper examines their impact on nutritional outcomes in vulnerable populations. The research also explores the scalability of bio-fortification programs, their integration into existing agricultural systems, and their cost-effectiveness compared to other interventions like supplementation and fortification. Challenges, including regulatory hurdles, public acceptance, and accessibility in rural communities, are discussed, alongside strategies for overcoming these barriers. The findings highlight bio-fortification as a sustainable and scalable approach to reducing the global burden of micronutrient deficiencies, particularly in regions with limited access to diverse diets. By aligning agricultural innovation with public health goals, bio-fortification offers a pathway toward improved nutrition and food security. Future directions include enhancing bio-fortification technologies through advanced genetic editing, expanding crop varieties to meet regional needs, fostering global policy support, and integrating bio-fortified crops into climate-resilient agricultural systems.

Bajjuri Sahithi
Neela Vamshi
B.Sc Bt.Mb.C 2

## Nanotechnology and tissue Engineering:- Building the future of Regenerative Medicine

*Convergence of Technology & Biology – Transforming Life Sciences*

**NANOTECHNOLOGY AND TISSUE ENGINEERING: BUILDING THE FUTURE OF REGENERATIVE MEDICINE**

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https://doi.org/10.34298/ctbls.2025.ch024

**Abstract**
*Nanotechnology offers groundbreaking methods for medical diagnosis, treatment, tissue regeneration, and biomedical imaging. The small size of nanoparticles (1-100 nanometers) facilitates interaction with biological systems, improving the sensitivity and specificity of disease detection through enhanced imaging. Nanotechnology reshapes dentistry, improving diagnostics, treatment precision, and dental materials. Developing nanocomposites, nano-adhesives, and nano-bone grafts represents a significant advancement in dental materials. Nanorobots offer the potential for pain-free procedures and targeted drug delivery within the oral cavity. Nanostructured scaffolds used in tissue engineering mimic the extracellular matrix. It promotes cell growth and tissue regeneration. This technology plays a key role in improving the effective monitoring of bioelectric signals in cancer treatment using advanced sensors and electrodes. It revolutionizes surgery by enabling high-precision, minimally invasive procedures through nanorobotic technology. Organ-on-a-chip (OoC) systems offer an innovative and versatile micro-physiological platform for replicating the dynamic tissue microenvironment, enabling the study of nanotechnology-biology interactions. Researchers are using models that combine nanotechnology, microfluidics, and tissue engineering to mimic the complex dynamics of musculoskeletal tissues in a controlled manner. This allows them to effectively study disease mechanisms and assess therapeutic approaches, such as nanotechnology-based interventions. Scientists are leveraging the integration of nanotechnology with other technologies like tissue engineering to achieve targeted drug delivery, precise sensing, and versatile manipulation of cellular processes, driving a paradigm shift in research at the cellular level and early disease diagnosis and possible prognosis. Nevertheless, resolving safety and bioaccumulation issues is a prerequisite for its broader clinical translation.*

***Keywords:*** *Cancer, Dentistry, Musculoskeletal, Nanotechnology, Tissue engineering, Organs-on-a-chip*

**1. Introduction**

Disease and injuries caused due to multiple reasons has resulted in either tissue damage or organ loss. To prevent the tedious process of transplantation, researchers and scientists have developed innovative therapies that can regenerate the damaged tissues or organs. The novel interdisciplinary field is regenerative medicine that applies the basic principles of life sciences with engineering to regenerate and restore the normal tissues or organs from its diseased or injured state (Mao & Mooney, 2015) [Fig 1].



Vamika Anil, S. Prerana
B.Sc Bc. N&D.C 3

# PAPER PUBLICATIONS

"Revolutionizing Health Care In-Silico Vaccine Designing"

Anirban Dash, Mirza Fareedulla Baig
B.Sc. Mb.G.C 3

*Convergence of Technology & Biology – Transforming Life Sciences*

**REVOLUTIONIZING HEALTH – CARE: *IN – SILICO* VACCINE DESIGNING**

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*Bhavan's Vivekananda College of Science Humanities & Commerce*
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https://doi.org/10.34293/ctbtls.2025.ch021

**Abstract**

*In - Silico Vaccine Designing represents a paradigm shift in vaccine research, using computational tools to accelerate and refine the development process. By integrating bioinformatics, immunoinformatics, and structural biology, this approach enables researchers to identify and predict antigenic regions with high precision, reducing the time and cost associated with traditional vaccine development. Tuberculosis (TB) is a global health threat, making it necessary to develop innovative vaccine strategies. This study focuses on the in-silico design of a multi-epitope vaccine targeting the integral transmembrane protein kefB of Mycobacterium tuberculosis. The amino acid sequence of kefB was retrieved from UniProt, and antigenic epitopes were identified using computational tools. B-cell epitopes were predicted via LB-tope - ABCpred, while T - cell epitopes (MHC-I and MHC-II) were derived from IEDB. The best antigenic epitopes were selected based on their Vaxijen scores, followed by allergenicity prediction using AllerTOP. A vaccine construct was designed by linking the epitopes to a 50s ribosomal protein adjuvant using linkers.*

*The construct was modified in 3D using SwissModel, visualized with Chimera, and validated through structural assessment tools, including the Ramachandran Plot via MOLProbity and refinement by GalaxyWEB. The final construct was docked with the Toll-like Receptor 2 (TLR2) of Homo sapiens using PatchDock to ensure receptor-ligand compatibility. Codon optimization was performed using JCat for improved expression, and a pET vector was designed for potential cloning. Host immune response simulation (C-ImmSim) and population coverage analysis (IEDB) confirmed the vaccine's immunogenic potential. This in - silico approach highlights a promising strategy for vaccine development against tuberculosis and emphasizes the potential of computational biology in accelerating vaccine research thus revolutionizing health care.*

***Keywords:*** *In - Silico Vaccine Design; Immunoinformatics; Epitopes; Pathogenomics; Tuberculosis*

**Introduction**

*In-silico* vaccine design is a revolutionary approach in immunology that utilizes **bioinformatics** to enhance and expedite vaccine development. By employing computational techniques and data - driven strategies, researchers can efficiently identify and assess potential vaccine candidates with remarkable precision. This approach combines genomics, proteomics, immunoinformatics, and structural biology to predict antigenic epitopes, enhance immune response optimization, and ensure vaccine safety and effectiveness.

Computational modeling facilitates the swift simulation of interactions between antigens and immune receptors, enabling the creation of highly specific multi-epitope constructs. Additionally, modeling biological responses helps detect potential side effects in the early stages of development, thereby improving the safety profile of vaccines.

*In - Silico* strategies enable researchers to replicate real-world biological interactions, forecast population-level immune responses, and design vaccines tailored for diverse groups, paving the way for more personalized medicine.




# BOOK/BOOK CHAPTER PUBLICATIONS

## Rhythms of Microbiology, Exploring the role of Artificial Intelligence in the field of Microbiology



V.Seshi Deepak
Yedurla Venkata Tanishq
B.Sc BT.Mb.C 3
Dr. T. Chaitanya
Asst.Prof. Dept of Microbiology


## Autumned

Autumned is a modern anthology exploring the intertwined themes of grief, loss, healing, and spirituality. These poems navigate the depths of uncertainty and the lingering weight of deception. Through unwritten letters and words left unsaid, the collection captures the quiet ache of what could have been. With a delicate balance between life and the consequences of seemingly harmless choices, Autumned offers a raw yet graceful reflection on emotional resilience and self-discovery.

Shikha Punjarla
B.Sc Bt.G.C 3

# BOOK/BOOK CHAPTER PUBLICATIONS

- Revolutionizing healthcare: The transformative power of Artificial Intelligence
- Advancements in medical science through Nanobiotechnology: Applications in diagnostics and Therapeutics


| |
|---|
| REVOLUTIONIZING HEALTHCARE: THE TRANSFORMATIVE POWER OF ARTIFICIAL INTELLIGENCE<br>*Ms. Anchal Singh, Ms. Nikki Kumari and Dr. S. Chaitanya Kumari* |
| HOMOEOPATHY THE QUANTUM SCIENCE AN OVERVIEW WITH NANOTECHNOLOGY<br>*Dr. Anuradha Babar* |
| EVALUATION OF PLASTIC DEGRADATION ABILITY OF MUSHROOMS<br>*Ms. Rankawat Sangeeta and Dr. S. Chaitanya Kumari* |
| ADVANCEMENTS IN MEDICAL SCIENCE THROUGH NANO BIOTECHNOLOGY: APPLICATIONS IN DIAGNOSTICS AND THERAPEUTICS<br>*Mr. G. Satya Tarun Sriyamsu, Ms. D. Bhavani, Ms. Panja Gowthami, Ms. Bajjuri Sahithi and Dr. S. Chaitanya Kumari* |

Ms Anchal Singh, Ms Nikki Kumari
B.Sc Mb.G.C 3
Mr G Satya Tarun Sriyamsu, Ms D Bhavani, Ms Panja Gowthami, Ms Bajjuri Sahithi
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Dr. T. Chaitanya
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Chapter – 18

**IMPACT OF ARTIFICIAL INTELLIGENCE (AI) IN INDIAN FARMING**

**Dr. Vanitha. S[*1] and Ms. Vamika Anil[*2]**

[*1] Assistant Professor, [*1, *2] Department of Biochemistry & Nutrition, Bhavan's Vivekananda College of Science, Humanities and Commerce, Telangana.

**Introduction**

India's agricultural sector remains a primary source of employment, with roughly 60% of the population relying on it for their livelihood. This sector also contributes significantly to the national economy, accounting for about 18% of GDP. Indian farmers navigate through a complex agricultural system, encountering challenges throughout various stages, starting from acquiring inputs to marketing and managing post- harvest activities. Despite their crucial role, the challenges faced by Indian farmers often receive less public attention. Some of the major challenges experienced by farmers in India are. [Fig.1]



**Fig. 1 Major challenges experienced by Indian Farmers**

To address the issues and challenges in Indian farming practices, implementing advanced science and technology with artificial intelligence could efficiently revolutionize the agricultural field.

Artificial intelligence (AI) is the skill and power of any machines to simulate the intelligences of highly developed living organisms. Leveraging machine learning (ML) and



Impact of artificial intelligence (AI) in Indian farming.

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# BOOK/BOOK CHAPTER PUBLICATIONS

Role of medicinal plants in modern drug discovery: A bridge between tradition and innovation

Nandini Sharma
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S.Vanitha
Asst.Prof. Dept of Biochemistry & Nutrition

ROLE OF MEDICINAL PLANTS IN MODERN DRUG DISCOVERY: A BRIDGE BETWEEN TRADITION AND INNOVATION

Dr. S. Vanitha*1 and Ms. Nandini Sharma*2

*1Assistant Professor, *2 Student, Department of Biochemistry & Nutrition, Bhavan's Vivekananda College of Science, Humanities and Commerce, Sainikpuri, Secunderabad, Telangana.

**1. Introduction**

Nature is always a golden sign to show the prominent phenomena of coexistence. Natural products from plants, animals and minerals are the basis for treating human diseases. Human societies have been in close contact with their environments since the beginning of their formation and used the ingredients of the environment to obtain food and medicine. Information about medicinal plants has long been transmitted gradually from generation to generation, and human knowledge has gradually become complete with the formation of civilizations and the provision of more facilities. For centuries, medicinal plants have been a cornerstone of healing practices, rooted in traditional systems like Ayurveda, Traditional Chinese Medicine, and Indigenous knowledge. These plants, revered for their natural compounds, have been used to treat illnesses, relieve pain, and promote well-being. Today, the wisdom of traditional medicine continues to inspire modern drug discovery. Scientists are exploring these age-old remedies, not just to validate their effectiveness, but to uncover new treatments for some of the world's most pressing health challenges.

**1.1 Introduction: History of Medicinal Plants**

Medicinal plants are used as a medical resource in almost all cultures and have been undoubtedly considered by human beings since ancient times. The term medicinal plant refers to a variety of plants that have medicinal properties. These plants are a rich source of compounds that can be used to develop drug synthesis. The parts of medicinal plants that may be used are different types of seeds, root, leaf, fruit, skin, flowers or even the whole plant.

The active compounds in most parts of the medicinal plants have direct or indirect therapeutic effects and are used as medicinal agents. Humans are mainly dependent on raw plant materials in order to meet medical needs to maintain health and cure diseases. Medicinal plants have been transformed into one of the oldest sciences in countries such

*Role of Plants, Microbes & Animals in Medicine (pg. 146*

# Fun Of Biohive

Start

FUN OF BIOHIVE BLENDS LEARNING AND LAUGHTER WITH SCIENCE-THEMED GAMES, QUIZZES, AND ACTIVITIES FOR CURIOUS MINDS.

## LEVEL 2

# Bio Cipher

I twist and turn but never fall,
In every cell, I stand tall...
A code of life, existing big and small...
Three letters name us all
What am I?

I'm a messenger, quick and light,
I carry codes to the places right...
Though I'm banded single, I still impress
Helping you to make genetics success.
What am I?

I'm small and round,
I float with ease.
In bacterial cells, I like to make my crease.
A little ring with genes to spare,
I help scientists promote genes everywhere.
What am I?

Grouped together, part by part
I work as one, with a kickstart...
To turn genes off or have them run...
To regulate them, and have the fun...
Lac or trp, I accept pairs
An order of the gene-filled regulatory affairs ...
What am I?

?

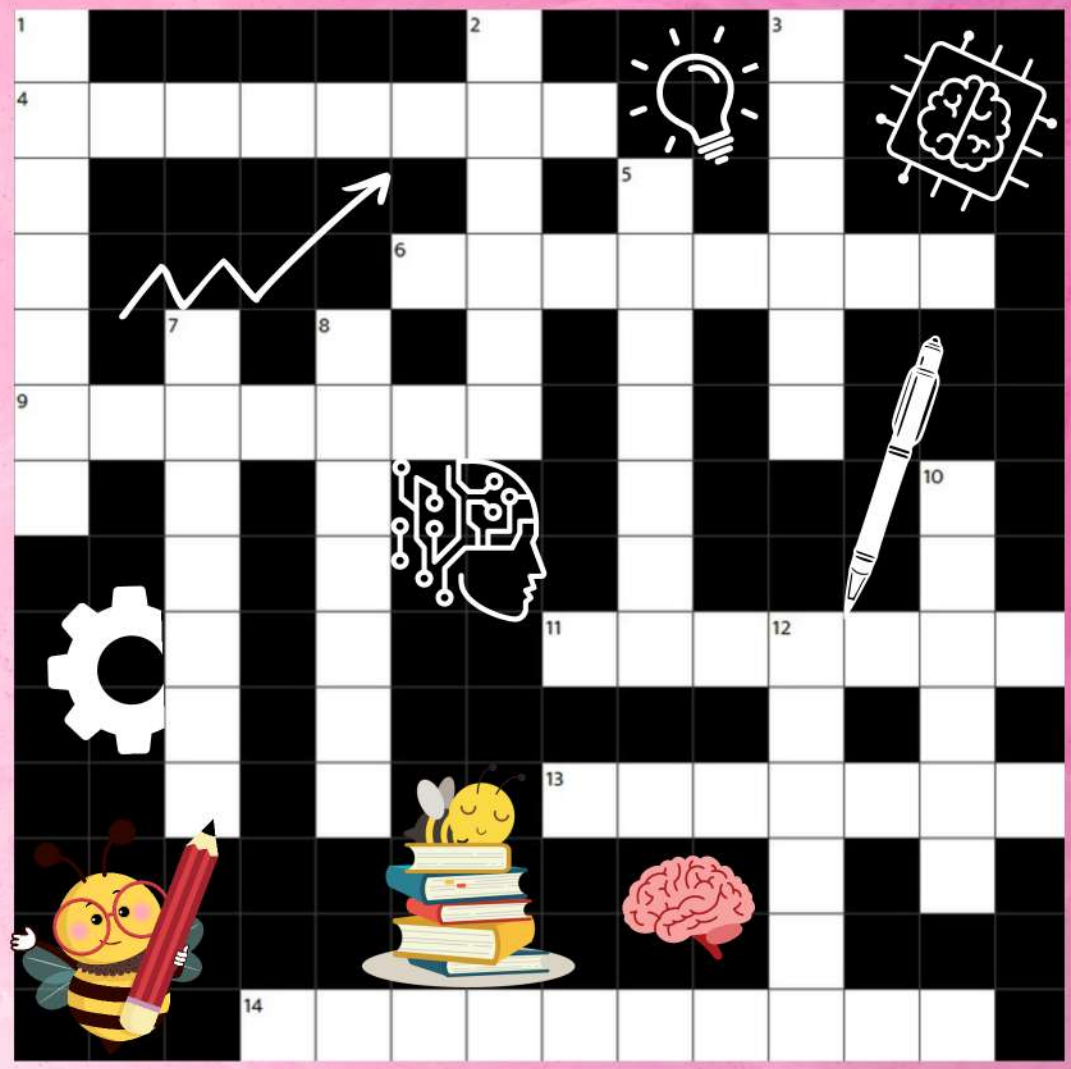
Like a Surgeon's skill, I make a tailored snip,
Right at the site I hold my grip.
Like Sherlock, I deduce a short repetition...
Then make my signature cut so clean and revert silently in position
What am I?

I duplicate without a womb of muscle,
I prefer cycles of heat and tussles...
No heart, no mind, yet I create
Billions born at a molecular rate...
What am I?

When genes go wrong, I try to fix,
With viral tools or clever tricks...
Spider-Man had me long back in ages,
A boon to him by Genetic pages
Replacing parts, which lost in their paths
I give healing hopes... and save from wraths
What am I?

I am stitched from more than one,
A genetic tapestry which was begun...
From gene to plasmid like I'm like water which flows,
A hybrid form that ever blooms and grows.
Pirates say the word, their favourite aggression,
Which is given in my name, a 4 lettered identification...
What am I?

# ATOMS & RIDDLES



## ACROSS :

4. I am Mendeleev's first born.
6. I am found abundantly in your atmosphere & also used as a refrigerant.
9. Shine a blacklight, I glow with pride, a glowing rock with danger inside!
11. I am a metal, but flow like rain. In thermometers, I help explain!
13. Man of Steel's Home Planet. I am as noble as the man himself!
14. I ignite when fire catches, I'm often found in your matches.


## DOWN :


1. The God of Thunder shares my name, I'm strong and powerful, but not as same.
2. If you take a sniffy, I make your voice squeaky.
3. I'm the breath inside your chest, I help a fire burn it's best.
5. I am a liquid at room temperature, I maybe your bro but very irritating and toxic.
7. I shimmer like silver, yet I'm softer than steel, in the warmth of your hand, I turn liquid.
8. In molten form, I'm a liquid flowing. Cool me down & colors will show a staircase with rainbow hue.
10. I form bond with my kind, when arranged in a specific way we are unbreakable.
12. I shine with a reddish glow, in wires I help with the current flow.

# POLYPEPTIDE PURSUIT

START

FINISH

*buzz here for answers*

# Nobel Prize Winners

## mRNA Vaccine Technology Against COVID-19

### *Nobel Prize in Physiology or Medicine, 2023*

mRNA Vaccines against COVID-19 and for their work in mRNA vaccine technology, Katalin Karikó and Drew Weissman were awarded the 2023 Nobel Prize in Physiology or Medicine. The Pfizer-BioNTech and Moderna COVID-19 vaccines were developed quickly- thanks to their discovery of how to alter synthetic mRNA to prevent immunological rejection. In addition to saving millions of lives during the pandemic, their efforts cleared the path for upcoming gene treatments and vaccinations.

## Quantum Dots – Light-Emitting Nanocrystals

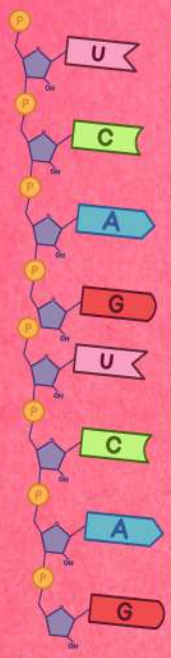
### *Nobel Prize in Physics, 2024*

The 2023 Nobel Prize in Chemistry went to Moungi Bawendi, Louis Brus, and Alexei Ekimov for their groundbreaking research on quantum dots, which are nanocrystals that emit light of distinctive hues based on their size. These days, 4K TVs and medical imaging both use these dots. Their breakthrough opens up new technical possibilities in optoelectronics and biomedicine by combining chemistry and physics at the nanoscale.

## The Protein Structure Breakthrough with AlphaFold

### *Nobel Prize in Chemistry, 2024*

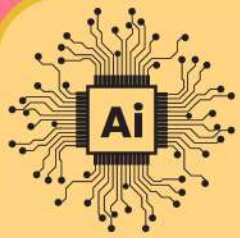
Demis Hassabis, John Jumper (DeepMind), and David Baker were granted the 2024 Nobel Prize in Chemistry for creating AlphaFold2, a ground-breaking artificial intelligence program that uses amino acid sequences to predict the three-dimensional structure of proteins. For decades, protein folding had been an enigma, and AlphaFold's precision was on par with experimental techniques. By facilitating quicker drug development and a better comprehension of cellular mechanisms, this invention is revolutionizing biology and medicine.




## microRNA and Gene Regulation

***Nobel Prize in Physiology or Medicine, 2024***

microRNA Discovery and Gene Regulation For their revolutionary discovery of microRNAs (miRNAs), which are tiny RNA molecules that control gene expression rather than coding for proteins, Victor Ambros and Gary Ruvkun were awarded the 2024 Nobel Prize in Physiology or Medicine. They discovered that microRNAs attach to messenger RNAs and stop them from being translated into proteins while working with C. elegans. By connecting these tiny molecules to development, metabolism, and illnesses like cancer and neurological conditions, this created a whole new area of study in genetics.




## Neural Networks and the Foundations of Artificial Intelligence

***Nobel Prize in Physics, 2024***

Neuronal Networks and the Foundations of AI John Hopfield and Geoffrey Hinton received the 2024 Nobel Prize in Physics, but for their groundbreaking work in neural networks—mathematical models modeled after the human brain. AlphaFold and other modern artificial intelligence is based on their theory. By bridging the fields of neuroscience and computer science, their work has influenced our understanding of memory, learning, and intelligent behavior in both biological and mechanical systems.


CAREER CONUNDRUM OFFERS ADVICE AND ALUMNI INSIGHTS, GUIDING STUDENTS ON PATHWAYS FOR HIGHER STUDIES AND FUTURE SUCCESS.

# Career Conundrum

# Pursuing GLOBAL Academic Opportunities

Pursuing academic opportunities abroad enables students to engage with diverse educational methodologies, cutting-edge research, and multicultural environments. Such experiences complement the strong foundation provided by India's robust and dynamic education system, fostering a global outlook, critical thinking, and adaptability - skills that can further enrich a student's academic journey. International exposure cultivates cross-cultural collaboration, encourages innovation, and develops leadership qualities, ultimately empowering students to bring back valuable insights and competencies that contribute meaningfully to India's growth and its evolving role in the global landscape.

# From Familiar Halls to Foreign Roads

## FEATURING ALUMINI ACROSS THE GLOBE

Muhammad Abdul Rouf (BtGC 2014-2017)

Alekhya Gangavaram (MGC 2021-2024)

Kameshwari Gollakota (BtGC 2016-2019)

Sarfaraz Shaikh (BtGC 2019-2022)

## Q1. Can you describe your current career trajectory and how your education abroad has influenced it?

Growing up in Kudus, Indonesia, in an underprivileged family, the idea of pursuing higher education seemed almost impossible for me. However, through God's power, perseverance, hard work, and the support of many, I am so fortunate to gain opportunities to study abroad in India, China, and now Canada with fully funded governmental scholarships. My journey has taken me far from home.

Each country I have lived in has enriched my scientific perspective and personal growth. In India, I learned resilience; in China, precision and discipline; and in Canada, I am now developing the creativity and leadership skills needed to drive meaningful research. Studying in different environments taught me to adapt, appreciate diversity in thought and research approaches, and strengthened my belief in the power of education to change lives.

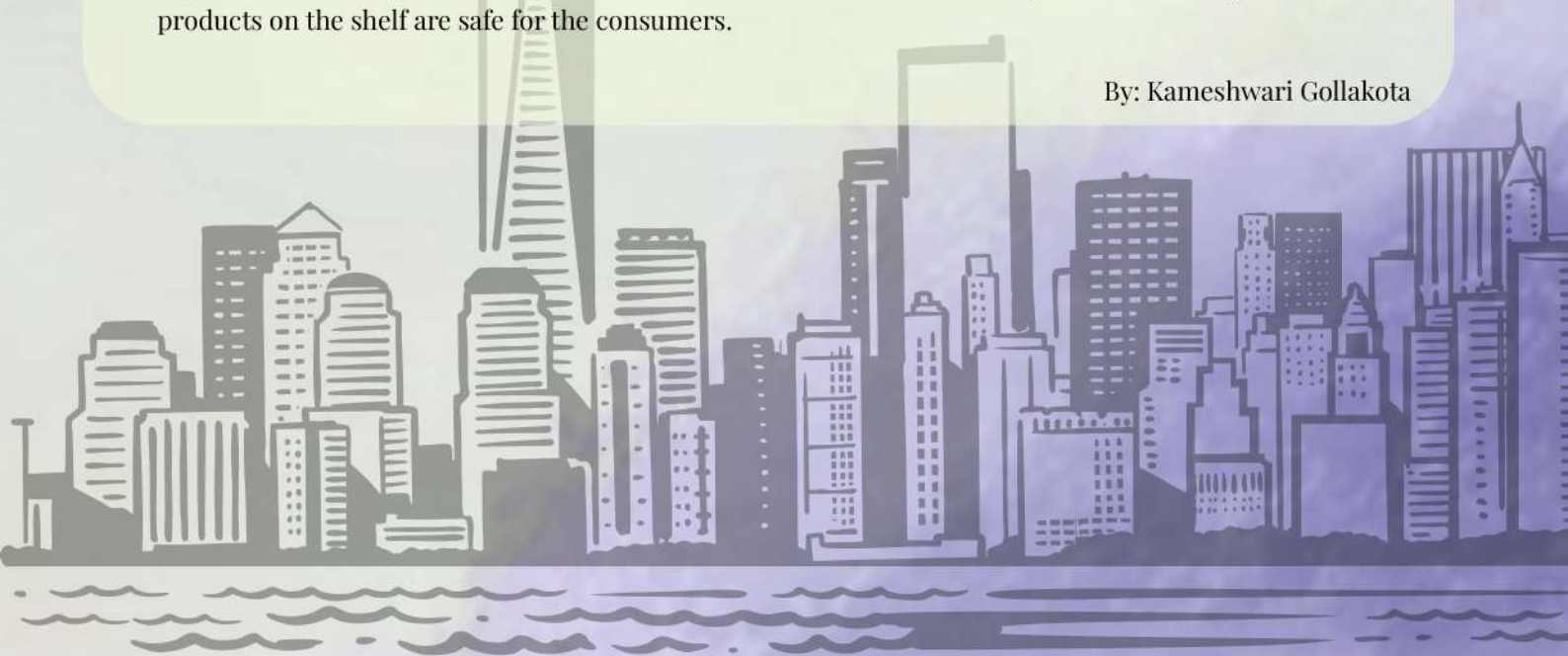
Currently, as a Ph.D. candidate at the Université de Montréal, Canada I am building expertise in cardiovascular biology and developmental research. My international education has shaped not only my technical skills but also a deeper sense of responsibility, to use my knowledge to contribute to global scientific advancement and to inspire many from backgrounds similar to mine. I aspire to a career where I can lead meaningful research, mentor the next generation of scientists, and foster collaborations that bridge nations and communities. Science has opened the world to me, and now I am determined to give back to the world through science.

By: Muhammad Abdul Rouf

Currently I work as a Product Technologist, focusing on product risk& regulations, food regulations, compliance, specifications, ensuring correct labelling, testing & site audits for global markets. It is really a dynamic space and what makes it even more exciting is its global nature. I get to work with products and regulations from all over the world. Studying Food Systems and Management gave me a much broader understanding of food products move across borders, how different countries approach regulations and why do they do so, the critical role compliance plays in building safe and trusted food systems and beyond including products such a healthcare, pharma, cosmetics etc.

What I really like about my journey is that it shows how diverse the career paths can be. There are so many exciting roles that combine science, business, regulation and innovation. I am able stick to my technical capabilities with regulations and and direct the business towards compliance and being satisfied that products on the shelf are safe for the consumers.

By: Kameshwari Gollakota



## Q1. Can you describe your current career trajectory and how your education abroad has influenced it?

I recently graduated with a Master's degree in Biotechnology with honors, and I am eager to advance my career in quality management within the pharmaceutical and food manufacturing sectors. During my undergraduate studies, I initially viewed biosciences as focused on research and academia. However, my experience in regulatory affairs and quality assurance has guided me to explore the industrial side of biosciences more deeply.

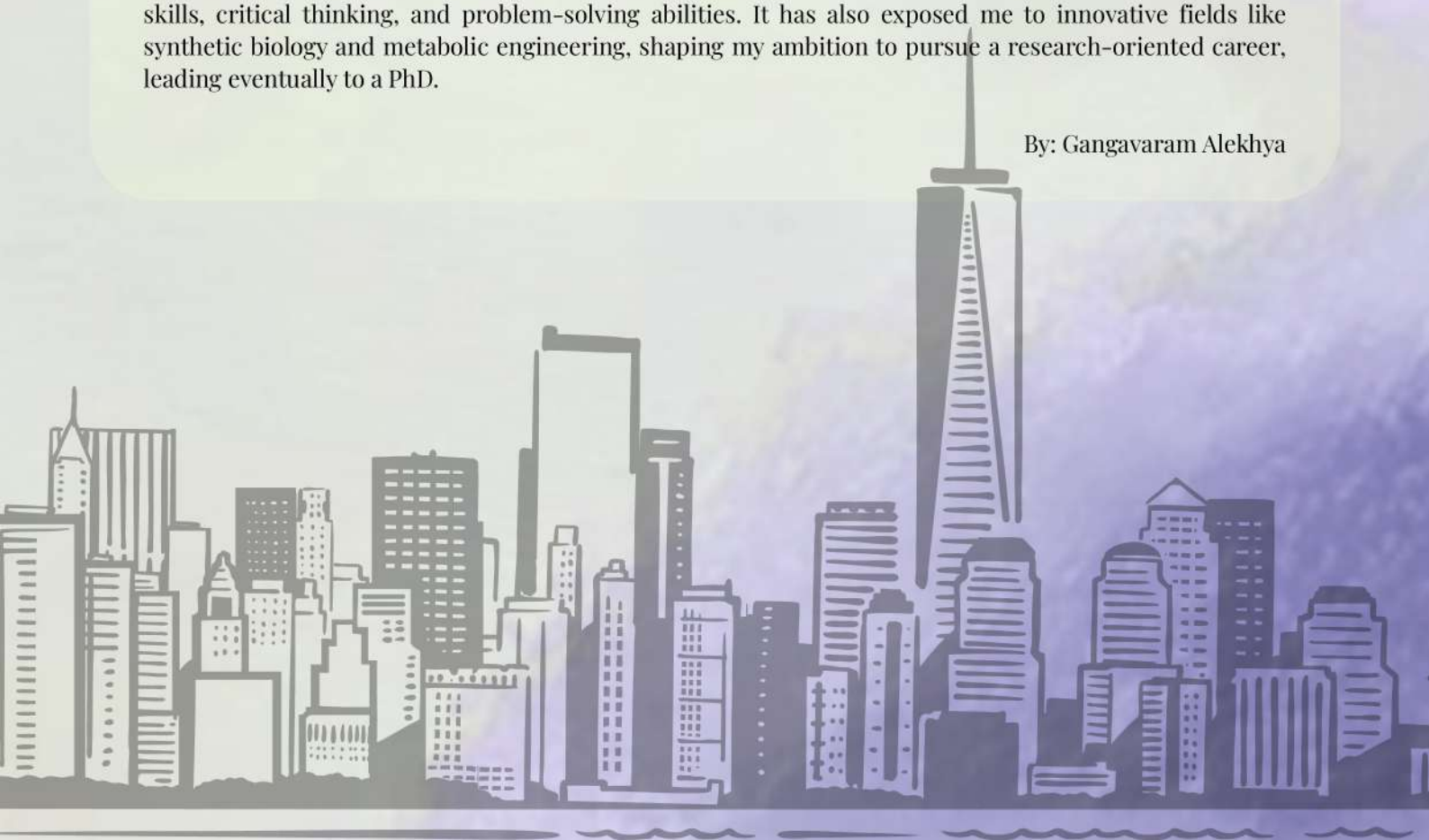
Roles in the industry require a combination of core laboratory skills, a thorough understanding of regional regulations, a strong business acumen, and the ability to translate research findings into large-scale manufacturing processes. I also appreciate that my background in Chemistry has allowed me to qualify for positions in both the food and pharmaceutical industries. Additionally, it has enabled me to work as a part-time tutoring assistant in Chemistry for high school students here in Australia, an opportunity I never anticipated.

By: Sarfraz shaik

Currently, my career trajectory is directed towards research and development in molecular biosciences, with a particular interest in microbial biotechnology and sustainable biological systems. Building on my undergraduate foundation in Chemistry, Microbiology, and Genetics, I am now deepening my expertise through the Master's program in Molecular Biosciences and Productive Biosystems at TU Dresden.

Studying abroad has significantly expanded my scientific perspective. The interdisciplinary approach, advanced research facilities, and international environment at TU Dresden have sharpened my technical skills, critical thinking, and problem-solving abilities. It has also exposed me to innovative fields like synthetic biology and metabolic engineering, shaping my ambition to pursue a research-oriented career, leading eventually to a PhD.

By: Gangavaram Alekhya



## Q2. What led you to choose this particular country and institution for your studies? Were there any factors (academic, cultural, career-related) that influenced your decision?

My decision to pursue my Ph.D. in Canada, specifically at the Université de Montréal, was shaped by at least a combination of academic, cultural, and career-related factors. Academically, Canada is well known for its strong investment in research and innovation, particularly in biomedical sciences, the field I am deeply passionate about.

The Université de Montréal stood out to me not only because of its outstanding research programs and state-of-the-art facilities, but also because of its collaborative, interdisciplinary environment that encourages creativity and critical thinking. Culturally, I was drawn to Canada's diversity and inclusivity. Coming from Indonesia and having already studied in India and China, I understand how important a welcoming environment is when you are far from home. Canada's multicultural society made me feel that I could both learn from others and also contribute my own experiences and background to the community. From a career perspective, studying here provides a strategic advantage. Canada's strong emphasis on global collaboration, translational research, and public engagement aligns closely with my long-term goal of becoming a scientist who bridges basic science and societal impact. The Université de Montréal, in particular, offers an ideal platform where I can grow not just as a researcher, but as a future leader in science.

Overall, choosing Canada and the Université de Montréal was not just a decision for my academic growth, but a life decision to become part of a vibrant, forward-looking community that aligns with my personal and professional aspirations.

By: Muhammad Abdul Rouf

When I was looking at options for studying abroad, I wanted a program that would connect science with real-world industry practices. The country I chose (UK) has a really strong reputation for strong regulatory practices, innovation standards and global outlook. Academically, the institution (Cranfield University) stood out because of its intake (only masters and PhD institution and no bachelors) so naturally the courses are designed for industry and higher academic structures, it's strong industry connections, practical learning approaches.

Broader international perspective was really important to me. Culturally, I was also drawn to diversity within the university - which only took 20 students globally for this masters. So, I knew I would be learning alongside people from all over the world, which adds a richness to the experience beyond just academics. Career-wise, I was very intentional about choosing a place that would open doors globally.i wanted to gain skills and experiences that would be valued across different countries and industries.

By: Kameshwari Gollakota

Q2. What led you to choose this particular country and institution for your studies? Were there any factors (academic, cultural, career-related) that influenced your decision?

I was eager to move to a country recognized for its strong academics and career growth opportunities, where there were minimal language or cultural barriers. Fortunately, I received offers from nearly all the top Australian universities.

In particular, I was thrilled to receive an offer from the University of Melbourne, which also came with a generous scholarship that allowed me to start immediately.

By: Sarfraz shaik

I chose Germany, and specifically TU Dresden, for its strong emphasis on research-driven education, advanced biotechnology programs, and global reputation in life sciences. The interdisciplinary structure of the Molecular Biosciences and Productive Biosystems program, combined with access to cutting-edge research facilities and a vibrant academic environment, perfectly aligned with my career goals.

Additionally, Germany's culture of innovation and its strong career prospects in biotechnology influenced my decision.

By: Gangavaram Alekhya

## Q3. What led you to choose this particular country and institution for your studies? Were there any factors (academic, cultural, career-related) that influenced your decision?

My favorite part of living and studying abroad has been the opportunity to experience so many different cultures, live and meet among people with different perspectives and values. It has broadened my worldview and taught me to be more open-minded and adaptable. That said, adjusting to a new culture was not always easy. At first, language barriers, different social norms, and even small daily habits felt overwhelming even exacerbated with different and extreme weather like here in Canada during winter. But I learned to overcome these challenges by staying calm and curious, asking questions, and building friendships with both local students and other internationals. I realized that genuine openness and patience are key and gradually we become familiar with those challenges. In the end, those early struggles made my experience even more meaningful, because they helped me grow not only as a student, but also as a person ready to work in a global environment.

By: Muhammad Abdul Rouf

One of my favorite parts of studying abroad was how much it opened my mind – not just academically but personally too. My first job was of Research Assistant in the "Postharvest Group". It was surprised to see how a research teams works abroad, how the projects are managed and how the involvement of different teams is crucial for a good research. I have also seen a lot of industry and government involvement in these areas and how important stakeholders they are. I have worked on projects with PepsiCo (lays), DEFRA. It taught me to think globally, which is something that continues to shape my work today. Of course, there were challenges too. Adjusting to a new culture, a different education style, and even small everyday things like food, weather and communication styles took some time. In the beginning, it was easy to feel overwhelmed and homesick. But I found that staying curious, being open to new experiences, and building a strong support network made all the difference. I made an effort to connect with both local students and other international students and those friendships helped me feel more at home. I also learned to be patient with myself: it's ok to take time to adjust. Looking back, those challenges helped me grow just as much as the academic experience did. It's all part of the journey, and it makes you so much stronger, more adaptable, and more confident – both professionally and personally.

By: Kameshwari Gollakota

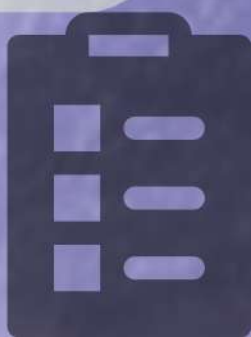
Q3. What was your favorite part of your experience abroad? Did you encounter any challenges in adjusting to a new culture, and how did you overcome them?

I would say that the best part of this experience is managing our household chores, finances, work, and academics. The day of graduation will always be a proud moment for everyone after the struggles of the past two years. Yes, it is hard to be away from family and rely only on calls, but everything starts to feel more normal once the first semester is completed. I consider my first semester to be a bigger achievement than the entire graduation because those days were never easy.

By: Sarfraz shaik

My favorite part of my experience abroad so far has been starting my master's at TU Dresden. Although I'm still quite new to this place, I'm excited about the opportunities ahead I've loved meeting people from all over the world and exploring the beautiful city of Dresden. Adjusting to a new culture hasn't been without its challenges, especially with the language and settling into a different academic environment. But by staying open, asking for help when needed, and embracing the new experiences, I'm hopeful that Dresden will soon start to feel like a second home.

By: Gangavaram Alekhya



# Career Trajectories: Voices of Science

# Interview

## Dr.Manjula Bhanoori, M.Sc., Ph.D.

Dr. Bhanoori Manjula, Associate Professor and Chairperson of the Board of Studies in Biochemistry and Nutrition at Osmania University, is a distinguished researcher with over 25 years of experience in female reproductive health, particularly focusing on endometriosis and polycystic ovary syndrome (PCOS). She holds a Master's in Plant Sciences from the University of Hyderabad and a Ph.D. in Biochemistry from Osmania University, with prior affiliations at CSIR-CCMB and the University of Tennessee Health Science Center. With an H-index of 23, she has published over 45 research papers and four books, mentored ten Ph.D. scholars, and actively serves as a peer reviewer for leading scientific journals. A Fellow of the Telangana Academy of Sciences since 2020, Dr. Manjula is also an accomplished Telugu writer, having penned around 40 poems and several stories, many of which have earned literary accolades. Her creative passion blends with her scientific outreach on her YouTube channel, @drmanjulabhanoori, where she shares poems and songs dedicated to Biology.

**Q:** Ma'am, could you tell us about your journey into science? What motivated you to pursue a career in life sciences?

**A:** My journey into science started with a sense of wonder — a fascination with the cell and how life functions at the most fundamental level. But it became deeply personal early on. My grandmother and mother both died of cancer — cervical and ovarian. Back then, there were no advanced chemotherapies with minimal side effects. The main option was radiation, and the suffering they went through stayed with me. I often felt the treatment seemed harsher than the disease itself. Those family stories, especially the helplessness my mother described, instilled in me a drive — a silent promise, perhaps — to find ways to detect such diseases early. I always saw cancer not just as a disease, but as a call to action. But like life, my path in science was never linear. As an undergraduate, I was initially in animal sciences, but I found the dissection work emotionally difficult — I couldn't reconcile with the practice of sacrificing animals. I still remember the pitting of frogs in physiology labs, and it was enough for me to say, "No more." I shifted to plant sciences during my postgraduate studies at the University of Hyderabad, and then to molecular biology. My PhD was on Neurospora crassa, a fungus — so no animals were involved, which brought me peace.
Later, during my postdoctoral work in the U.S., I worked on atherosclerosis using cell lines, and occasionally had to rely on colleagues for animal work. I realized then that I could still make meaningful contributions without compromising my values.

When I returned to India, I joined a genome-wide association study project on endometriosis — at first, I wasn't fully invested. It felt dry, just screening for variants. But once I began to understand the depth and complexity of the disease — and the complete lack of non-invasive diagnostics — I was pulled in.
Then came the turning point: I was diagnosed with endometriosis myself — but only after 18 years of misdiagnoses. Despite being a researcher in the field, doctors brushed off my symptoms. It didn't show up on MRI or ultrasound, and I kept being told it was just IBS. But I knew.

Eventually, thanks to a collaborator and a compassionate gynaecologist, I had exploratory surgery — and everything I'd suspected was there. Adhesions, inflammation — it was all visible.

That experience was a firestarter. Since then, I've made it my mission to develop non-invasive markers for this painful, underdiagnosed disease. And 25 years later, we're still pushing forward — working with blood, saliva, menstrual fluid, and even exploring therapies from unconventional sources like sepia ink.

**Q:** In your view, how has life sciences education evolved in India over the years? What changes have you seen in students and the system, ma'am?

**A:** It's a question that touches a nerve, because I've seen a drastic shift — not just in numbers, but in mindset.
Two decades ago, there was a healthy distribution between students taking up biology and physical sciences. There was curiosity, enthusiasm, a hunger to understand life. Today, that balance has been lost. Many now see life sciences as a less rewarding field — low pay, long timelines, uncertain career prospects.
Postdoctoral research, especially abroad, is undervalued and underpaid. I've known brilliant scholars who earned less than janitors in the U.S. That's the reality, and it's disheartening. It deters all but the most passionate.
In the last five years, I've observed that many MSc students are preparing for government exams rather than fellowships like CSIR or pursuing research careers. Their primary aim is stability — not discovery. Only a couple of students in each batch are truly driven by science itself.
Earlier, PhD admissions were reserved for those with fellowships. Now, most join without any funding. It reflects a broader decline in student motivation. I'm not blaming them — it's a complex socio-economic issue. But we're seeing a generation that wants fast results in a field that demands deep patience and slow perseverance.
Still, I believe this is just a phase. Science always revives itself. The golden era for biology will come back — and we'll be ready.

**Q:** Ma'am, what advice would you give to students considering a career in life sciences?

**A:** First, know what you're getting into. Life sciences is not a shortcut to success — it's a long, often winding path. You must have both short-term and long-term goals, and most importantly, a real sense of purpose.
If you're coming here just for a job, you'll get frustrated. But if you come to learn — to genuinely understand how life works — then this field will never betray you.
Even if you don't become a researcher or professor, the knowledge you gain can help your family, your community. Understanding drug interactions, genetic conditions, immune responses — these aren't abstract concepts. They affect real lives.

Studying biology is studying yourself. We are made up of 100 trillion cells. Life science is the science of the self. And the deeper you go, the more you fall in love with it. It becomes a positive addiction.
I tell my students: fall in love with the cell. It won't leave you. It's the most loyal companion you'll ever find.

**Q:** Ma'am, you've mentioned your love for literature alongside science. How do you bring those worlds together?

**A:** Literature and science are two wings of the same bird for me. Science demands truth, structure, and evidence. Literature gives you freedom — to imagine, to feel, to express.
When I write poetry about the cell, or compose songs about the journey of life, I'm not just simplifying science — I'm humanizing it. That's important. Because data alone doesn't move people. But stories do.
During difficult moments — with my health, or in research — writing has been a source of strength. It lets me explore emotions while staying rooted in reality.
I believe every scientist has a poet inside them. We may not all write verses, but we feel the beauty of what we study. When you see a cell divide, or witness a gene regulate life — it's nothing short of poetic.

Prakruti & Nikhita:
Thank you, ma'am. Your journey, your wisdom, and your honesty have been deeply moving. It's a privilege to share this conversation with our readers.

Dr. Bhanoori:
Thank you! I appreciate the opportunity to share my story. I hope it inspires even one student to choose this path with heart and purpose. Science is not just a profession — it's a way of understanding life. And if you pursue it sincerely, it will always lead you home.

**HEAD DEPARTMENT, BIOCHEMISTRY**
**OSMANIA UNIVERSITY**

Interviewed by : K. Prakruti & Nikhita
B.Sc. MbGC - III

# Interview

## NANDA KISHORE

### PRESIDENT OF RAAGA FOUNDATION

Mr. Nanda Kishore is an alumini of Bhavan's Vivekananda College. He completed his masters from M.S.Ramiah college in Bangalore. He is the president of Raaga foundation which is Rehabilitation centre for Animals and Birds

Vaishnavi:
What inspired you to do this work?

Mr. Kishore:
I have always loved nature and animals and found great pleasure in bonding with them. We wanted to give that same experience to the general public—not only watching the animals but also giving them a chance to touch and feed them. Our Raga Foundation property was built for this purpose. I have worked closely with the Bangalore Forest Department and knew the pros and cons of a zoo. Hence, we wanted to build a self-sustaining ecosystem with minimized human interference. At Raga, we try to automate our processes and utilize our own waste. I use most of my biotechnology background for this. I never felt that I was cut out for traditional jobs, so I got into business naturally. We also engage local skilled farmers, and this job gives them space to stay and a platform for their own growth through our endorsement of their products like manure and seeds, apart from their regular salary. We also ensure their children are schooled, their talents nurtured, and entrepreneurial support is provided.

Reetu:
Is there anything that inspired you to do this from Bhavans?

Mr. Kishore:
I had a wonderful time at Bhavans where all my teachers and friends always encouraged us to believe in our dreams and try new and different things in life. That's how I am here today.

Vaishnavi:
How was your time in Bhavans? Do you have any special memories?

Mr. Kishore:
My time in Bhavans was lovely. My friends and I used to come together, sit in the canteen, and have jam sessions with guitar and cool music. The interesting part was that I met my wife in Bhavans—she was in the same friend group.
Reetu:
What skills do you think are required for the work that you do?

Mr. Kishore:
While no specific skills are mandatory for this work, everything we've accomplished is the result of hands-on learning and experience. In the beginning, we faced several challenges, especially in areas like farming where results weren't matching our efforts. That's when I realized the value of collaboration, so we brought in skilled farmers who guided us and helped manage the crops better. We educated ourselves along the way through continuous learning and trial and error. More than technical skills, it's the right mindset—determination, adaptability, hard work, smart decision-making, and most importantly, a meaningful purpose—that truly drives success and keeps us going in tough times.

Vaishnavi:
What is your favourite area in this place?

Mr. Kishore:
As such, I don't have any one favourite place here—I love the whole property that we have built.

Reetu:
What species of snakes can we find here?

Mr. Kishore:
As of now, we have ball pythons, which are non-venomous. We are trying to introduce other species that are also non-venomous. All of these are bred in captivity, so they are not aggressive, although precautionary steps are required to handle them. We train our animals to be social.

**PRESIDENT OF RAAGA FOUNDATION**

Interviewed by: Reetu and Vepa Vaishnavi

BSc. BtGC - III

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**MIRZA FAREEDULLA BAIG**
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**TANIYA SADHINENI**
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## The Team

# CO-FOUNDERS' MESSAGE

Biohive is an amalgamation of words, memories, and irreplaceable moments. It was never merely a newsletter to us; cared for tenderly, grown with gentle love, and sustained by each discussion and sleepless night spent.

What began as an idea in passing conversation became a real representation of our passion. What you are reading in this edition is a portion of ourselves- an embodiment of our experience as Life Sciences Department members. Every laugh, every rush with deadlines, and every research and write-up- every member invested a portion of themselves in the edition you are currently reading.

Is it just another newsletter? Maybe to you. To us, it's everything.

The vibrant colors in between these pages represent the vibrant experience we have had in this department- abounding in knowledge, growth, and unwavering support. We are indeed grateful to our Principal, the Head of the Department of Genetics and Biotechnology, our in-charges, and most of all, our ever-supportive Dr. S. Nagamanju Ma'am.

Each and every word has been carefully selected, and every sentence thoughtfully written- to guide, to enlighten, and to touch you, our grateful readers. If you're reading this, we hope you can glimpse the fun, the camaraderie, and the wonderful experience that each Life Sciences student shares.

With this edition, we leave behind our legacy

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Signing off- Shikha, Abhilaya & Nidish

Bharatiya Vidya Bhavan

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