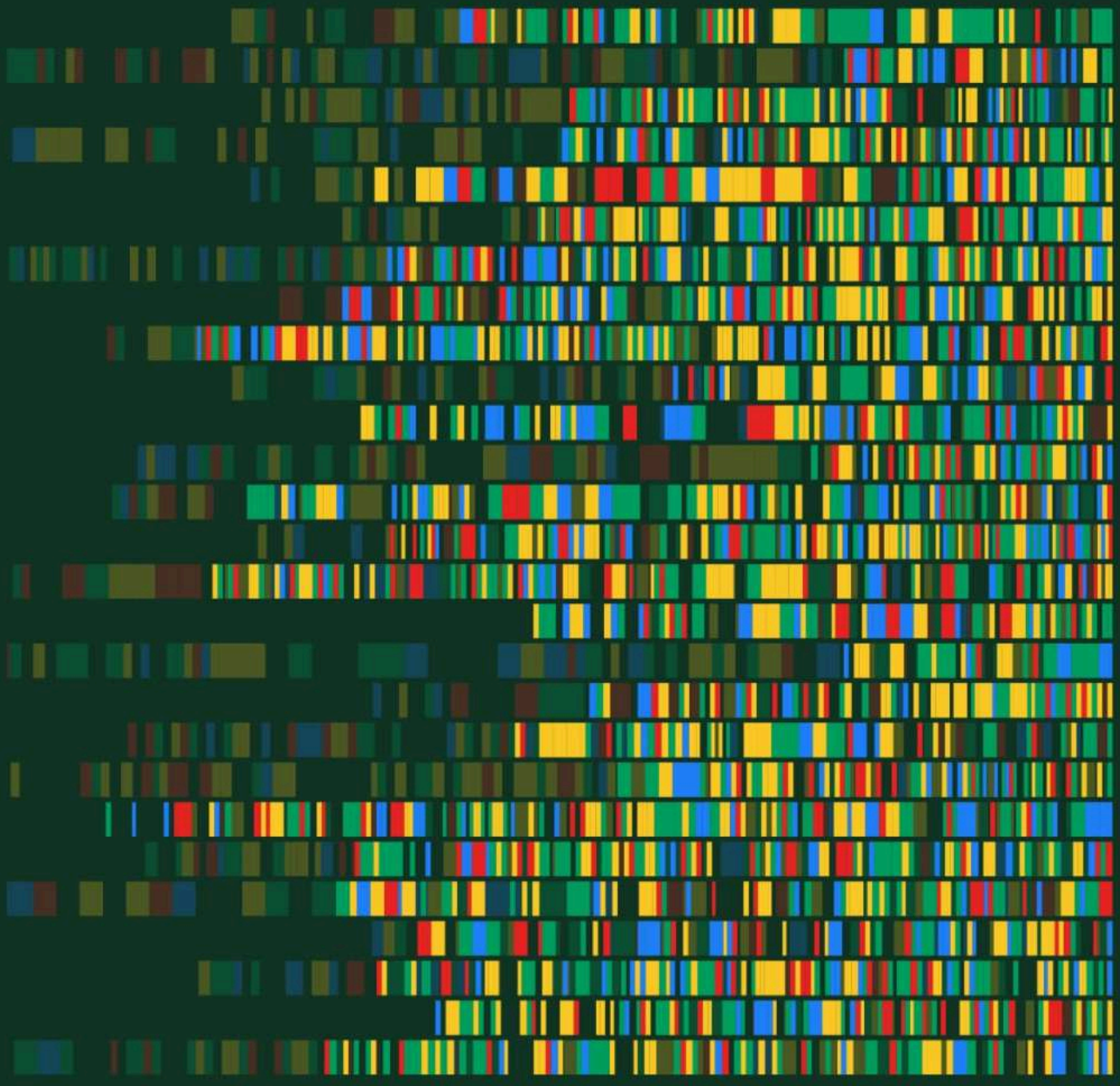
BHASKARACHARYA COLLEGE OF APPLIED SCIENCES
UNIVERSITY OF DELHI
NAAC Accredited 'A++' || Star College Status - DBT || NIRF College 2025 Rank - 45

ANNUAL MAGAZINE OF DEPARTMENT OF BIOMEDICAL SCIENCE

TRANSCRIPT



VOLUME II

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ABOUT THE DEPARTMENT

The Department of Biomedical Science is dedicated to bridging biology and medicine, with an advanced emphasis on understanding human health and disease at the molecular, systemic, and cellular levels. The department complements theoretical classroom learning with well-equipped laboratory practices to enhance the versatility and quality of education among students. Through regular lectures and close interactions with faculty members, students are encouraged to develop and assess their research aptitude and attitude.

The Department's laboratories are well equipped with instruments such as UV-visible spectrophotometers, thermal cyclers, gel documentation systems, biosafety cabinets, refrigerated high-speed centrifuges, orbital shaker incubators, microtomes, UV transilluminators, microplate ELISA readers, digital colony counters, digital viscometers, melting point apparatuses, and binocular microscopes with camera and projection systems, as well as other instruments including electronic balances, autoclaves, colorimeters, vertical and horizontal electrophoresis units, electro-blotting systems, laminar hoods, magnetic stirrers, vortex shakers, ice flaking machines, and ovens. Therefore, the department provides all the necessary facilities for students to gain as much practical experience as possible. This ensures the provision of a strong platform for students in their future endeavors in academics, research, and industry.

The Department of Biomedical Science is one of the few departments to have been awarded Star Department Status by the Department of Biotechnology (DBT), Government of India. Various innovative research projects and activities, new experiments, hands-on training sessions, regular workshops, invited lectures, conferences, and other events are conducted every academic year under the guidance of highly qualified faculty members, under the aegis of the Star College Scheme of DBT.

ABOUT TRANSCRIPT

The departmental magazine of the Department of Biomedical Science, Transcript, is the result of the collective efforts of the department's students to provide a platform for sharing creative ideas and contributions that reflect the intellectual, creative, and scientific spirit of the Department. Transcript '24 was previously published as the first edition of our department's annual magazine, the result of months of collaboration, teamwork, dedication, and artistry, bringing together various contributions from students and faculty.

The extensive and multifaceted work involved in creating the magazine was curated by the editorial team, who compiled content across various sections, including academic articles, scientific awareness pieces, creative writing, poetry, artwork, photography, and Department updates. The magazine also introduces the faculty of the Department, including teaching staff, along with messages from institutional authorities. Achievements, events, and activities that took place during the academic year, as well as significant position holders in clubs and the department, were also highlighted.

A significant aspect of the magazine is that it bridges science with creativity, reflecting the holistic development encouraged within the Department. The primary objective of the magazine is to provide a platform for students to express their ideas, talents, and perspectives beyond the classroom. Another key objective is to document and celebrate the achievements and activities of the department, thereby strengthening a sense of identity and pride among its members.

The magazine serves as a medium to connect students, faculty, and the wider academic community, encouraging knowledge sharing and collaboration. Overall, Transcript is not just a publication but a reflection of the department's core values and vibrant culture, where science meets creativity, serving as a strong source of expression, innovation, and community building.

Therefore, with these objectives in mind, we move forward to present the second edition of *Transcript*, featuring fresh ideas and the overarching theme of science with a touch of creativity to further enhance the quality of the content.

MESSAGE FROM DEAN OF COLLEGES, DU

Prof. Balaram Pani
Dean of Colleges, University of Delhi

I extend my warm greetings and best wishes to the students and faculties of the Department of Biomedical Science of Bhaskaracharya College of Applied Sciences on the publication of this departmental magazine. This initiative reflects the creativity and academic enthusiasm that characterize the vibrant learning environment of the University of Delhi.

Recent times have reminded us of the importance of resilience, responsibility, and compassion in addressing societal challenges. As students and scholars, your role extend beyond academic pursuits to contributing meaningfully to the well-being of society. By promoting awareness, supporting community welfare, and assisting those in need, you embody the true spirit of service and social responsibility.

The University administration remains committed to ensuring that students' academic progress and related activities continue with care and sensitivity toward their welfare and future aspirations.

I congratulate the students whose initiative made this publication possible and the faculty mentors who guided them throughout this journey. May this magazine serve as a platform for intellectual expression, creativity, and scholarly engagement, inspiring continued excellence within the academic community.

I wish you all good health, success, and a bright future ahead.

PRINCIPAL'S WARM WISHES

Prof. Avneesh Mittal

Officiating Principal

Bhaskaracharya College of Applied Sciences

It gives me immense pride to address the aspiring minds of the Department of Biomedical Science and to extend my heartfelt congratulations on the launch of your departmental magazine. This initiative serves as a testament to the creativity and dedication that define our students and faculty.

At Bhaskaracharya College of Applied Sciences, a NAAC A++ accredited institution, the Department of Biomedical Science continues to shine as a beacon of academic excellence. Offered by only three colleges under the University of Delhi, this programme has earned recognition as one of the most distinguished and sought-after under-graduate course.

Year after year, we witness a growing number of students choosing to join this programme, often migrating from other colleges and disciplines, drawn by the exceptional academic environment and opportunities our institution provides. The department has nurtured countless students who have excelled during their academic journey and went on to secure admission to premier institutions such as JNU, IISc, IISER, IIT, AIIMS, as well as leading universities across the globe for higher studies.

Such remarkable achievements are a reflection of the unwavering commitment and excellence of our faculty members. Having trained and conducted research at renowned institutions in India and abroad, our faculty members serve as mentors and torchbearers for the next generation of scholars. Through their rigorous academic guidance, they inspire not only undergraduate learners but also contribute significantly to advanced research and doctoral scholarship.

I am confident that this magazine will emerge as a platform showcasing the talent, innovation, and scholarly pursuits of our department. It is through such collaborative efforts that our academic community continues to flourish and grow stronger.

TEACHER-IN-CHARGE'S WISHES

Prof. Uma Chaudhry
Department of Biomedical Science, BCAS

Dear Children,

As we bring out this edition of our Department Magazine, I am filled with pride and gratitude for each one of you. While one cherished batch now stands at the threshold of new beginnings, many of you continue your journey with us — learning, exploring, questioning, and growing each day.

To the graduating batch (Batch of 2022-26), as you step beyond the gates of Bhaskaracharya College of Applied Sciences, carrying with you not just degrees, but experiences, the seasons of hard work, the colours of friendships, the thrill of achievements, and even the lessons hidden in challenges. When you would look back, I hope you will say with confidence, "I lived fully, I learned deeply, and I made my years count."

To those who remain with us, remember that your journey is still unfolding. Continue to participate wholeheartedly in academics, research, college fests, outreach, and every opportunity that comes your way. May you grow into compassionate, capable, and confident individuals, making both the institution and yourselves proud. I encourage every student to remain inquisitive, to welcome challenges as opportunities for growth, and to have confidence in their abilities. Let scientific inquiry and critical thinking illuminate your path. May your questions lead to exploration, your exploration to discovery, and your discoveries to solutions that serve society.

My sincere congratulations to the editorial team and all contributors for their hard work in bringing out this wonderful edition. May GENESIS 2026 inspire many more ideas, innovations, and milestones in the years ahead.

Fondly,
Uma Chaudhry

TEACHERS REMINISCE

My association with the Department of Biomedical Sciences dates back to the year 2004 when our college started B.Sc. (H) Biomedical Sciences. It has been a wonderful journey of mutually productive interaction which I would'nt trade for anything else. It gives me immense pride and joy to see our students excel in Indian as well as global arena. There is a rich sprinkling of students in the field of Biomedical Sciences including Biotechnology, Genetics, Bioinformatics. May they continue to excel by following the path shown by their illustrious peers.

Dr. Anita Sondhi (Dept. of Biochemistry)

Biomedical science is a calling to decode life's mysteries and turn discoveries into healing for humanity. It fuses biology with technology, data, and global challenges- demanding bold innovation and unwavering integrity.

The words of Daisaku Ikeda, Japanese Buddhist philosopher, educator, and peace advocate, resonate here:

"The purpose of education is to create value- to find meaning, to live with wisdom, and to contribute to the happiness of others."

Let this guide your biomedical research: anchor work in ethics, empathy, and real-world impact on diagnostics, therapies, and public health.

Young researchers, embrace limitless curiosity, purposeful collaboration, and fearless innovation. Whether we see 2047 or not, future generations will- dedicate today to their secure, bright tomorrow, as PM Modi envisions for Viksit Bharat.

Dr. Shivani G Varmani

It gives me immense pleasure to extend my warm greetings to all students, colleagues, and alumni on the occasion of our Annual Department Fest, GENESIS 2026.

Biomedical Science is a field that nurtures curiosity, critical thinking, and a deep appreciation for the complexity of life. Every year, this fest reminds us that science flourishes not only in laboratories and classrooms but also through collaboration, creativity, and community spirit. I encourage all of you to participate wholeheartedly, learn from one another, and strengthen the bonds that make our department vibrant and dynamic. My sincere appreciation goes to the organizing committee and student volunteers whose dedication makes this event possible. I also congratulate the editorial team and all contributors for their hard work and commitment in bringing out this issue. This magazine is a reflection of our department's intellectual vitality, creativity, and collective effort.

Prof. Uma Dhawan

TEACHERS REMINISCE

It is with a sense of honour and responsibility that I convey my message for this edition of our departmental magazine. The publication exemplifies the scholarly temperament and disciplined efforts of our students and faculty members. Such academic initiatives contribute meaningfully to the enrichment of our intellectual environment. I place on record my appreciation for the editorial team's dedication and extend my best wishes for its continued excellence.

Dr. Kapil Roy

It fills me with great pride to be a part of this wonderful Department of Biomedical Science. Since the day I have joined the department, I have been happy to teach the future scientists. I truly appreciate the efforts of the students, which are manifested in their drive to participate in various subject-related events. I hope that the magagine reflects the efforts put in by the editorial team and that the content contributed by other students enables readers to appreciate the contributions that the department and its students make to the college and beyond.

Dr. Neha Singh

Biomedical Science extends far beyond the classroom, influencing diagnostics, therapies, and public health in meaningful ways.
As the field becomes increasingly interdisciplinary-integrating biology with technology is essential. With innovation comes responsibility; our work must be guided by scientific rigor, ethics, and empathy, as it directly impacts human lives. To our young researchers, I encourage you to question boldly, explore widely, and pursue research that addresses real healthcare challenges. Let this magazine inspire you to think beyond boundaries and contribute thoughtfully to the evolving future of biomedical sciences.

Dr. Vipul Yadav

TEACHERS REMINISCE

The Department of Biomedical Science is dedicated to render high quality education and research for the undergraduates. This provides a course which is a foundation of modern science that merges the biological science with other applied science skills to improve scientific temperament. It has an integrated approach to technological tools and exceptional learning techniques for the students. The department has empowering teachers who nurture the students into facing challenges and become competent and responsible citizens who will contribute to a sustainable future .
I feel honoured and grateful to be a part of this fantastic Department.
A Quote for our students: **“An investment in knowledge always pays the best interest.”**

Dr. Divya Verma

It is a pleasure to extend my heartfelt wishes on the occasion of GENESIS 2026 and the release of the Transcript. This magazine reflects the enthusiasm, creativity, and dedication of our students as they grow through learning and innovation. I encourage every student to stay curious, embrace challenges, and believe in their potential, letting scientific thinking guide their path, turning curiosity into discoveries that benefit society.
In the fast pace of life, remember to stay calm and listen to the quiet whispers within your heart—that helps us move forward with purpose. Respect your teachers, for they burn themselves to give you light and guide you toward knowledge. With perseverance, compassion, and self-belief, may you achieve excellence and contribute meaningfully to society.

"Love everyone, serve the needy, remember God, and always speak the truth."

Dr. Ravi Jain

It gives me immense pleasure to share my warmest wishes on the release of this edition of Magazine at the Department of Biomedical Science, BCAS. This publication stands as a true testament to the curiosity, perseverance, creativity, and unwavering passion of our students and faculty for advancing biomedical knowledge.
May this issue inspire innovative thinking, encourage meaningful research collaborations, and motivate everyone to strive for higher standards in learning and discovery. Let it serve as a dynamic platform for intellectual growth, scientific dialogue, and continued innovation in biomedical sciences. I extend my heartfelt congratulations to all contributors and wish you continued growth, success, and impactful achievements in the ever-evolving field of biomedical science.

Dr. Chanchal Bareja

CREATIVE EXPRESSION

THE HEART OF THE CAMPUS: LOVING THE CHAOS AND THE QUIET

College is a strange, beautiful whirlwind, isn't it? It's a place where the days feel like a lifetime and the years feel like a heartbeat. One moment, you're sitting in the canteen, the sun hitting the table just right, laughing until your stomach hurts with people who were strangers only a month ago. In those moments, it feels like you've finally found where you belong. You feel invincible, like the world is just waiting for you to step out and take it.

But then, the sun sets, and the another side of the moon shows up. Suddenly, you're staring at a stack of files that won't write themselves, a laptop screen that's too bright for 3 AM, and the looming shadow of exams that feel like they'll decide your entire life. There's the pressure of attendance, the exhaustion of back-to-back classes, and that quiet, heavy realization that you're the one in charge of it all now. It's amazing, it's lovely, and—if we're being honest—it's sometimes completely overwhelming.

But that's the secret beauty of these years. It's the first time we're truly out there, navigating the mess, and trying to figure out who we are when no one is watching. To make it through this rollercoaster with your heart intact, you need two anchors to hold onto.

1. The Crowds and the "Core"

There is a specific kind of magic in the sheer number of people you encounter here. College is perhaps the only time in your life when you will be surrounded by thousands of people your own age, all chasing different dreams in the same hallways.

My advice? Open your heart to the crowd. Don't be a ghost in the corridors. Talk to everyone—the person standing behind you in the library queue, the lab partner you've never spoken to, the senior who looks like they have it all figured out (spoiler: they don't). These "campus friends" are the ones who make the environment feel like home; they are the smiles that brighten a rainy Tuesday and the people who make the atmosphere feel electric.

However, the psychological trick to staying grounded is knowing the difference between a crowd and a "core." You can have a hundred friends to party with, but you need an inner circle to cry with. You need those two or three souls with whom you can drop the "I'm fine" act entirely.

College can feel incredibly lonely even when you're surrounded by people, and having a small group where you can "share your heart out" is your safety net. You need people who know your coffee order, your biggest fears, and the exact look on your face when you're about to give up. When the assignments get too heavy and the exams feel too close, these are the people who will remind you why you started. They make the heavy parts of life feel a lot lighter, simply by standing next to you in the dark.

THE HEART OF THE CAMPUS: LOVING THE CHAOS AND THE QUIET

2. Discipline: The Only Way to Feel Light

While friends are the heart of your college life, discipline is the spine. It's the part no one sees, but it's what keeps you standing tall.

We often think of discipline as something heavy or restrictive-like a cage of rules. But in reality, discipline is what gives you your freedom. Think about that feeling of guilt when you're out with your friends but you know you have an unfinished assignment waiting at home. You aren't really "there," are you? You're half-present, burdened by the work you skipped.

When you choose to be disciplined-when you show up to that 9 AM lecture even when you're tired, or when you finish your file work three days before the deadline-you are giving yourself a gift. You are clearing the air. Discipline is the only thing that allows you to enjoy the "lovely" parts of college without a shadow hanging over you.

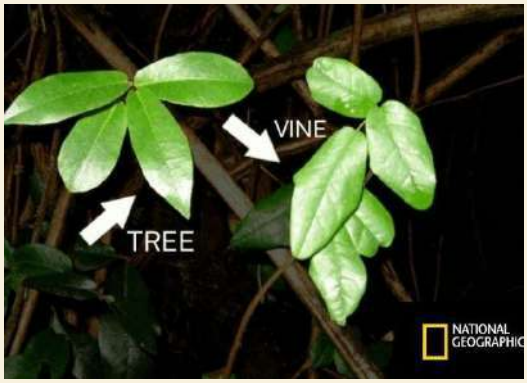
Friends make the journey beautiful, but discipline is what builds your future. It's the thing that earns you your credits, your respect, and your confidence. It's the promise you make to your future self that says, "I'm going to make sure you succeed." If you can master your time, you'll find that the "harsh" days aren't actually attacks; they're just milestones you're already prepare.

Chiranjeevi S Kumar
II Year

A WORLD OF ECCENTRIC ORGANISMS

Humans have always boasted about the superiority of their species in terms of cognitive and analytical abilities, but we sometimes forget that we live in a world brimming with wonders and mysteries, vast enough to render such pride homeless. Nature, after all, remains the greatest engineer. Across this sentient sphere of the solar system exist several strange species so remarkable that they stretch the limits beyond our imagination. In this article, I'd like to introduce some of those peculiar backbenchers of the biological world, who exist as one of the most remarkable things nature has ever created.

1) *Boquila trifoliolata*-



This flowering plant, also known as the chameleon vine, is only found in the temperate forests of Argentina and Central and Southern Chile.
Boquila trifoliolata is the only known plant species that has the ability to mimic the leaves of numerous host plants. This is called memetic polymorphism which is a form of Batesian mimicry in which a harmless species mimics a harmful one to repel predators. A real show- off in the camouflage world- an artist of the finest category.

2) *Welwitschia mirabilis*-

Sometimes referred to as the tree tumbo (*tweeblaarkanniedood* ('two leaves; can't die') in Afrikaans), *Welwitschia mirabilis* is a 'living fossil' plant which is endemic to the Namib Desert in Namibia and Angola.
One of its most unique features is that it grows only two permanent leaves which grow continuously over its whole lifetime. Over centuries, the two leaves split into tattered, ribbon-like forms. This plant is one of the longest living plants and is known to survive thousands of years by absorbing coastal fog.

Undamaged leaves of *Welwitschia*

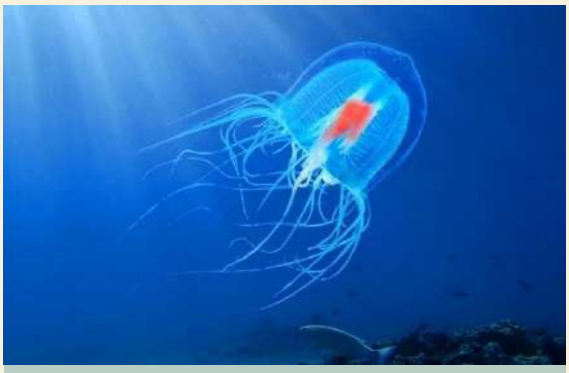
Welwitschia in the desert

A WORLD OF ECCENTRIC ORGANISMS

3) *Turritopsis dohrnii*-

Turritopsis dohrnii is also known as the immortal jellyfish because unlike other living organisms, death is an option for them, not a fate they are bound to succumb to.

They emerge as small, free-swimming larvae which eventually settle down, giving rise to a polyp colony. Jellyfishes then bud off from these polyps and become sexually mature over time.



The immortal Jellyfish

If this jellyfish is exposed to any kind of environmental challenges or physical damage it can regress to its polyp stage, forming a new polyp colony. Sounds a bit like the mythological bird Phoenix, doesn't it?

But due to its ability to withstand potentially unfavourable and inhospitable conditions, which would normally be fatal to other organisms, this species has higher efficiency than competing species in their consumption of food, and has therefore invaded many environments, leading to loss of other species. Hm, maybe immortality isn't as good as it sounds :).

4) *Tardigrada*-

Tardigrades are miniscule & plump water bears although some of their species are terrestrial as well. They are some of the most resilient animals living on this planet and can withstand a diverse range of environments. They have been known to show extreme tolerance to very high pressure, temperature, ionising radiations and vacuum. They make themselves indestructible by drawing their legs in and forming a dehydrated cyst during which time there is no metabolic activity that takes place in their bodies.

Tardigrada

Dehydrated tardigrades were also taken on space missions and exposed to ultraviolet and cosmic radiations, vacuum and microgravity. When they were brought back to Earth, most of them were rehydrated, and several were indeed alive. So yes, an apocalypse can wipe out most species off the face of the earth, but these folks will keep on thriving nevertheless.

Sanjukta Baidya
I Year

GROUNDED BY GRAVITY: DEBUNKING THE RETROGRADE THEORY

In 1983, when Sally Ride-the first American woman to go to space, was preparing for her first flight, NASA gave her a massive box of 100 tampons for a one-week trip! This is one of the most famous examples of how clueless the initial approach was for women in space.

In the early 80s, NASA's all-male-medical community believed that gravity was the primary force responsible for pulling menstrual blood out of the body. Without this gravitation pull, they feared that the blood would flow backward through the fallopian tubes and into the pelvic cavity-phenomenon known as Retrograde menstruation which may lead to life threatening infection peritonitis or even endometriosis.

This theory was debunked by Dr. Rhea Seddon and Dr. Virginia Wotring along with Dr. Varsha Jain and many other female colleagues. Dr. Seddon pointed out that Uterus is a muscular organ which uses its natural contractions (peristalsis) and its internal pressure to expel the lining. Much like the heart pumps blood or the esophagus moves food via contractions, the uterus is an 'active pump' and not a gravity fed vessel or lava lamp. Her work was later supported by Dr. Votring and Dr. Jain, who published the data proving that menstruation in space is identical to menstruation on earth.

For decades, the mystery around 'space period' held the door shut for women while the rest of the world moved forward. The normal biological process was turned into a 'disability' that disqualified elite female pilots from even applying. While the experts once feared that biology would be a barrier to the stars, we now know that the "experts" were wrong, and the female body is perfectly "flight-ready" just as it is.

Mahi Kabi
I Year

TOOTH FOR THE EYE

You might have heard the phrase dagger for the eye but have you ever seen one? Well you might have not seen a dagger but brace yourself to see a tooth for the eye. A surgical procedure for corneal implant called osteo odonto keratoprosthesis or tooth in eye surgery is making its mark in the med innovation market. The procedure was pioneered by Prof. Benedetto Strampelli and further refined by Prof. Giancarlo Falcinelli. It requires your tooth and some alveolar bone around it to act as a scaffold for a small cylinder which replaces cornea, this scaffold is then inserted back into your mouth to develop connective tissue and blood supply around it, while the scaffold prepares itself for moving to eye from mouth, the surgeon makes sure to prepare the eye to welcome this prosthesis in a similar way by taking a thin layer of oral mucosa and stitching it to the eye so that the scaffold is held in place. After three months or so, the scaffold along with the cylinder is stitched onto the graft of oral mucosa which restores vision for the patient with low risk of rejection. Described in a few words here, this process is a tedious one and brief with many considerations pre-surgery and potential risks-post surgery. It is usually the last option for end-stage ocular surface diseases such as Steven Johnson's syndrome, autoimmune dry eye-related disease, trachoma etcetera, before this option, corneal transplants are usually taken into consideration.

Idhika Sethi
I Year

हे स्त्री तुम खूबसूरत हो !

तुम खूबसूरत हो, खुद से ये हर बार कहो
तुम खूबसूरत हो, क्योंकि -
तुम संघर्ष हो करती
तुम जब किसी से ना डरती
जब सीना तान के हो चलती
जब भारी पलकों के साथ
कंधों पर जिम्मेदारियों को लेकर चलती।

तुम खूबसूरत हो,
चाहे ये जमाना कुछ भी कहे
न मंगलसूत्र से बनती
न सैंडल पर हो जाती

रंग, रूप तुम्हारा कुछ भी हो
और, चाहे ये जमाना कुछ भी कहे
तुम खूबसूरत हो।।

तो बस इतना ही है कहना तुमसे
कि, अपने अंदर की ये आग न बुझाना
कुछ कर गुजरने का जोश न मिटाना
हर सुबह उठ कर तुम फिर चलना
गिर जाओ, तो फिर उठना
और, खुद से हर दफा कहना
हाँ! तुम खूबसूरत हो
और रहोगी।।

श्रद्धा विश्वकर्मा
१ वर्ष

REGIONAL POEMS (TRANSLATION ON RIGHT SIDE)

हमर हितेषी

हमरा सँ किनको आश छैक,
किनको हृदय में उल्लास छैक।
कियो हमरा लेल सपना पोशी रहल अछि ।
हमर सपना के अपन, बना लेने अछि ।
सब बाट आसान बनेबाक लेल
उड़्य लेल पंख देबे लेल
हमरा लेल अपन सब सुख त्याग करे लेल
कियो सब कठिनाई के समक्ष दृढ़ता स बैसल अछि।
हमर सपना के अपना बना लेने अछि।
ओ हमरा लेल, हर क्षण तैयार रहैत छथ
हमर मुस्कान लेल, अपन सुखक बलिदान द देने छथि) उना हमर सपना के आँखि में बुननिहार कियो
हमर सपना के अपन बना लेने अछि सपना ।

मेरे शुभेच्छु

किसी को मुझसे आस है
किसी के मन में उल्लास है।
कोई मेरे लिए ख्वाब संजोए बैठा है।
मेरे सपनों को अपना बनाएं बैठा है।।।
सभी रास्ते आसान करने को
मेरे लिए अपनी खुशियाः कुर्बान करने को
कोई दृढ़ता से सभी कठिनाइयों के समक्ष बैठा है।
कोई मेरे सपने अपना बनाए बैठा है।
मेरे लिए हर क्षण तैयार बैठा है,
और अपनी आँखो में मे मेरे सपने बुन रहा
कोई मेरे सपने के अपना बनाए बैठा है।

प्रियंका कुमारी
१ वर्ष

പുലർകാലസ്വപ്നം

തീവണ്ടിയുടെ ഘോരമാം
നിശബ്ദതയിൽ
പാളവും ചക്രങ്ങളും തമ്മിലുള്ള
തേങ്ങലിൽ
അത്യുഷ്ണത്തിൽ
ഒരു പുലർകാല സ്വപ്നമെന്ന പോലെ
നിന്നെ കാണും

കടുക്പാടങ്ങളെ കളിയാക്കി കൂക്കുന്ന
വണ്ടിയോ
മനം കരിയിക്കാൻ മുഖത്തടിക്കുന്ന
വെയിലോ
ആ സ്വപ്നത്തെ കുറിച്ച്
അറിയുകയില്ല
ഒരു സൂചന പോലും ഞൻ
നൽകുകയില്ല

DAYDREAM

In the massive silence of the train
Between the wailings between the wheels and track
In the scorching heat
I will see you as a daydream

Neither the train mocking the mustard fields
Nor the light which weakens your soul
Will know about that dream
I wont even give a clue

Emmanuel Paul Kunnath
IV Year

ENGLISH

THE DIFFERENT PERSPECTIVE

Don't look that way!
The sky crumbles,
In a world enlightened with flares,
No other sound but that of the sirens,
The promise of it being the last one
Shatters as another metal bird flies by.
Parliaments reduced to ash,
Lives on the brink of extinction.
In a place where everything is lost,
And no one knows the cost.
Look another way,
Children fiddling in the grass,
Birds chirping a melody,
As apollo showers his warm blessing.
A place where you and I are together,
Nought a trench but a shelter.
Men and women dancing around,
To the pianist who plays to all the drunk.
Cheers and encores follow up
If only there was no one to rule,
And no one to cower,
Aren't there things more powerful than 'POWER.'

Myraa Jaiswal
I Year

A NARRATIVE OF SIGNALS

Upon an instance a neuron fired,
For a stimulus whose response was required.
The signal travelled many pathways
Some quick by saltatory conduction,
Some a little slow because of chemical coordination.
The impulse transmitted till it reached an effector,
A hormone is produced , now find its detector.
Plumhing into pipelines of gushing blood.
Findinh destination through the tissues,
Coming across cell membranes who have many issues.
"You can't cross me you aren't a lipid! "
The other says, "For me receptor you aren't a fit. "
The trace element finally reaches where it's required
A receptor to which it could finally bind,
Starting a cascade mechanism inside.
T receptor goes through conformational change,
Triggering the intrinsic proteins in range.
The signal becomes more powerful with each step.
Through the help of secondary messengers,
Down this chain enzymes are rendered,
Into it's active state forming compound needed.
This proves that the network exceeded.
The signals travel in our body each day.
Understanding the signal's travels is imperative,
The tiniest parts form the bigger narrative.

Myraa Jaiswal
I Year

BATTLEFIELDS GALORE

Here comes a party clad of deception. what am I to believe?
With no education , no perception.
As a patriot, my duty is to cleave.
Who and for what reason?
"Just do as the government says!
Raise your voice, be hanged for treason."
But I'm only a boy with different dreams to chase
Of singing songs with tales disguised.
But with higher ups choking on cakes and tarts
I was sentenced to this bleeding riptide
To a trench with my pockets full of metal darts.
Canons and deadly gases surround,
I should die but i dream a bit further,
reach a home where Im bound,
with my family of little troubles.

T'was only an illusion
for a man whose life is not his own

Myraa Jaiswal
I Year

INHERITED IN MY SEQUENCE

I did not choose you.
You felt encoded , like something written
into my DNA long before I understood
what inheritance meant.

Among billions of nucleotides,
you were not a random mutation.
You were a conserved sequence ,
protected through evolution,
preserved against time.

If my heart were a genome,
you would be the gene
that never undergoes deletion,
never faces frameshift,
never silenced by methylation.

You bind to me
like a transcription factor —
initiating cascades of expression
I once kept repressed
Since you,
my fear has been downregulated,
my hope amplified,
my loneliness knocked out
as if edited cleanly
by CRISPR precision.

You are not dominant over me ,
we are codominant,
expressed together,
visible in the phenotype
of every smile I try to hide.

If love were Mendelian,
perhaps they would call it
simple inheritance.
But this — this feels polygenic.

Complex. Multifactorial.
Influenced by environment,
yet undeniably genetic.

You crossed over
into the homologous chromosome
of my guarded world,
recombining parts of me
I never thought could align again.

In the randomness of genetic drift,
in the probability of independent assortment,
what were the chances
that two sequences
would complement so perfectly?

Perhaps we are alleles
at the same locus —
different,
yet incomplete without the other.

And if one day distance attempts mutation,
if silence behaves like deletion —
remember this:
Some bonds are not transient RNA.
Some are not easily degraded.

Some are replicated faithfully,
generation after generation,
protected by repair mechanisms
stronger than entropy itself.

If I were to pass down
one trait to time,
let it be this —

That loving you
felt less like coincidence
and more like inheritance.

And if destiny is written
in the language of A, T, G, and C,
then somewhere
in my double helix

you are the sequence
I never want to lose

Anshul
II Year

INNATE

"Innate"

We are not fragile.
We are immunological.

Built with surveillance systems,
We flag danger,
We recognize brilliance,
With equal accuracy.

We are all a little like immune cells,
Born alert,
Never fully asleep.

Some of us are macrophages,
Carrying old battles in our cytoplasm,
Digesting pain quietly
So others can live lighter.

Some are neutrophils,
Rushing first into chaos,
Brave, impulsive,

Dying early but leaving stories behind.

Some move like T cells,
Waiting for the right signal,
Activated only
When meaning presents its antigen.

And some,
Ah, some are B cells,
Holding memory in secret compartments,
Turning heartbreak into antibodies
So the same wound never breaks them twice.

Life presents antigens.
Failure multiplies.
Fear mutates.

We adapt.
We differentiate.
We build memory.

We are adaptive immunity,
Activated by meaning,
Expanded by challenge,
Refined by exposure.

We do not repeat the same wound twice
without building resistance.

Sometimes we overreact,
Cytokine storms of emotion,
Autoimmune wars
Where we mistake ourselves for the enemy.

But even misdirected defense
is still proof
that we are built to survive.

And sometimes,
We learn tolerance.

We learn
Not every foreign thing
Is a threat.

Some differences
Are growth.

Under the microscope,
Cells look small.

But inside them,
Complex defense networks,
Silent survival signals,
Blueprints of resilience.

Maybe that is what we are too:
Soft tissue
With astonishing immunity.

Not fragile.
Adaptive.
Evolving.

Fighting.
Remembering.
Forgiving.

Dhwani Jain
II Year

RESEARCH ROOTS, BUSINESS WINGS

Integrative Analysis of Shared Neurodegeneration-Associated Pathways Linked to Bisphenol A and Polybrominated Diphenyl Ethers

Bisphenol-A (BPA) and Polybrominated Diphenyl Ethers (PBDEs), two ubiquitous environmental contaminants and endocrine-disrupting chemicals, are important risk factors in neurotoxicity research. From their conclusions, there is sufficient evidence to implicate them in cognitive dysfunction and neurodegenerative processes.

Bisphenol A (BPA) belong to the category of Endocrine Disrupting Chemicals and is one of the most produced synthetic compounds, found in epoxy resins and polycarbonate plastics, which are used in food storage and many containers. Exposure to BPA has a detrimental effect on the neuronal system, including increased oxidative stress, altered expression levels of several important genes and proteins, detrimental effects on neurotransmitters, excitotoxicity and neuroinflammation, impaired blood–brain barrier function, neuronal damage, effects of apoptosis, disruption of intracellular Ca^{2+} homeostasis, decrease in axon length, microglial DNA damage. Furthermore, exposure to BPA raises the risk of neurologic disorders, such as neurodegenerative conditions like Parkinson's and Alzheimer's and neurovascular conditions like stroke as well as cognitive deficits and behavioural dysfunctions. These effects are evident in diverse experimental models and supported by molecular and epidemiological studies, and therefore provide a link towards BPA's contribution to neuronal degeneration and cognitive decline.

Polybrominated diphenyl ethers (PBDEs), used globally as flame retardants, are synthetic neurotoxic compounds, these are persistent and lipophilic, therefore get accumulated in mammalian tissues, and are stable in the environment. Different studies suggest that when they undergo biotransformation the resulting metabolites are more toxic than the parent compounds. Organisms that are in their developmental stages are more susceptible to the toxic effects of PBDEs and their outcomes are more severe. PBDEs exerts oxidative stress which in turn has adverse effects on the neuronal synapse, brain morphology, and decreases neuronal viability.

Shruti Banerjee
Guide: Prof. Uma Dhawan

Management of Agricultural Pests and Diseases Using Panchang Extract Prepared from *Solanum nigrum*

Agricultural productivity has been severely constrained by insects, pests, and phytopathogenic pathogens, which leads to significant loss of crop yield worldwide. Conventional chemical pesticides, though effective, can pose some serious concerns, including environmental pollution, biomagnification, bioaccumulation, development of resistant pest populations, and, in some cases, adverse effects on non-target organisms and human health; cause cancer, allergies or even death in severe cases. All this leads to an ecological imbalance. These challenges highlight the importance of exploring eco-friendly and sustainable alternatives for pest and disease management. *Solanum nigrum*, commonly known as Black nightshade, and as 'Makoi' in India, is a medicinal plant with an enormous potential for developing an effective bio-pesticide attributed to its various phytochemical constituents and pharmacological effects. We intend to do water-based extraction of the whole plant or to make a lyophilised powder and further checking its efficacy by conducting field testing on plants. The extract would be a "Panchang" based extract which connects it to the Indian Knowledge System. We aim to provide a formulation which would be easy to use and can be widely used by farmers. The anticipated results are reduced pathogen load, and provide a better alternative than the chemical pesticides. This project bridges the traditional ayurvedic knowledge with modern evidence-based research to produce a biocontrol product that is safe to use and the development of a 'Best of-Waste' product.

Jyotsna & Suhani
Guide: Dr. Shivani G Varmani

Evaluation and Use of Botanical Extracts from *Achyranthes aspera* for the Management of Agricultural Pests and Diseases

Crop production can be affected by the presence of insects and disease-causing microbes. Insects and disease-causing microbes have the potential to cause significant damage to crops.

Although chemical pesticides are widely used by humans to counter these threats, the overdependence on these chemicals has resulted in some not-so-desirable effects, including detrimental effects on the environment, development of resistance among insects, toxicity to a variety of organisms, and disruption of the balance of nature. Therefore, there is a definite need for efficient biocontrol methods that can counter these problems.

Achyranthes aspera is a herbal plant with a wide range of uses. The plant contains a number of active compounds such as phenolics, flavonoids, alkaloids, saponins, and tannins that have shown efficacy against bacteria, fungi, and insects. Based on this knowledge, it is proposed to prepare a water-based Panchang extract from *A. aspera*. The proposed extract will seek to leverage the most important compounds in the plant, as has been identified in the Indian Knowledge System, while also ensuring that resource waste is minimized by using a substantial amount of plant material that would otherwise be considered waste.

The aim is to first evaluate the biocontrol potential of this formulation in a laboratory setting and then confirm these in the field. The ultimate aim is to create a sustainable and flexible biocontrol agent that can be used to control crop pests and plant diseases in both laboratory and practical agricultural settings.

Lavisha, Aditi Ujjainwal
Guide: Dr. Shivani G Varmani

Plant-Based Mitigation of Indoor Air Pollution from Lithium-Ion Battery Overheating

In this era, we live surrounded by screens. From early morning alarms on our phones to late-night work on our laptops, electronic devices have quietly become part of our everyday routine. But hidden inside these devices are lithium-ion batteries, powerful, efficient, and essential to modern life. What many people don't realise is that when these batteries overheat or are used for long periods, they can release tiny particles into the indoor air. Because we spend most of our time indoors, this invisible pollution may be affecting the air we breathe without us even knowing it. My research began with a simple question: If technology is contributing to indoor air pollution, could nature offer a solution?

Remembering this famous saying, "Nature can balance itself". I turned to something much simpler and closer to home: indoor plants commonly found in Indian households. This research not only brings attention to a hidden source of indoor pollution but also reminds us that sometimes the most effective solutions are rooted in nature itself, quietly working beside us, just like the plants in our homes.

Sameer Ahmed
Guide: Dr. Shivani G Varmani

Immunochemical Profiling of Vegan Foods for Detection of Hidden Animal Protein Using ELISA and LC-MS/MS

The consumption of vegan and plant-based food products has increased significantly in recent years due to growing awareness about health, environmental sustainability, and ethical concerns. As demand continues to rise, the global market for processed vegan foods is expanding rapidly. However, this growth has also made the production system more complex. Many vegan and non-vegan products are manufactured within shared facilities and supply chains, which increases the risk of unintended cross-contamination with animal-derived proteins.

Such contamination raises concerns regarding the authenticity of vegan-labeled products. It is especially serious for individuals with allergies to common animal proteins such as milk, egg, and gelatin. Several studies have reported the presence of undeclared animal ingredients in products marketed as vegan, including chocolates, cookies, and other processed foods. These incidents are often linked to cross-contamination during manufacturing or inadequate sanitation practices. In addition, the use of gelatin, which is derived from bovine or porcine sources, in confectionery items and dietary supplements poses ethical, religious, and legal concerns for consumers following vegan or vegetarian diets.

Therefore, there is a clear need for sensitive and reliable methods to detect trace levels of animal proteins in vegan foods. This study aims to address this gap by proposing a combined analytical approach to identify hidden animal protein contamination, ensuring product authenticity, allergen safety, and regulatory compliance.

Angilina
Guide: Prof. Uma Chaudhry

DNA Interactions Induced by Aluminium from Pharmaceutical Antacid Formulations

My interest in this particular topic began from observing how commonly antacids are used in everyday life. For many people, they're a routine solution for digestive discomfort and acidity. But this familiarity made me curious: when something is used so frequently, especially over long periods, what might be happening beyond its immediate relief? That question encouraged me to explore the biological effects of antacid components more deeply. Many widely used antacids contain aluminium. Although it helps neutralise stomach acid effectively, aluminium itself has no essential biological role and is chemically quite reactive.

This raised an important scientific curiosity for me: if aluminium can interact with biological molecules, could repeated exposure influence cellular systems in subtle ways that we don't immediately notice DNA became the central focus of my work because it is not just a static genetic blueprint; it is structurally dynamic and highly sensitive to its chemical environment. Aluminium, as a strongly charged metal ion, has the potential to interact with DNA and influence its structure or organisation. What especially interested me is that most scientific studies examine simple aluminium compounds, while real pharmaceutical formulations exist in more complex chemical forms. Understanding this difference feels important when thinking about real- world exposure.

My research primarily uses *in silico* approaches to model how aluminium interacts with DNA at the molecular level and to predict possible structural effects. These findings can later be explored further using biophysical and functional analyses. Overall, this work is driven by a simple but meaningful curiosity understanding how substances we commonly rely on for everyday health may quietly interact with the most fundamental systems of our cells.

Divya Raina
Guide: Dr. Kapil Roy

Methylmercury and Brain Ageing: Why Long Term Epidemiological Evidence Remains Absent?

My work explores whether chronic low-dose exposure to methylmercury (MeHg), a globally prevalent environmental neurotoxicant, may contribute to molecular processes associated with brain aging and neurodegeneration. While MeHg-induced developmental neurotoxicity is well established, its potential involvement in late-onset disorders such as Alzheimer's disease, Parkinson's disease, and Amyotrophic lateral sclerosis remains insufficiently understood. The absence of definitive epidemiological evidence—largely due to prolonged latency periods, multifactorial disease etiology, and challenges in lifetime exposure assessment—has created a critical gap in environmental neurobiology.

In addressing this gap, I investigated whether transcriptomic alterations associated with MeHg exposure converge with molecular signatures observed in neurodegenerative conditions. My findings reveal a predominance of gene downregulation following MeHg exposure, suggesting suppression of neuronal maintenance and metabolic processes. Functional convergence appears to involve oxidative stress responses, mitochondrial dysfunction, neuroinflammatory signaling, and apoptotic regulation—mechanistic hallmarks consistently implicated in neurodegenerative pathology.

Although these observations do not establish causality, they provide systems-level molecular evidence supporting the biological plausibility that chronic environmental MeHg exposure may influence neurodegenerative vulnerability over time. By shifting focus from overt toxicity to subtle long-term molecular perturbations, this work underscores the importance of integrating environmental toxicology with aging research. Ultimately, it highlights the need for longitudinal, multi-omics, and gene–environment interaction studies to better understand how persistent low-dose toxicant exposure may shape trajectories of brain health across the lifespan.

Vaishnavi Jha
Guide: Prof. Uma Dhawan

Detection of Animal-Derived Contamination in Vegan Foods: Current Analytical Approaches and the Need for Universal PCR-Based Markers

Nowadays, more and more people are choosing vegan and plant-based foods for health, environmental, and ethical reasons. But even though these foods are labeled as vegan, small amounts of animal-derived material can accidentally enter them during processing, packaging, or transportation, especially when factories use the same equipment for both animal and plant products. This hidden contamination can break consumer trust and go against strict food regulations. My project focuses on finding a better way to detect this contamination using DNA testing. While current methods look for many different animal genes or unstable mitochondrial DNA, I am working toward using one stable, universal gene that exists in all vertebrates but not in plants. This would make detection simpler, more accurate, and easier to standardize. If successfully applied, this method could help food companies ensure cleaner production, help regulators enforce vegan labeling more effectively, and give consumers confidence that the foods they buy truly match their values.

Priyank Raj
Guide: Prof. Uma Chaudhry

Engineering Cysteine-Free Nanobodies for Enhanced Cytoplasmic Expression and Function

Nanobodies, formally designated as VHH domains, are the smallest functional antigen-binding fragments, originally discovered in the heavy-chain-only antibodies (HCAbs) of camelids and sharks. Their compact architecture allows them to target cryptic epitopes that are sterically inaccessible to conventional IgG antibodies. However, a significant "Redox Bottleneck" limits their utility as intrabodies, probes intended to function within the living cell interior.

The native cytoplasm is a highly reducing environment that prevents the formation of the conserved intradomain disulfide bond. Without this covalent "staple," most nanobody frameworks suffer from thermodynamic instability, leading to misfolding and the formation of insoluble inclusion bodies. Traditional solutions include directing the proteins to the periplasmic space to access an oxidizing environment or utilizing engineered host strains (such as SHuffle or Origami) that have been genetically modified to allow disulfide formation in the cytoplasm. However, these approaches often suffer from low protein yields, translocation limits, or impaired cell growth.

This research will investigate a novel paradigm: the construction of completely cysteine-free nanobodies. Validated by biophysical evidence showing that the mechanical stability of VHH complexes can be independent of the disulfide state, the project will utilize directed evolution to identify compensatory framework mutations. By generating high-diversity libraries through error-prone PCR, we will screen for rare variants capable of native, soluble folding in reducing environments. Eliminating redox dependency will enable high-yield, soluble expression in standard bacterial hosts and will facilitate the future use of nanobodies as real-time intracellular biosensors or inhibitors to modulate disease pathways directly within human cells.

Purva Goel
Guide: Dr. Anita Sondhi

Multiplex PCR Coupled with Metagenomics for Rapid and Specific Detection of Salmonella in Fresh Produce to Enhance Microbial Safety and Food Quality

The aim of the research is to ensure microbial safety and quality of fresh produce. Since the global dietary intake has been shifted to the consumption of fresh fruits and vegetables, it typically bypasses microbial inactivation steps. This has increased the risk of outbreaks associated with enteric pathogens. As a result, microbial safety and food quality have become global priorities. Traditional culture-based methods are more time consuming. They are unable to detect the viable but non- culturable microorganism. This drawback can be overcome by the advanced sequencing technology such as metagenomics. This research explores how we can include metagenomics in combination with advanced Polymerase Chain Reaction technique such as Multiplex PCR for rapid detection of all microbial profiles. Multiplex PCR technique allows simultaneous amplification of multiple DNA or RNA targets in a single reaction tube, saving substantial time, labor, and costs while metagenomics provides unbiased results of comprehensive microbial community profiling. Together, these techniques can significantly reduce detection time and improve accuracy. This research would critically analyse the current studies to highlight key findings and research gaps to facilitate the practical application of advanced techniques to reduce foodborne illnesses.

Umaima Khan
Guide: Prof. Uma Chaudhry

In silico Screening of Extremophiles Derived Small Molecules for the Stabilization of the Ku70/80 Heterodimer for Enhanced Radio Protection.

Radiotherapy is a fundamental modality in cancer treatment; however, exposure of healthy tissues to ionizing radiation leads to DNA double-strand breaks (DSBs), resulting in genomic instability and treatment-associated toxicity. The non-homologous end joining (NHEJ) pathway is the primary repair mechanism for radiation-induced DSBs in human cells, with the Ku70/80 heterodimer acting as the initial DNA damage sensor. Under high-dose radiation, destabilization of the Ku70/80–DNA complex can impair repair efficiency. Extremophiles such as tardigrades exhibit exceptional radiotolerance, largely attributed to the DNA-protective Damage Suppressor (Dsup) protein, highlighting a potential strategy for radioprotection. This study aims to identify extremophile-derived natural compounds capable of stabilizing the human Ku70/80–DNA complex, thereby enhancing DNA repair efficiency during radiation exposure. Several extremophile-derived compounds demonstrated favorable binding affinity at the Ku70/80 DNA-binding interface and exhibited acceptable predicted pharmacokinetic and toxicity profiles, indicating their potential to act as Ku70/80 stabilizers. The findings support a novel Dsup-mimetic, small-molecule-based radioprotective strategy centered on stabilizing the Ku70/80–DNA repair complex. This study provides a computational foundation for future experimental validation and development of adjunct radioprotective agents for radiotherapy.

Rina Choudhary
Guide: Dr. Kapil Roy

Monitoring of MCR-1 Mediated Colistin Resistance in Soil, Meat and Seafood Samples: A Genotypic and Phenotypic Study from Delhi

Antimicrobial resistance (AMR) is a growing global public health threat, as many bacteria are becoming resistant to commonly used antibiotics. Colistin is considered a "last-resort" antibiotic for treating severe infections caused by multidrug-resistant Gram-negative bacteria. However, the emergence of the *mcr-1* gene, which enables bacteria to resist Colistin, has created serious concern. This gene is particularly dangerous because it can spread easily between bacteria through horizontal gene transfer, allowing resistance to move across animals, humans, food, and the environment, fitting within the One Health framework. In North India, especially Delhi, limited research has explored the presence of *mcr*-mediated colistin resistance across multiple sources. This study addresses that gap by examining soil, meat, and seafood samples collected from five zones of Delhi—North, South, East, West, and Central. Both phenotypic screening using colistin-supplemented agar and genotypic detection through PCR with novel primers were employed to ensure reliable findings. The research aims to detect the presence of the *mcr-1* gene, identify potential reservoirs, and map resistance hotspots. The findings will support improved AMR surveillance, guide antibiotic regulation, and strengthen coordinated efforts to control the spread of colistin resistance.

Sanskriti Rout
Guide: Prof. Uma Chaudhry

Relationship Between Antioxidants and Health

Natural antioxidants obtained from plant materials have received considerable attention because of their efficacy and safety profile compared to synthetic antioxidants. The current study aims to extract and analyze the antioxidant compounds present in *Trigonella foenum-graecum* (fenugreek) seeds using 70% ethanol as the hydroalcoholic solvent system. The seed powder was processed for heat-assisted extraction to facilitate the extraction of phenolic and flavonoid compounds, which are mainly accountable for the antioxidant properties. The extract was filtered and concentrated to yield a semi-solid crude extract. The use of 70% ethanol was informed by its effectiveness in the extraction of polar and moderately non-polar phyto-constituents. The antioxidant activity was determined using standard *in vitro* methods, and the results showed strong free radical scavenging activity, indicating the presence of high levels of bioactive compounds. The significance of this research is that it emphasizes the need to optimize the extraction conditions like solvent composition, temperature, and time to maximize the phytochemicals. The results of this study confirm the potential use of fenugreek seed extract as a natural source of antioxidants. The study also adds to the increasing trend of using plant-based drugs.

Nikita Kumari
Guide: Dr. Anita Sondhi

Cross Disease Meta-Analysis of HNRNPA2B1, MEPCE, CSNK2A1, and NOTCH1 Expression and their Shared Pathway in Neurodegenerative Disorders

Neurodegeneration is the gradual loss of structure and function of neurons that leads to decline in cognitive or motor abilities. Depending on the symptoms, there are many different types. But emerging research suggests that these disorders may share deeper biological connections. However, the studies are limited and often done independently. My project explores whether common molecular patterns exist across these diseases at the level of gene expression. This will be achieved by analyzing already existing public datasets to find a consistent pattern across different neurodegenerative diseases like Alzheimer's, Parkinson's, Frontotemporal Dementia, and Amyotrophic Lateral Sclerosis. Understanding shared pathways could shift how we view neurodegeneration — not as isolated diseases, but as interconnected disorders driven by common processes. Such insights may help guide future research toward more unified, mechanism-based therapeutic strategies.

Ananya Yadav
Guide: Prof. Uma Dhawan

Effect on Physiological Parameters of the Brain due to the Stress of Exam Date Sheet Notification

Academic stress is one of the major cause of increasing rate of diseases in more than 60-70% of university students. It is possible to measure the presence and level of stress in students when they do and do not have academic burden. The stress level can be measured by various methods, such as HRV, HR, GSR, ECG, breathing rate, blood oxygen level, etc.

Out of all, EEG BIOPAC system is a notable device to record the changes in the stress level of students before and after the stressor is induced. EEG works by recording the activity of the brain waves, filtering them out to reduce noise artifacts and then separation of different brain waves based on their frequencies, e.g., Alpha waves 8-13 Hz, Beta waves 13-30 Hz.

Changes in stress levels directly affects the activity of different brain waves, which helps to identify the presence or absence of stress. Alpha waves which are associated with a calm and relaxed state will be suppressed under stress, whereas Beta waves, associated with alertness, thinking and concentration will show an increase when the stressor is present.

This research aims to study students of BCAS and later bring forth ways through which students can manage exam stress and reduce the chances of repercussions.

Tanvi Sharma
Guide: Dr. Neha Singh

Graph Based Network Analysis of DNA Segments to Identify Allosteric Drug-Binding Sites

DNA has long been targeted in drug design by concentrating mainly on nearby, obvious binding regions known as canonical sites, but in reality DNA behaves as a flexible and dynamic molecule capable of transmitting signals across distant parts of its structure through allosteric communication. While graph-based network analysis has already helped scientists understand similar behavior in proteins, its systematic application to DNA remains largely unexplored. This study presents a computational framework in which DNA segments are treated as dynamic interaction networks to locate distant control regions that can influence traditional binding sites when a ligand attaches elsewhere on the molecule. To model this, all-atom molecular dynamics simulations are first used to recreate realistic three-dimensional DNA structures and capture their natural structural fluctuations over time. These simulated structures are then analyzed using graph theory, where parameters such as betweenness centrality reveal communication pathways within the DNA. A further metric, termed the allosteric influence score, is applied to rank and prioritize the most important regulatory locations. The anticipated outcome is a validated analytical pipeline capable of producing DNA interaction graphs and predicting potential allosteric binding regions, with certain distant hubs expected to produce measurable structural changes at canonical sites. Overall, this work aims to aid drug development by offering a network-based and structurally informed understanding of DNA allostery, enabling the design of drugs that exploit long-range molecular interactions rather than relying solely on conventional docking approaches.

Sudheer Gautam
Guide: Dr. Kapil Roy

Physiological Effect of Social Media Notifications on Acute Stress Responses

The rapid integration of smartphones into daily life has made social media notifications a frequent and often unavoidable stimulus. Although previous research has largely focused on self-reported anxiety and perceived stress, limited studies have objectively examined the body's immediate physiological reaction to such digital interruptions. The present study aims to investigate the physiological effects of social media notifications on acute stress responses in healthy undergraduate students aged 18–25 years.

An experimental design will be employed using a BIOPAC data acquisition system to record electrocardiogram (ECG) and electroencephalogram (EEG) signals. Baseline physiological activity will be recorded under resting conditions, followed by exposure to standardized social media notification sounds. Heart rate and heart rate variability derived from ECG will be used to assess autonomic nervous system activation, while EEG activity will be analysed for changes in alpha and beta wave patterns associated with relaxation, alertness, and anxiety. A standardized perceived stress questionnaire will also be administered to support physiological findings.

It is expected that notification exposure will produce an increase in heart rate, a reduction in heart rate variability, decreased alpha activity, and increased beta activity, indicating heightened arousal and stress. By combining autonomic and neural measures, this study seeks to provide objective evidence that everyday digital alerts can function as acute stressors and contribute to understanding how routine technology use influences human physiological stress regulation, particularly among college students in the Indian context.

Emmanuel Paul Kunnath
Guide: Dr. Neha Singh

SAHAYE: Elderly Care Services

The growing elderly population and the shift toward nuclear family structures have created challenges in accessing coordinated and reliable elderly care services. Existing solutions are fragmented, with separate providers for medical assistance, companionship, transportation, and emergency care, leading to inefficiencies and increased anxiety for families. This project proposes SAHAYE, an integrated elderly care platform designed to unify essential services into a single, accessible system. SAHAYE focuses on healthcare coordination, companionship, emergency response, and mobility support while maintaining seniors' relationships with their trusted doctors. The project also introduces caregiver training programs for unemployed youth and interested family members, promoting employability and trust. Through market research, prototype development, and financial analysis, SAHAYE demonstrates strong demand and feasibility, offering a scalable and socially impactful solution to modern elderly care challenges.

The increasing number of elderly individuals and the transition from joint to nuclear families have created new challenges in providing reliable and coordinated elderly care. Current services are often scattered across different providers for medical help, companionship, transportation, and emergency support, causing inefficiencies and stress for families. This project introduces SAHAYE, a unified elderly care platform that connects essential services through one accessible system. The platform supports healthcare coordination, companionship, emergency assistance, and mobility services while respecting seniors' relationships with their existing doctors. SAHAYE also includes training programs for unemployed youth and interested family members to build a trusted caregiving network. Through market research, prototype development, and financial evaluation, the study shows strong demand and highlights SAHAYE as a scalable and socially beneficial solution for modern elderly care needs.

Aarushi Chauhan
Guide: Prof. Uma Chaudhry

Akshat Chauhan
Guide: Prof. Uma Dhawan

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Niharika Das

M.Sc. Biomedical Science
Dr. B.R. Ambedkar Center for Biomedical Research (ACBR)

Adarsh

M.Sc. Biomedical Science
Dr. B.R. Ambedkar Center for Biomedical Research (ACBR)

Manish Prakash Mishra

M.Sc. Biomedical Science
Dr. B.R. Ambedkar Center for Biomedical Research (ACBR)

Anas Hameed

ALUMNI SPOTLIGHT

ALUMNUS OF OUR DEPARTMENT

Programme Manager
IND-CEPI, BIRAC

Dr. Pooja Tanwar
(Batch 2007-2010)

Reader /
Assistant Professor
Department of Biological Sciences (TIFR, Mumbai)
Department of Atomic Research, Govt. of India

Dr. Prashant
(Batch 2009-2012)

Biomimetics & Regenerative Biology Scientist
Founder, 24 Skin Bank™
Former Assistant Professor, Amity University, Haryana

Principal/Co-Investigator on DRDO and ICMR-funded research projects;
Author of Scientific Books (Springer Nature); Patent granted by GOI

Dr. Deepa Suhag
(Batch 2005-2008)

Senior Life Sciences
Consultant
Devote Consulting,
New York

Dr. Kailash Singh
(Batch 2009-2012)

Founder director & CEO
A.S.S. Science Foundation
Founder Director
Green Skill Solution LLP
Visiting Faculty, DSEU
(Dept. of Sustainability)
Nodal Officer
CPCB for GPI Project

Dr. Gaurav Sharma
(Batch 2006-2009)

ALUMNUS OF OUR DEPARTMENT

Assistant Professor
Department of Developmental Biology and Genetics, IISc

Dr. Meetali Singh
(Batch 2006-2009)

Distinguished Alumni Awardee from BCAS

Joint Director
Income Tax Office (Investigation), Ahmedabad

Ankit Jain
(Batch 2007-2010)

Distinguished Alumni Awardee from BCAS

Officer In-Charge, Scientist C
ICMR - National Institute of Malaria Research, Field Unit (FU), Ranchi

Nodal Officer
Department of Health Research (DHR), Model Rural Health Research Unit, Angara Ranchi

Ph.D. IIT Delhi, Postdoctoral Fellowship (PDF) - Houston Methodist Hospital, Texas, USA

Dr. Praveen Kumar Tripathi
(Batch 2009-2012)

Global Product Manager,
Genes2Me Pvt. Ltd.

Dr. Upasana Bajaj
(Batch 2010-2013)

Director,
Diogenus Consortium

Dr. Aakash Dudhmande
(Batch 2012-2015)

ALUMNUS OF OUR DEPARTMENT

Buisness Consultant
Cognizant Technology

Chaitanya Jain
(Batch 2013-2016)

Project Scientist
Indian Institute of Technology, Delhi

Dr. Anoushka Khanna
(Batch 2011-2014)

Assistant Professor
Sri Guru Tegh Bahadur Khalsa College, University of Delhi

Dr. Deepali Joon
(Batch 2007-2010)

Managing Director
Boehringer Ingelheim India Pvt Ltd.

Meenal Gauri
(Batch 2004-2007)

PRIDE OF BIOMEDICAL SCIENCE

ACHIEVEMENTS

Reliance Foundation Undergraduate Scholar

Poster Presentation at the 75th International Astronautical Congress in Milan (2024)
Got the chance to interact with ISRO Chairman S. Somnath

Genomics India Conference (2024)
Silver Prize in BioQuiz

Internship at Institute of Nuclear Medicine and Allied Sciences (INMAS), DRDO

Oral Presentation at the Global Space Exploration Conference (2025)

Served as the co-chair of technical session on "Bioastronautics, Life Sciences and Space Medicine"
And, member of the International Programmes Committee (organising committee) at the Global Space Exploration Conference (GLEX) (2025)

Worked on the HOPE (Himalayan Outpost for Planetary Exploration) analog mission in collaboration with the Human Spaceflight Centre, ISRO (2025)

"Between Two Worlds" Mars Analog Expedition Member in Ladakh (2025)

ACHIEVEMENTS

MEENAKSHI
4TH YEAR

BEST STUDENT AWARD
(FEMALE CATEGORY)
(2025-26)

MEENAKSHI
4TH YEAR

CREATIVE CONTRIBUTION
AWARD
(2025-26)

MEENAKSHI
4TH YEAR

INVITED AS A JUDGE AT ST.
COLUMBA SCHOOL, DELHI

SANSKRITI ROUT
4TH YEAR

SECOND POSITION IN
COLLEGE
(ANNUAL EXAMINATION)
(2023-24)

SANSKRITI ROUT
4TH YEAR

THIRD POSITION IN
NATIONAL CONFERENCE
POSTER PRESENTATION
(2026)

UMAIMA KHAN
4TH YEAR

DISTINCTION IN
INNOVATION FOR EARTH
2.0 PROGRAM,
AS A PART OF STEP GLOBAL
SUMMIT, NSUT (2025)

NAAISHA RAINA
3RD YEAR

ABSTRACT PUBLISHED IN
NATIONAL CONFERENCE,
IHE

NAAISHA RAINA
3RD YEAR

PUBLISHED
ARTICLE IN BRIC, ILS

TANYA SINGH
3RD YEAR

POPULAR SCIENCE STORY
UNDER UNDERGRADUATE
CATEGORY, WRITE ON-24,
INDIABIOSCIENCE (2025)

ACHIEVEMENTS

SONAKSHI SRIVASTAVA
3RD YEAR

THIRD POSITION IN INTER COLLEGE FINE ARTS COMPETITION (RANGOLI), (2025)

SONAKSHI SRIVASTAVA
3RD YEAR

THIRD POSITION IN MICROBIO CINEWORLD FOR MICROQUEST (2025)

SONAKSHI SRIVASTAVA
3RD YEAR

BEST RANGOLI PRIZE IN NATIONAL LEVEL RANGOLI COMPETITION ORGANISED BY MBSI

SONAKSHI SRIVASTAVA
3RD YEAR

WINNER IN POSTER COMPETITION,
BIOE3 POLICY AWARENESS CAMPAIGN COMPETITION

SHEETAL
3RD YEAR

FIRST POSITION IN WESTERN INTER CLUB COMPETITION

NITIKA
3RD YEAR

PROJECT ON COMPUTATIONAL PREDICTION OF PHYTOCHEMICALS BINDING USING MACHINE LEARNING AND DEEP LEARNING METHODS

SHRUTI SHUDIPTA MOHANTY, 3RD YEAR

SPECIAL MENTION IN QUOTE WRITING COMPETITION ORGANISED BY ATELIER

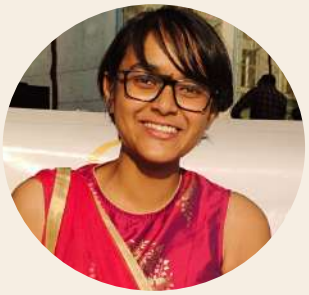
NANDINI
3RD YEAR

ACTIVE MEMBER OF STUDENT FACULTY COORDINATION COMMITTEE (2024-25)

ACHIEVEMENTS

NANDINI
3RD YEAR

FIRST POSITION IN COLLEGE IN ANNUAL EXAMINATION (2023-24)



NANDINI
3RD YEAR

FIRST POSITION IN CHARACTER CLASH, ORGANISED BY CONFIANZA, DEBATE CLUB

NANDINI
3RD YEAR

VCIS INTERNSHIP

ANKUR ANAND
2ND YEAR

CONSOLATION PRIZE IN AQUA FANTASIA, ORGANISED BY AKRITI-MODERN & FINE ARTS CLUB (2025)

SNEHA GARG
4TH YEAR

TEAM WINNER IN CIRCULAR ECONOMY MODEL FOR EARTH 2.0 PROGRAM, AS A PART OF STEP GLOBAL SUMMIT, NSUT (2025)

DHWANI JAIN
2ND YEAR

SUCCESSFULLY COMPLETED NATIONAL SUMMER TRAINING PROGRAM ON RESEARCH METHODOLOGY 5.0

HIMANSHU DAHIYA
1ST YEAR

ELECTED AS CENTRAL COUNCILLOR OF BCAS FOR ACADEMIC SESSION (2025-26)

KASHAK YADAV
1ST YEAR

FIRST POSITION
KHO-KHO COMPETITION AT FATEH ANNUAL TRAINING CAMP, HELD BY SGTB NCC COMPANY (2026)

KASHAK YADAV
1ST YEAR

SECOND POSITION
QUARTER GUARD AT FATEH ANNUAL TRAINING CAMP, HELD BY SRI GURU TEGH BAHADUR KHALSA NCC COMPANY (2026)

ACHIEVEMENTS

KASHAK YADAV
1ST YEAR

COMPLETED FATEH ANNUAL TRAINING CAMP, HELD BY SRI GURU TEGH BAHADUR KHALSA NCC COMPANY (2026)

SHRADDHA VISHWAKARMA
1ST YEAR

THIRD POSITION IN SINGING COMPETITION, HELD AT MOTILAL NEHRU COLLEGE (2025)

IDHIKA SETHI
1ST YEAR

FIRST PRIZE IN MASK MAKING COMPETITION ORGANISED BY YUVA AND AKRITI (2025)

AKSHITA VERMA
1ST YEAR

THIRD POSITION IN SLOGAN WRITING COMPETITION ORGANISED BY YUVA AND NSS (2025)

AKSHAT PATTNAIK
1ST YEAR

FIRST POSITION IN DANCE COMPETITION DURING REPUBLIC DAY (2026)

SPORTS ACHIEVEMENTS

SHEETAL
3RD YEAR

SECOND POSITION
IN 3 MIN FITNESS
CHALLENGE

SECOND POSITION IN
INTER-DEPARTMENTAL
TABLE TENNIS GIRLS
(DOUBLES)
SPARDHA' 25

SECOND POSITION IN GIRLS'
INTER-DEPARTMENTAL
DOUBLE BADMINTON,
SPARDHA' 25

SECOND POSITION IN
INTER-DEPARTMENTAL TUG
OF WAR (DOUBLES)
COMPETITION
SPARDHA' 25

FIRST POSITION IN
INTER-DEPARTMENTAL
TABLE TENNIS
COMPETITION (GIRLS)
SPARDHA' 25

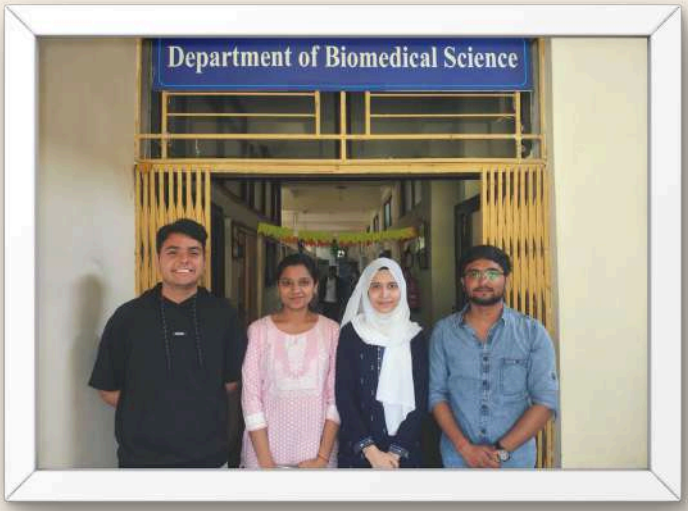
THIRD POSITION IN INTER-
DEPARTMENTAL
BASKETBALL
COMPETITION (GIRLS)
SPARDHA' 25

PRIDE OF BIOMEDICAL SCIENCE

Participated in **National One Health Hackathon** and selected to Regional level which was held at **Manipal University, Jaipur.**
Team members -
1. Ajay Kushwaha (Leader)
2. Subhra Jyoti Dey (Co-lead)
3. Bisman kaur
4. Sudipta Paul
5. Wishesh joshi

EduThon 2025 , organized under the aegis of the **Unnat Bharat Abhiyan, Ministry of Education:**
Team Farm2Fork Guardians – First Prize
Theme of their Idea: Activity-Based Learning Kits Aligned with the Curriculum

Students: Tanish Bhat, Sneha Garg, Sanskriti Rout, Umaima Khan, Priyank Raj of BMS 3 and 4 years



EduThon 2025 , organized under the aegis of the **Unnat Bharat Abhiyan, Ministry of Education:**
Team TrackEd – First Prize
Theme of their Idea: Student Attendance and Learning Tracking Systems

Students: Shipra Shailesh, Sneha Sibangi, Meghana Jha, Khushi Chauhan, Shadab Raza of BMS 2 year

PRIDE OF BIOMEDICAL SCIENCE

EduThon 2025, organized under the aegis of the **Unnat Bharat Abhiyan, Ministry of Education**:
Team Echoes of Home – Second Prize
Theme of their Idea: **Digital Storytelling & Local Language Content Development**
Students: Dhwani Jain, Sharon Jasmine, Mridula Sharma, Archi Biswas, Priyanka Choudhary of BMS 2 year

International Conference on Advancements in Biology 2025, Madan Mohan Malviya Auditorium, Hansraj College, University of Delhi, India.
Team members -
1. Pragya Bhattacharjee
2. Abhishek Sinha
3. Aayush Kashyap
4. Nandini Prasad

Brain-Body Insights Innovations Research Symposium 2026 hosted by **GENTECH** in collaboration with **BIOPAC Systems Inc.**
Attendants:
1) Tanjidul
2) Tanvi
3) Emmanuel
4) Devansh
5) Arpita

REFLECTIONS: A YEAR OF GROWTH AND ACHIEVEMENT

Swacchata Pakhwada was held on 08 August 2025 as the first initiative of unifying students and faculty and making them understand the importance of keeping surroundings hygienic. There was a demonstration of proper disposal and cleaning methods that was performed by the students on the campus itself.

SWACHHTA PAKHWADA

Swachhta Pakhwada was held on 29 September, 2025. The event aimed to spread awareness about cleanliness, hygiene, and the importance of maintaining a healthy environment. This was an event that aimed at subjects of public health and proper disposal methods. The event also involved taking a swachhata oath by all the faculty members as well as the students on keeping surrounding clean.

SWACHHTA PAKHWADA 2.0

The DNAmics society was proud to present Genesis 2025- the annual departmental fest on 27-28 February, 2025. On day 1, there were invited talks hosted by Dr. Meenakshi Sharma and Professor Laishram R. Singh on the topics “An elegant worm for Biomedical Research” and “ How do proteins avoid roadside accidents enroute to their native states” respectively with Poster Presentation Competition and fun games. On Day 2 there was an invited talk and a hands-on dry lab workshop hosted by Dr. Jyoti Bala on the topic “RNA bioinformatics and its biomedical impact.”

GENESIS’25

BIOPIXELS COMPETITION

Biopixels was a unique and innovative scientific photography competition held from March-April, 2025. The core objective of the event was to encourage students to blend scientific concepts with the art of photography, thereby creating visually compelling and educational photographs. It showed that even complex scientific ideas can be communicated powerfully through visuals.

Autosciography was an autobiography writing competition held from March-April, 2025, with the perspective of any scientific instrument. The aim of the event was for the participants to gain a deeper understanding of how scientific instruments work, their history, and their role in discoveries by researching before writing. It improved the ability to explain complex scientific concepts in engaging and understandable ways in the form of story telling to keep readers and listeners engaged.

AUTOSCIOGRAPHY COMPETITION

Department of Biomedical Sciences celebrated the Teacher's Day. The day was made enjoyable for the teachers by arranging games and performances. This day was meant to make the teachers feel appreciated for all that they do for us and a reminder to all that if it were not for the amazing teachers we have.

TEACHER'S DAY CELEBRATION

SMART PRIMER DESIGN: THE GATEWAY TO PCR DETECTION AND CLONING WORKSHOP

The Department of Biomedical Science and Microbiology organized an inter-college hands-on workshop on 08 November 2025 to provide students with a practical understanding of smart primer designing and its applications in PCR detection and gene cloning. NCBI databases and online bioinformatics tools for designing primers were introduced. This not only strengthened technical and analytical skills in molecular biology but also confidence in applying computational approaches to real-world biological problems.

Rangoli competition was held on 17 October 2025 as a part of Deepotsav fest. The event aimed to promote cultural expression, by making rangoli in an organic way to promote an eco-friendly celebration. Participation in this event enhanced students' sense of creativity, teamwork, and cultural awareness.

RANGOLI COMPETITION IN DEEPOTSAVA

A day every freshman dreams of when they enter college! Freshers' 2025 was held on 07 October 2025. The departmental theme for Freshers' was Halloween. First years were heartily welcomed by all seniors and teachers, making the first years part of the DNAmics family. There were performances, games and ramp walks to entertain. The day was heartwarming and there could be no better way to make the first years feel more welcomed.

FRESHER'S CELEBRATION

The DNAmics society welcomed Dr. Vineet Gaul, a scientist in National Institute of Plant Genome Research to host a scientific talk on Exploring the Biological World at Atomic Level. This event took place on 9th February, 2026. For accuracy in research, one must have deep knowledge of the chemicals that make up an organism and how it results in the different functions of their bodies.

SCIENTIFIC TALK ON 'THE BIOLOGICAL WORLD AT ATOMIC LEVEL'

The Technical Session on BIOPAC systems was held on 20 January 2026 in the college itself. This session bore crucial basic knowledge one needed to operate the BIOPAC System to acquire data for various physiologies. The students learned about ECG, EMG, EEG and EOG by doing the practical on the day itself by being the conductors and the test subjects.

TECHNICAL SESSION ON BIOPAC PHYSIOLOGICAL DATA ACQUISITION SYSTEM

On 09 February 2026, a group of students from our college, along with a faculty member, had the wonderful opportunity to interact one-on-one with Prof. Bonnie Bassler at AIIMS Delhi before her TNQ Distinguished Lecture. The session was engaging, insightful, and deeply inspiring.

Students asked questions related to her research on bacterial communication, scientific journey, and the challenges she faced along the way. Prof. Bassler responded with clarity, encouraging curiosity, persistence, and bold thinking in science.

This enriching exchange set the tone for the lecture that followed and remains a proud and inspiring moment for all who attended.

THE TNQ DISTINGUISHED LECTURES IN THE LIFE SCIENCES

NPL CSIR VISIT

NPL CSIR visit was conducted on 17 October 2025, to see various CSIR labs such as those working on superconductivity, x-ray diffraction to determine molecular structures of novel synthetic compounds, and new types of solar panels. Students learned how time is maintained and coordinated with global clocks and the UTC and International Date Line.

Hindi Diwas was celebrated by the University of Delhi on 10 September 2025 with great enthusiasm and reverence. The event aimed to highlight the significance of Hindi as an important national language. Students from our Department actively participated in the programme, gaining valuable exposure and proudly representing the department in this meaningful initiative.

HINDI DIWAS CELEBRATION AT UNIVERSITY OF DELHI IN COLLABORATION WITH SANSAD TV

The students visited the Microbiology Laboratory in Venkateshwara Hospital on 03-05 November 2025. The educational visit was organized as part of the Medical Microbiology course under the UGCF curriculum for our students. It aimed to provide students with direct exposure to modern clinical laboratory practices like histopathology and molecular diagnostics.

MICROBIOLOGY LABORATORY VISIT, VENKATESHWARA HOSPITAL, DWARKA

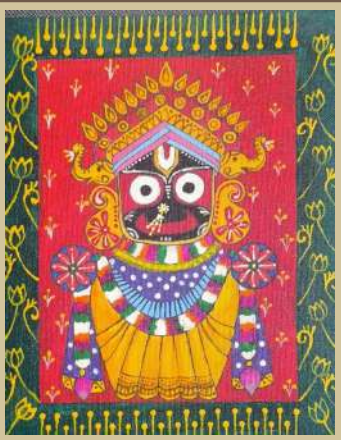
PAINT AND BRUSH MAGIC

Nirja Sah, I Year

Nirja Sah, I Year

Myraa Jaiswal, I Year

Idhika Sethi, I Year



Akshat Pattnaik, I Year

Akshat Pattnaik, I Year

PAINT AND BRUSH MAGIC

Ankur Anand, II Year

Sonakshi Srivastava, III Year

Sonakshi Srivastava, III Year

Sonakshi Srivastava, III Year

Tisha Prasad, III Year

PAINT AND BRUSH MAGIC

Nirja Sah, I Year

Myraa Jaiswal, I Year

Nirja Sah, I Year

Nirja Sah, I Year

Kajal Sinha, II Year

Kajal Sinha, II Year

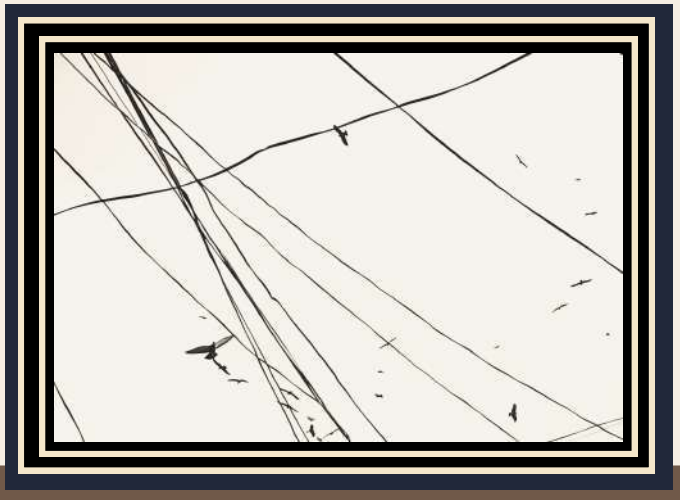
REFLECTIONS & FRAMES

Aiteeya Dutta, I Year

Aiteeya Dutta, I Year

Aiteeya Dutta, I Year

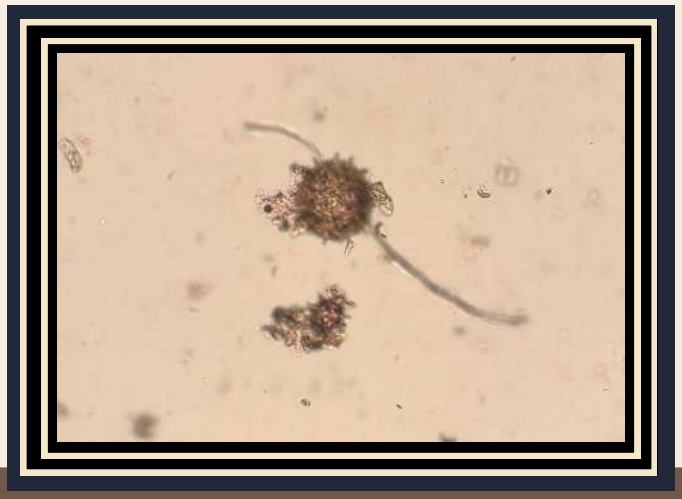
Abhishek Sinha, III Year



Abhishek Sinha, III Year

Abhishek Sinha, III Year

REFLECTIONS & FRAMES



Yana, I Year

Yana, I Year

Riya Yadav, I Year

Idhika Sethi, I Year

Riya Yadav, I Year

Dhwani Jain, II Year

IGNITING YOUNG SCIENTIFIC MINDS

THE MICROBIOME SHIELD MIST: REVOLUTIONIZING SKIN HEALTH

Background: The skin, our largest organ, represents a complex ecosystem that constantly interacts with the external environment. The skin microbiome plays a crucial role in maintaining barrier integrity, regulating immune responses, and protecting against pathogenic microorganisms. However, many conventional skincare products disrupt this delicate microbial balance, potentially increasing susceptibility to inflammation and infection. Recent research suggests that topical prebiotics, probiotics, and postbiotics can modulate the skin microbiome and improve skin health outcomes, including enhanced hydration and reduced appearance of fine lines. Emerging evidence indicates that microbiome-friendly formulations may positively influence aging processes and inflammatory responses, highlighting their potential as therapeutic topical applications.

Hypothesis: A specially designed microbiome-balancing mist can be developed for daily use, incorporating targeted prebiotics, postbiotics, and beneficial bacterial strains such as *Nitromonas eutropha*. This formulation is expected to enhance the skin's natural barrier function, reduce susceptibility to environmental stressors, and help address common dermatological concerns such as acne, inflammation, bumps, and wrinkles, ultimately improving overall skin resilience and appearance.

Action plan: The project will be implemented in three phases:

1. **Formulation Development:** Optimization of a stable, shelf-life–friendly mist formulation that preserves microbial viability and product stability.
2. ***In vitro* and *ex vivo* Studies:** Evaluation of efficacy against common skin pathogens using skin models to assess antimicrobial activity and barrier-enhancing properties.
3. **Clinical Trial:** Conducting a randomized, double-blind pilot clinical trial to assess parameters such as transepidermal water loss, inflammatory biomarkers, and microbiome diversity.

Challenges: Key challenges include maintaining bacterial viability and stability within the mist formulation, achieving effective microbial adhesion to the skin, and navigating regulatory pathways associated with live probiotic cosmetic products. Ensuring product sterility while preserving beneficial microorganisms will also be critical.

Translational Aspect: This research has the potential to significantly advance dermatological science. Beyond general skincare applications, it may enable the development of specialized microbiome-based mists for conditions such as eczema, rosacea, acne, and other inflammatory skin disorders. Additionally, it could contribute to preventive skincare strategies aimed at reducing wrinkles, promoting healthy aging, and integrating therapeutic approaches into everyday skincare.

Adiba Naznin
Roll no.: 2301003

HOW DO GUT-DERIVED MICROBIAL METABOLITES REPROGRAM THE EPIGENETIC LANDSCAPE OF AIRWAY EPITHELIAL CELLS AND RESIDENT IMMUNE CELLS TO MODULATE TYPE 2 INFLAMMATION?

Background: Asthma is a chronic inflammatory condition in which the type 2 inflammatory response plays a crucial role. The "gut–lung axis" has increasingly gained recognition as an important factor influencing this disease, particularly through microbial metabolites such as short-chain fatty acids (SCFAs), which have demonstrated protective properties. However, uncertainty remains regarding how gut-derived signals influence distant airway cells at the molecular level. The objective of this study is to test the hypothesis that SCFAs- particularly butyrate- circulate systemically and directly alter the epigenetic landscape, including histone acetylation and DNA methylation, in both airway epithelial cells and resident group 2 innate lymphoid cells (ILC2s). This process may regulate cellular susceptibility to type 2 inflammation.

Research Gap: Current research has not established a direct causal link between specific gut-derived metabolites and the epigenetic state of structural and innate immune cells within the lung. Specifically, it remains unclear which genes in airway epithelial cells and ILC2s are epigenetically targeted by circulating SCFAs, and how such reprogramming determines the threshold for type 2 inflammatory responses.

Hypothesis: We hypothesize that gut-derived butyrate enters systemic circulation and reaches the airway mucosa, where it functions as a histone deacetylase (HDAC) inhibitor, inducing site-specific histone hyperacetylation and alterations in DNA methylation. This epigenetic reprogramming modifies chromatin accessibility at key gene loci, leading to either:

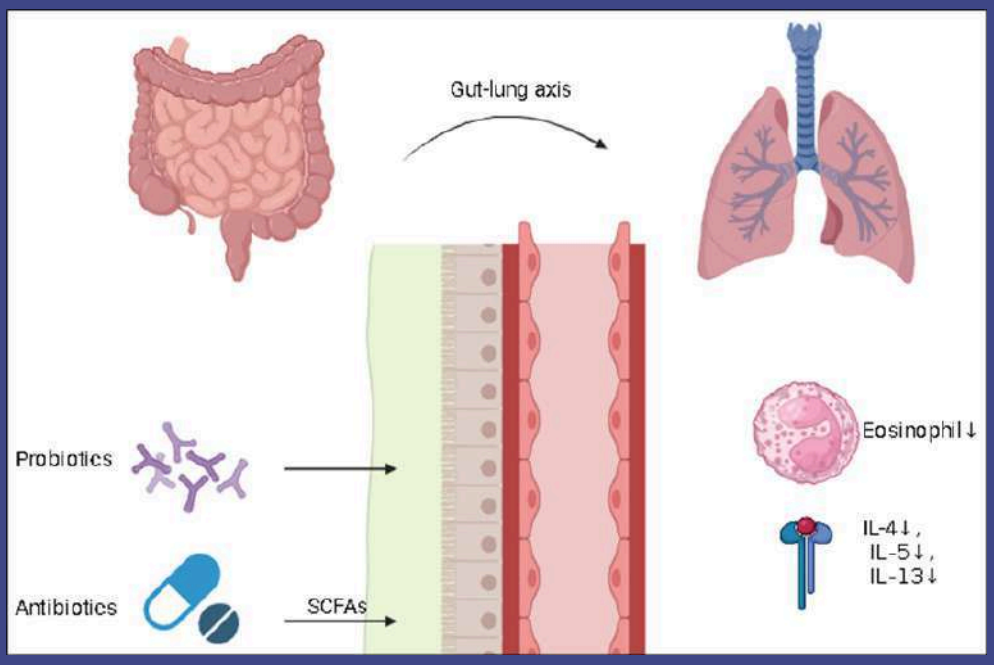
1. Enhanced expression of genes associated with barrier integrity and immune tolerance, thereby suppressing type 2 inflammation; or
2. In the absence of butyrate (due to a low-fiber diet or dysbiosis), maintenance of a "poised" chromatin state that permits rapid and exaggerated transcription of pro–type 2 inflammatory genes (e.g., IL5, IL13) following allergen exposure.

Aims:

1. To determine the direct epigenetic effects of butyrate on primary human airway epithelial cells and ILC2s in vitro.
2. To validate the in vivo relevance of butyrate-induced epigenetic reprogramming in a murine model of allergic airway inflammation.

Methodology:

1. *In vitro* studies: RNA sequencing and ChIP sequencing
2. *In vivo* studies: Murine model of allergic airway inflammation
3. Human cohort study



Reference:

1. Budden, K. F., Gellatly, S. L., Wood, D. L., Cooper, M. A., Morrison, M., Hugenholtz, P., & Hansbro, P. M. (2017). Emerging pathogenic links between microbiota and the gut-lung axis. *Nature reviews Microbiology*, 15(1), 55–63. https://doi.org/10.1038/nrmicro.2016.142

Chankit
Roll no.: 2301013

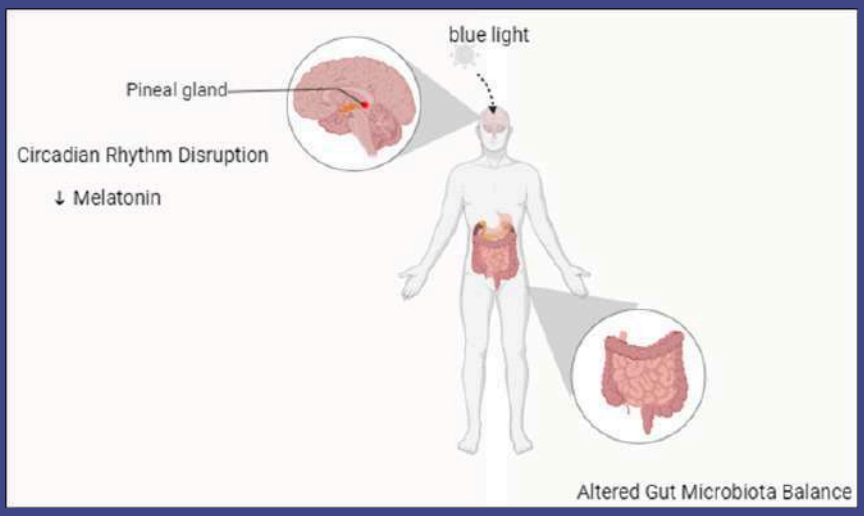
BLUE LIGHT EXPOSURE AND THE GUT–BRAIN–IMMUNE CONNECTION IN STUDENTS

Background: Using phones and laptops late at night has become very common among students. The blue light emitted from these devices can disturb the body's natural clock, which regulates sleep and hormone balance. Most people know that this affects sleep, but fewer realize that it may also impact the gut and immune system. Gut bacteria help with digestion, control inflammation, and support immunity. If the body clock is regularly disrupted, it may alter the balance of these beneficial bacteria and affect how effectively the immune system functions.

Hypothesis: Students who frequently use screens late at night may experience disruptions in their body clock, which could disturb gut bacterial balance and slightly weaken immune function.

Action Plan: Participants will be categorized based on the duration of night time screen exposure. Salivary samples may be collected to estimate melatonin levels as a marker of circadian disruption. Basic inflammatory markers, such as C-reactive protein (CRP) and pro-inflammatory cytokines (e.g., IL-6), may be assessed to evaluate immune modulation. Associations between screen exposure, melatonin levels, and inflammatory markers will be statistically analyzed to determine potential correlations within the gut–brain–immune framework.

Translational Aspect: This research could promote awareness of circadian health and its impact on immune regulation. The findings may support recommendations for healthier digital habits to improve long-term physiological well-being.



Aditi Bharti
Roll no.: 2301004

AWARENESS OF LABORATORY WASTE DISPOSAL PRACTICES

Biomedical laboratories generate various types of waste during routine practical activities, including biological waste, chemical waste, sharps, and general laboratory waste. Improper disposal of these materials can lead to serious health hazards such as infections, needle-stick injuries, and environmental contamination.

In college laboratories, students frequently handle different biological samples and chemicals; however, many lack a clear understanding of biomedical waste segregation and proper disposal guidelines. Due to limited awareness and a casual approach toward waste management, laboratory waste is sometimes disposed of incorrectly, increasing potential risks for both students and laboratory staff. Studies suggest that most undergraduate biomedical science students have insufficient knowledge regarding appropriate laboratory waste disposal practices.

To assess this issue, a structured questionnaire will be developed focusing on types of laboratory waste, the color-coding system, and correct disposal methods. Responses will be collected from biomedical science students, and the data will be analyzed using a basic percentage method to evaluate their level of awareness.

The findings of this study could contribute to improving laboratory safety training programs. Proper biomedical waste management practices learned at the undergraduate level can be effectively applied in research laboratories, hospitals, and diagnostic centers, thereby reducing health risks and environmental hazards.

Chandni Patta
Roll no.: 2301012

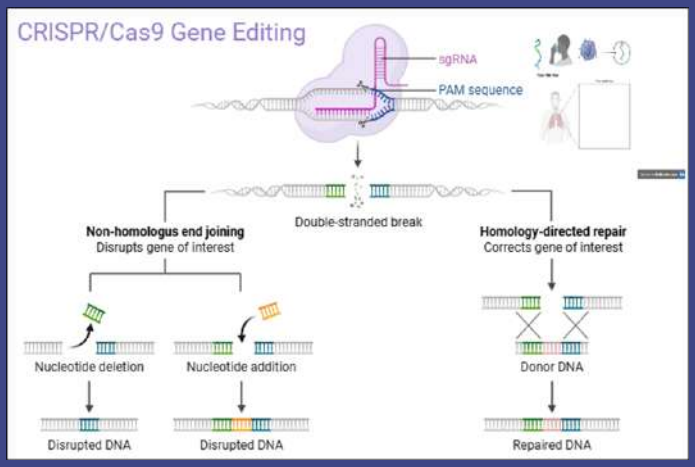
DESIGNING SOMETHING VIRAL SENTINELS TO RESIST DRUG-RESISTANT PNEUMONIA

As we all know, pneumonia remains a major global health threat, and our current primary weapons—antibiotics—are increasingly failing against multidrug-resistant microbes. These bacteria protect themselves by forming thick, slimy biofilms that prevent medicines from penetrating the cells. Beyond antimicrobial resistance, standard drugs often harm a patient's healthy gut microbiota and may cause toxic side effects within the body. Therefore, there is an urgent need for a "living medicine" that specifically targets pathogens without causing collateral damage.

I propose the development of Engineered Phage Sentinels (EPS)—transforming naturally occurring bacteriophages into programmable, precision-guided living medicines designed to eradicate drug-resistant bacteria. By genetically equipping these viruses with molecular scissors (CRISPR–Cas9) and biofilm-degrading enzymes (depolymerases), we can create a therapeutic tool far more effective than current treatments. Delivering these engineered phages via an inhaler would allow them to multiply precisely at the site of infection—the lungs—while minimizing effects on the rest of the body.

Practically, we can isolate natural bacteriophages from environmental sources that target pneumonia-causing bacteria such as *Streptococcus pneumoniae* or *Klebsiella pneumoniae*. Using laboratory techniques such as restriction digestion, these phages can be engineered with genes that dissolve bacterial protective layers and target essential bacterial DNA. Polymerase chain reaction (PCR) and sequencing will then be used to confirm that the genetic modifications are stable.

The final step involves formulating these engineered phages into a fine aerosol mist that can be easily inhaled. This approach is not merely a research proposal but represents a shift toward personalized medicine. By matching a patient's specific infection with a tailored phage therapy, highly precise treatment can be achieved. Furthermore, phages align with the principles of green medicine, as they are naturally biodegradable and do not pollute water systems like conventional pharmaceutical waste. Finally, through biostatistical optimization, these treatments could potentially be mass-produced more rapidly and cost-effectively than traditional drugs.



Aayush Kashyap
Roll No.: 2301001

ARTIFICIAL INTELLIGENCE FOR IMPROVING HEALTHCARE IN RURAL AREAS

People living in rural and remote areas often lack access to adequate healthcare facilities. Due to the limited availability of doctors, medical equipment, and hospitals, individuals frequently have to travel long distances even for basic treatment. Artificial intelligence (AI) can help address this problem by making healthcare services more affordable and accessible—not only for people in remote regions but for everyone.

AI-powered telemedicine applications can enable patients to consult doctors online without the need to travel long distances. Chatbots and virtual health assistants can assess symptoms and provide basic medical guidance. AI tools can also help monitor patients' health by recording essential parameters such as heart rate, pulse rate, blood pressure, body temperature, and other vital signs, and can alert healthcare providers when immediate medical attention is required.

By utilizing natural language processing (NLP) and machine learning algorithms, these systems can analyze patient-reported symptoms, suggest possible medical conditions, and recommend further consultation when necessary. The application of drones in rural healthcare can further support national development by enabling the rapid and efficient delivery of essential medical equipment, medicines, and radioactive materials such as fluorodeoxyglucose (FDG). This can help prevent half-life decay and ensure effective cancer treatment, representing a significant advancement in the healthcare sector.

Despite its promising potential, the implementation of AI in rural healthcare faces several challenges, including poor internet connectivity, limited digital literacy, and concerns related to data privacy. This research aims to study how AI can improve healthcare services in rural areas and help provide equitable healthcare opportunities for all.

Anchal Sharma
Roll no.: 2301007

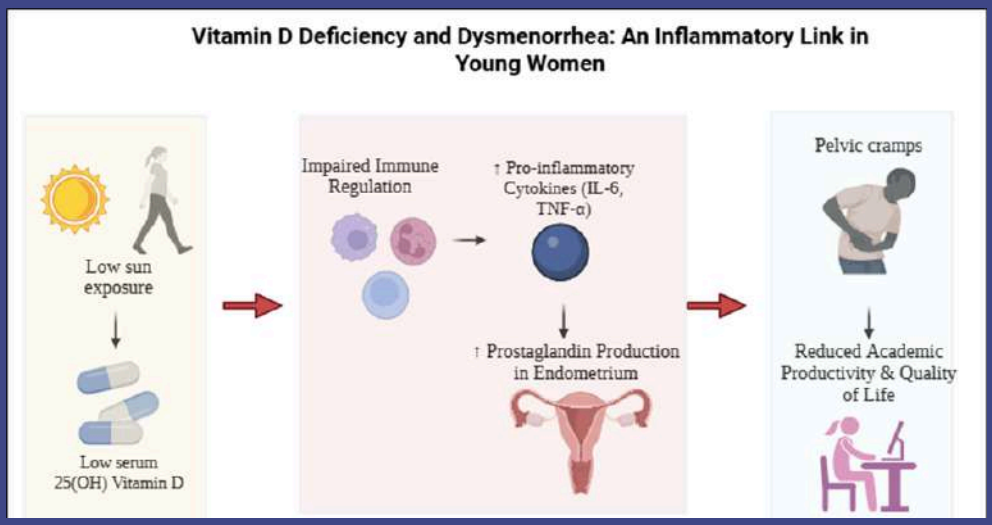
VITAMIN D DEFICIENCY AND ITS ROLE IN DYSMENORRHEA SEVERITY THROUGH IMMUNE MODULATION IN YOUNG WOMEN

Background: Nowadays, young females are experiencing extremely painful menstrual cycles, medically termed dysmenorrhea, and it is a problem affecting more than 60% of women worldwide. It is not something that should be taken lightly, as it often affects daily functioning and interferes with concentration, attendance, and academic performance. Recent evidence suggests that menstrual pain is linked to increased prostaglandin production and inflammatory responses in the endometrium. Vitamin D plays an important role in immune modulation and inflammatory control, apart from regulating calcium metabolism. Deficiency of Vitamin D is extremely common among young Indian women and may contribute to exaggerated inflammatory responses during menstruation. However, limited student-based studies explore this relationship.

Hypothesis: Lower serum Vitamin D levels are associated with increased severity of menstrual pain due to an enhanced inflammatory response.

Action plan: The action plan would be to recruit 50 undergraduate female students and record various details such as their pain severity using a Visual Analogue Scale (VAS), their menstrual cycle characteristics, everyday sun exposure, and their dietary habits. Further, we must measure serum 25(OH) Vitamin D levels, and these must be statistically correlated with each person's pain scores.

Translational aspect: If we find that low Vitamin D is linked to severe menstrual pain, it could encourage routine Vitamin D screening in young women, promote safe sun exposure, and encourage improvements in their everyday diet. This could reduce dependence on painkillers for every cycle. This could also lead to improvements in early preventive strategies instead of only symptom management.



G. Aadharshini
Roll no.: 2301017

THE BIO PAD: A WELLNESS PRODUCT FROM WASTE

Background: Many vaginal infections (like bacterial vaginosis) are often untreated due to a lack of detection, especially in areas with low or limited resources. Due to the alkaline pH (~7.4) of menstrual blood, it often masks infection markers, therefore limiting standard pH tests. Another problem that pads create is environmental pollution due to the use of plastic-based pads. Period cramps, faced during the menstrual cycle, are also one of the causes of discomfort during menstruation. This idea addresses these problems that have been unaddressed for millions.

Hypothesis: A wellness pad that has therapeutic effects, screens for infection, and determines vaginal pH. It's a multi-layered pad made from agricultural waste (like fruit fibers). The design includes dual zones, enzyme substrates, and plant-based analgesics. We can detect infections regardless of menstrual blood pH due to enzyme substrate reactions while providing pain relief.

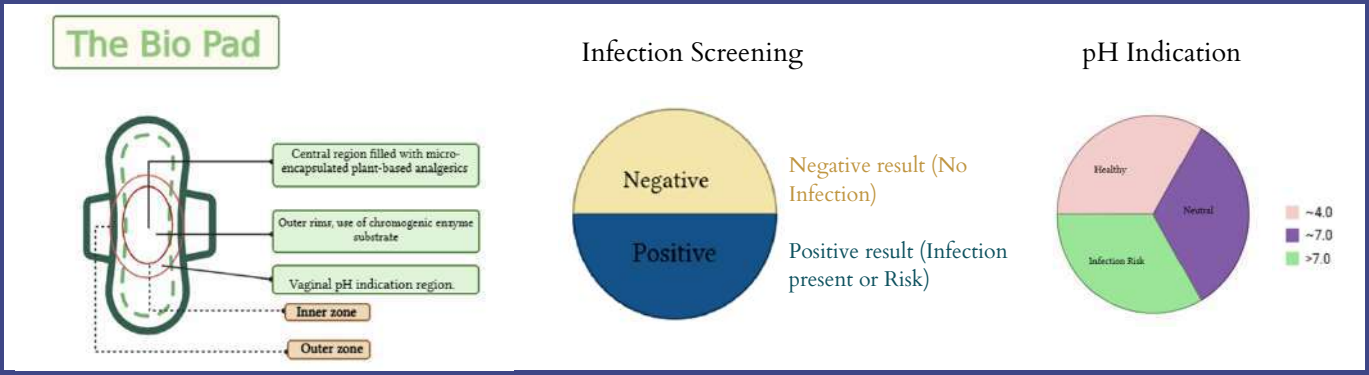
Action Plan: Material: extraction of cellulose from agricultural waste that is biodegradable and skin-friendly in nature; Analgesics: micro-encapsulation of plant-based analgesics (like clove/methanol oils) into the core of the pad to release with body heat, providing relief from cramps with fewer chances of side effects.

Dual Zone:

1.The outer zone- Soaks vaginal discharge and changes colour, indicating vaginal pH.

2.The inner zone- Soaks blood. By using chromogenic substrates in the outer strips of the zone that are specific to the enzyme sialidase (for bacterial vaginosis and other related conditions), it will change (if infection is present), providing the diagnostic nature of the pad.

Translational aspect: This proposal idea addresses the major issues related to menstrual health. It lowers the barrier to healthcare by providing screening in every menstrual cycle. By the usage of analgesics, it helps women overcome the physical burden that comes with the menstrual cycle and provides a circular economy through the use of waste materials, reducing environmental pollution and empowering women with early medical insights.



Biplab Boro
Roll no.: 2301010

MICROBE-BASED NATURAL SUNSCREENS FOR HUMANS

Introduction: Overexposure to UV radiation can cause sunburn, signs of premature aging, and skin cancer. Many of the commercial sunscreens available on the market are made up of chemical ingredients that can cause irritation to the skin as well as harm marine animals and ecosystems. Several microorganisms, including cyanobacteria, have evolved to resist high levels of solar radiation through the production of a class of compounds known as mycosporine-like amino acids (MAAs). These compounds have the ability to absorb UV radiation. As such, the use of MAAs as "naturally occurring" sunscreens provides an environmentally friendly and safe alternative to chemical sunscreens.

Hypothesis: Microbial UV-protecting compounds may be produced using genetically modified bacteria to create an environmentally friendly and biodegradable sunscreen for human use.

Approach: To accomplish this objective, gene libraries will be constructed from cyanobacteria that contain genes responsible for producing UV-protective compounds. These will then be transcribed and translated in a bacterial host for mass production. The UV-absorbing compounds will be extracted and purified, tested for their ability to absorb UV radiation and for their safety on human skin cells, and incorporated into a topical formulation.

Summary: If successful, this research has the potential to produce effective, affordable, and environmentally friendly sunscreens for human use.

Gyanvi
Roll no.: 2301020

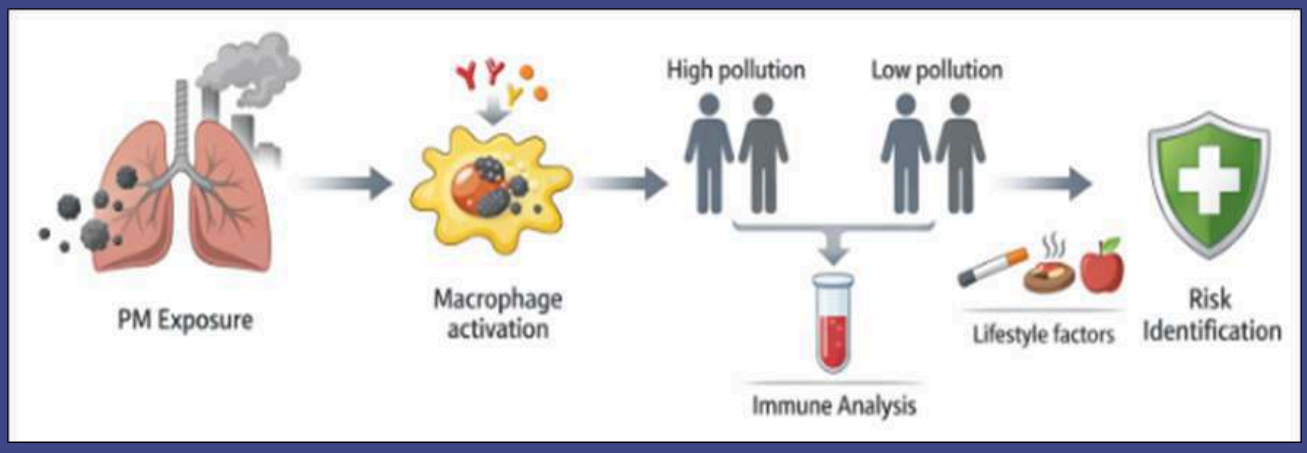
ENVIRONMENTAL POLLUTION AND INNATE IMMUNITY

Background: Urban air pollution, particularly fine particulate matter (PM2.5), is rising rapidly and may affect respiratory health by altering innate immune responses. Long-term exposure to these pollutants can trigger increased inflammation and disrupt the natural balance of the immune system in the lungs.

Hypothesis: Long-term exposure to urban particulate pollution could alter the activity of macrophages, which are important immune cells, and increase inflammatory signals, making individuals more likely to develop respiratory infections and experience immune system imbalance.

Action plan: The study will compare individuals residing in areas with high and low levels of pollution. It will examine basic inflammatory markers and immune responses related to macrophages through simple laboratory tests and observational data.

Translational aspect: Comprehending how pollution affects innate immunity could help individuals identify health risks early on and assist in the development of preventive measures for public health, particularly for individuals living in areas with high levels of pollution.



Megha Yadav
Roll no.: 2301025

CRISPR-CAS9 AS A TREATMENT PATHWAY FOR CHROMOSOME-16 MUTATION-ASSOCIATED AUTISM SPECTRUM DISORDER

Autism is a neurodevelopmental disorder associated with developmental delays, language impairment, and poor development of social cues. One of the most common genetic causes of autism is a 16p11.2 microdeletion, a deletion of roughly 24 to 29 genes on chromosome 16. The deletion of these genes is associated with many hallmarks of autism spectrum disorders. Tools like PASTE (Programmable Addition via Site-specific Targeting Elements), which combine enzymes like integrase with CRISPR-Cas9 systems, can be used. These tools allow insertion of sequences up to 36 kb, enabling the insertion of genes of interest. This may serve as a corrective tool for autism spectrum disorders and associated physio-psychological complications. Adenoviruses can accommodate large cargo and be used to enable gene delivery. Cells derived from patient-specific induced pluripotent stem cells (iPSCs), including GABAergic and glutamatergic neurons, can serve as potential targets of interest. Aside from neurons, astrocytes and microglia may also serve as targets for this treatment. These cells are extracted and, after in vitro treatment, inserted back into the patient. The trials may be carried out in brain organoids and in mice or rats in which autism has been induced. Currently, however, CRISPR technologies are not as accurate at delivering large kb segments of DNA as they are at small inserts. The therapy would need to be highly personalised depending on the extent of deletions, and in cases of larger deletions, it may not be possible to insert the genes through a single delivery. If such trials are successful, this could be a key step forward in both the treatment of autism spectrum disorders at a genetic level and personalised medicine.

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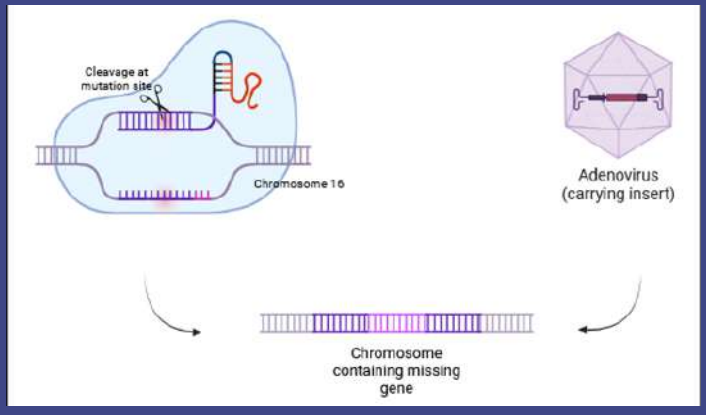


Nandini Prasad
Roll no.: 2301031

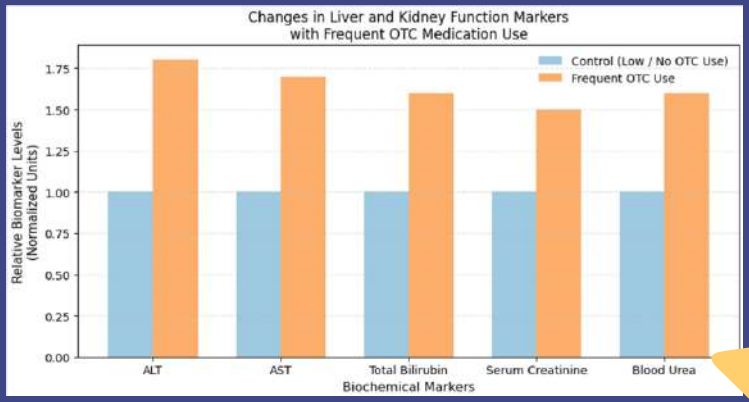
SELF-MEDICATION WITH OVER-THE-COUNTER DRUGS AND THE POTENTIAL RISK OF TOXICITY

Background: Over-the-counter (OTC) drugs such as paracetamol and antacids are often misused because their easy accessibility implies safety. However, frequent self-medication carries hidden dangers. Frequent dosing can place stress on the liver and kidneys, leading to potential long-term disease. Paracetamol misuse can cause liver injury, while the misuse of antibiotics contributes to antimicrobial resistance (AMR). Early biochemical stress can be detected by monitoring biomarkers through liver function tests (ALT/AST) and kidney function tests (KFTs). Research correlating OTC medication habits with these clinical markers is essential to quantify the risks associated with seemingly "safe" self-medication.

Hypothesis: Frequent or unsupervised consumption of OTC medications leads to measurable alterations in liver and kidney function parameters. Individuals who regularly self-medicate may show elevated levels of liver enzymes (ALT, AST, bilirubin) and altered kidney function markers (serum creatinine, urea, KFT parameters) compared to those who use medications under medical supervision. Early biochemical changes may serve as predictive indicators of long-term organ dysfunction.

Action Plan: A small-scale observational or cross-sectional study will be conducted comparing individuals who frequently use OTC medications with those who do not. Blood samples will be collected to assess liver function tests (ALT, AST, bilirubin) and kidney function tests (serum creatinine, urea, electrolytes). Data analysis will focus on identifying correlations between OTC usage patterns and changes in organ function markers. An awareness component will also be included to educate participants on safe medication practices and the importance of medical supervision.

Translational Aspect: The findings may inform stricter public health policies and improved monitoring of OTC drug sales. They could support routine screening recommendations for individuals with frequent self-medication habits and promote community awareness programs emphasizing responsible drug use. Additionally, the study may contribute to preventive healthcare models by encouraging the integration of periodic liver and kidney function tests in high-risk populations.



Naaisha Raina
Roll no.: 2301030

SIMULATING THE FUTURE BRAIN: THE ROLE OF ARTIFICIAL INTELLIGENCE IN PREVENTIVE NEUROSCIENCE

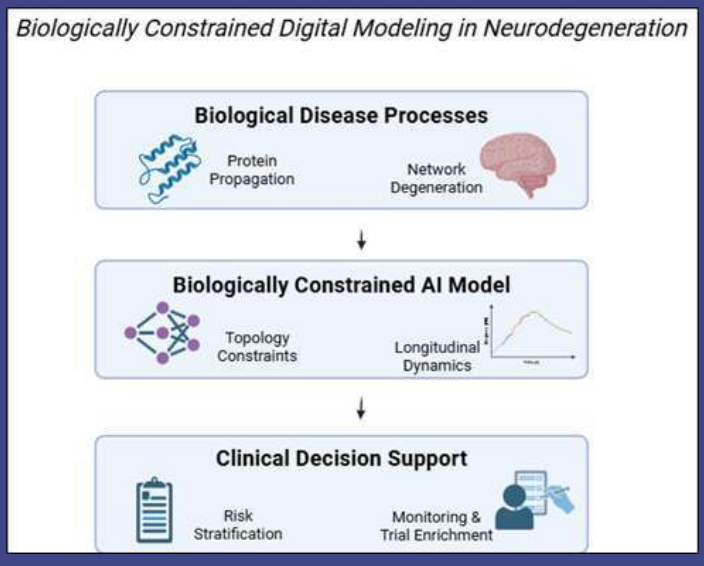
Alzheimer's and Parkinson's diseases progress through protein aggregation, trans-synaptic spread, synaptic dysfunction, and selective degeneration of vulnerable brain networks. Early compensatory mechanisms can delay noticeable symptoms, making early detection challenging. Most existing AI models identify statistical patterns in imaging and biomarker data, but they rarely incorporate known biological principles such as network topology, regional vulnerability, or disease propagation pathways. As a result, their interpretability and biological grounding remain limited.

In this proposal, I aim to integrate explicit biological priors into longitudinal dynamical models of disease progression. These priors include topology-constrained diffusion along structural connectomes, weighting of region-specific vulnerability, and temporal constraints informed by known propagation patterns. Here, "mechanistically constrained" refers to embedding established neurobiological structure and temporal ordering into the model design rather than simulating detailed molecular kinetics.

The proposed framework will combine graph-based network modeling with continuous-time trajectory estimation to quantify measurable longitudinal changes, such as hippocampal atrophy rates or declines in network connectivity. Patient-level temporal separation and cross-cohort validation will be applied to reduce data leakage and assess generalizability. Model performance will be evaluated through external calibration, subgroup stability, and preservation of risk ranking over time.

I acknowledge that subtype heterogeneity, limited long-term follow-up, and reliance on surrogate biomarkers constrain inference. Given the observational nature of the data, conclusions regarding causality will remain appropriately cautious.

The intended outcome is a probabilistic decision-support framework for risk stratification, disease monitoring, and clinical trial enrichment, with explicit uncertainty estimation to prevent deterministic interpretation.



Nitika
Roll no.: 2301032

INTRODUCTION OF DELTA FREQUENCY BINAURAL BEAT HEADSETS AS A THERAPEUTIC TOOL FOR MIGRAINE PATIENTS

Migraine is a common and complex neurological disorder in which headaches are accompanied by sensory hypersensitivity, where noise is one of the prominent triggers that enhances cortical hypersensitivity, activates the trigeminovascular pathway, and amplifies thalamocortical dysrhythmia, which increases the perception of pain by amplifying nociceptive signalling and phonophobia (i.e., sensitivity to sound). Abnormal auditory processing and reduced habituation to repetitive sound stimuli lead to central sensitization, which further worsens the severity and duration of migraines.

This eventually leads to the hypothesis that controlled auditory neuromodulation using delta-frequency binaural beats delivered through specialized calibrated headsets might prove useful in countering maladaptive neural oscillations, reducing cortical hyper-responsiveness, and enhancing parasympathetic activity, thereby alleviating migraine-associated headaches and phonophobia. Binaural beats are an auditory illusion that arises when two slightly different audio frequencies are presented separately to each ear, generating a perceived third beat corresponding to the frequency difference, which facilitates the synchronization of brain waves (e.g., a frequency of 250 Hz is presented to the right ear and a frequency of 260 Hz is presented to the left ear; then the brain perceives a third beat of 10 Hz).

Delta waves in the range of 0.5 to 4 Hz are associated with deep relaxation and pain modulation, which can potentially counteract noise-induced migraine attacks by stabilizing thalamic gating and limbic reactivity (e.g., if the left ear is presented with 210 Hz and the right ear is presented with 207 Hz, then the binaural beat frequency will be 3 Hz). Each subject will then be exposed to delta-frequency binaural beat stimulation, and improvement will be observed. Upon observation of significant pain reduction, a therapeutic calibrated delta-frequency binaural beat headset would be further introduced for pain relief and deep relaxation, proving to be a non-invasive and non-pharmaceutical form of therapy.

Wearable binaural beat headsets could prove to be a low-cost remedy for migraine management, reducing dependence on medications and supporting digital therapeutics.

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Pragya Bhattacharjee
Roll no.: 2301033

MOLECULAR DETECTION OF FUNGAL PATHOGENS IN MANGOES OF AMROHA (UTTAR PRADESH, INDIA)

Background: Mango (*Mangifera indica*) cultivation plays a major economic role in Western Uttar Pradesh, including mango-growing regions such as my hometown, Amroha. However, fungal diseases such as anthracnose often remain latent in fruits and leaves, showing no visible symptoms during the early stages. These hidden infections usually appear during ripening or storage, leading to post-harvest losses and reduced quality. Traditional disease identification depends on visual inspection by farmers, which cannot detect early or asymptomatic infections. Molecular techniques such as PCR offer a sensitive method to detect pathogen DNA before symptoms develop. Early detection could help improve disease management strategies and reduce harmful fungicide use by farmers.

Hypothesis: It is observed that apparently healthy mango tissues in Western Uttar Pradesh orchards may carry latent fungal pathogens that can be detected using PCR-based molecular techniques before any visible symptoms appear, thereby reducing post-harvest loss and fruit waste, which may also spread diseases (Nipah virus and Hepatitis A) if not properly decomposed.

Action Plan: Leaf and immature fruit samples will be collected from selected farms. DNA will be extracted, and PCR will be performed using pathogen-specific primers (e.g., for Colletotrichum species). Agarose gel electrophoresis will confirm the amplification. Infection frequency will be compared among the samples.

Translational Aspect: Early molecular detection could enable timely intervention, reduce post-harvest losses, minimize excessive fungicide application, and support improved mango farming practices in Western Uttar Pradesh, India.

Mohammad Yazdaan
Roll no.: 2301027

CORRELATION OF AUTOIMMUNE DISEASE PREVALENCE WITH ENVIRONMENTAL FACTORS

In recent decades, the number of reported cases of conditions such as Type 1 diabetes, rheumatoid arthritis, and systemic lupus erythematosus has increased worldwide. The growing body of evidence proves that environmental and lifestyle factors need to be evaluated as significant contributors to disease development, while genetic predisposition maintains its status as a critical risk element. This research proposal will investigate the connection between autoimmune disease rates and environmental factors while studying two specific elements: dietary patterns and air pollution effects. The eating habits associated with processed foods that contain refined sugars and harmful fats may lead to gut microbiota imbalance, causing chronic inflammation that affects immune system functions. The immune system may also become imbalanced because of extended exposure to pollutants, including fine particulate matter (PM2.5) and hazardous chemical substances.

The research team will evaluate publicly accessible health and environmental datasets to find statistical correlations among different variables. This proposal will adopt a quantitative, observational research design using secondary data analysis. The available datasets will be collected from national and international health and environmental databases such as the WHO and the CDC. Descriptive statistics will summarize trends, while Pearson or Spearman correlation tests will assess associations between autoimmune disease prevalence and environmental variables.

The translational aspects of the study may be as follows:

1. **Discovery and Mechanistic Understanding:** The research goal focuses on discovering environmental factors and biological processes operating in the environment.
2. **Clinical and Biomarker Development:** The research goal aims to transform scientific understanding into observable clinical outcomes.
3. **Intervention and Therapeutic Strategies:** The research goal aims to create and evaluate methods that address both environmental hazards and biological processes.
4. **Implementation and Health Policy:** The research goal seeks to convert research findings into practical applications and policy frameworks.

Sejal
Roll no.: 2301043

EXPLOITING QUORUM SENSING MECHANISM OF GUT MICROBIOTA AS A POTENTIAL CURE FOR COLON CANCER

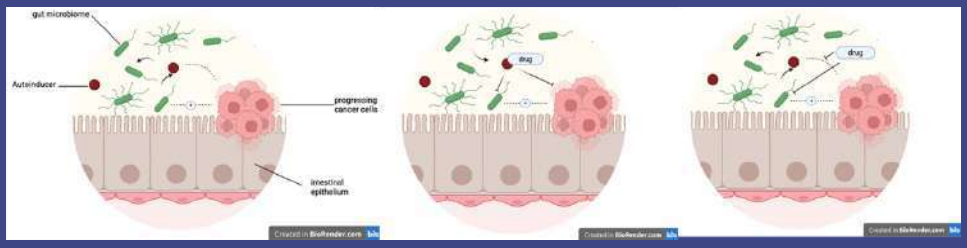
Background: Dysbiosis of gut microbiota has been observed in patients with CRC, with a decrease in commensal bacterial species (butyrate-producing bacteria) and an enrichment of detrimental bacterial populations (pro-inflammatory opportunistic pathogens) [1]. Quorum sensing, the process of cell-to-cell communication via chemical messengers, takes place in the gut among the microbiome and, in some forms of communication, also with the host. These interactions with the host can affect metabolic, neurological, inflammatory, and immunological functions, and the development of cancer can also be directly or indirectly promoted [2]. The research proposes the analysis of quorum-sensing interactions between the gut microbiome and host tumour cells to understand their role in tumour progression.

Hypothesis:

1. The quorum-sensing system of certain forms of the gut microbiota has a relative effect on gut tumour cell growth. Disruption of these systems can stop tumour progression.
2. The autoinducers of the quorum-sensing system are able to interact with tumour cells either directly or indirectly. This interaction might accelerate tumour cell progression.

Work plan: The research plans to exploit gut microbiota quorum sensing as a potential therapeutic approach for gut and colon cancer. This can be achieved either through the development of inhibitors or the development of drugs that work synergistically with quorum sensing.

1. If autoinducers are found to be capable of interacting with and entering cancer cells, they can be tested as a possible drug delivery system for colon cancer.
2. If a direct or indirect link is established between autoinducers of the quorum-sensing system and biochemical reactions or processes that induce cancer cell progression, inhibitors can be chemically designed to suppress tumour cell growth.



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Kiyara Vinod
Roll no.: 2301022

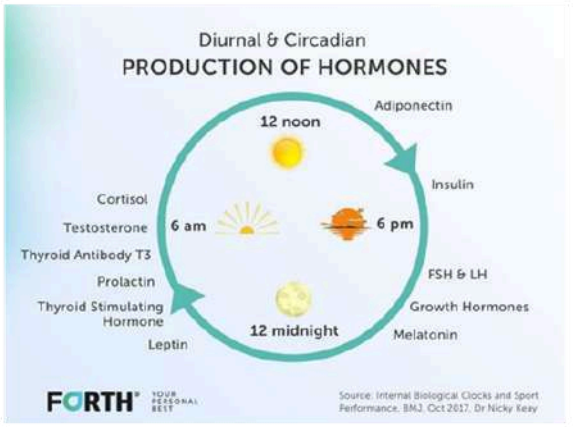
RELATION BETWEEN CIRCADIAN RHYTHM AND OVULATORY SYNDROMES

Background: Circadian rhythm is the body's internal clock that regulates the sleep–wake cycle and hormonal fluctuations over a 24-hour period. Common ovarian syndromes, particularly polycystic ovary syndrome (PCOS), involve hormonal imbalances that affect ovulation and fertility. Biological timing plays a crucial role in maintaining hormonal balance, as many reproductive hormones follow circadian patterns. Disruption of this timing can alter ovarian function and exacerbate symptoms of ovarian syndromes.

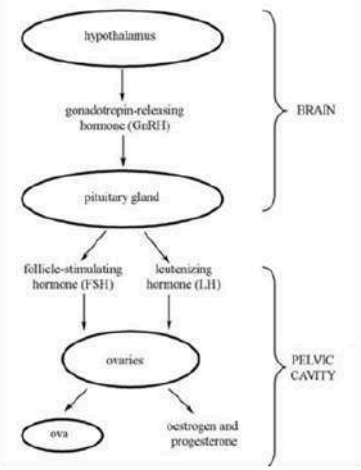
Hypothesis: Disruptions in sleep–wake cycles, irregular light exposure, or mistimed hormone secretion may contribute to ovarian dysfunction by disturbing the delicate balance of reproductive hormones. Such circadian misalignment could impair ovulation, increase androgen levels, and worsen metabolic symptoms in PCOS.

Action Plan: Studying this relationship could involve clinical observation of affected individuals, continuous hormone monitoring, and sleep tracking using wearable devices. Controlled lifestyle interventions that adjust light exposure and sleep timing would help assess causal effects on ovarian hormone regulation.

Translational Aspect: Understanding circadian influences on ovarian syndromes could guide personalized treatment strategies, optimize the timing of medication or lifestyle changes, and improve reproductive health management by aligning interventions with biological rhythms.



(Circadian Hormone Cycle)



(Ovarian Hormonal Regulation)

Sonakshi Srivastava
Roll no.: 2301046

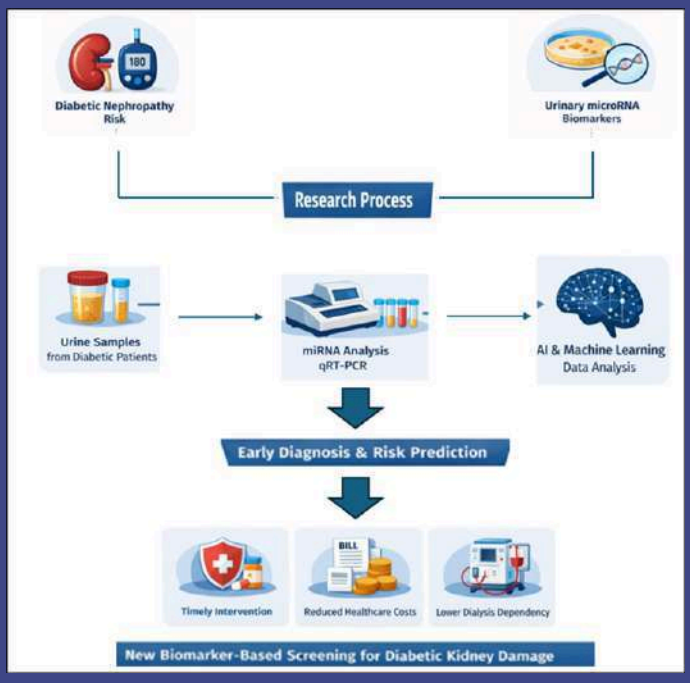
AI-AIDED EARLY DIAGNOSIS OF DIABETIC NEPHROPATHY USING URINARY miRNA BIOMARKERS

Diabetic nephropathy has become one of the leading causes of chronic kidney disease worldwide, especially in regions such as India, where the incidence of diabetes is increasing. However, early detection of the disease still poses a problem because commonly used indicators, such as serum creatinine and albuminuria, usually indicate damage only after the kidneys have suffered extensive injury. Urinary microRNAs (miRNAs) are showing promise as key players in the regulation of kidney disease and could serve as early predictive biomarkers. Specific urinary microRNA expression patterns can act as early, non-invasive indicators of diabetic nephropathy. Combining these patterns with machine learning should provide much better diagnostic results than those currently in use.

Urine samples from diabetic patients at various stages of kidney disease will be analyzed using quantitative RT-PCR to identify different miRNA expression profiles. We plan to build a neural network model to link miRNA patterns to early kidney injury and test it against traditional markers.

Urinary miRNA levels can vary based on age, gender, ethnicity, diet, blood sugar control, medications, and other conditions such as high blood pressure or obesity. All these individual differences make it difficult to rely on biomarkers consistently across different patient groups and populations. Differences in sample timing, storage conditions, RNA extraction methods, and handling procedures can affect miRNA stability and measurement. Without standardization, results may not be comparable between laboratories.

The practical implications of this research are significant. If confirmed, it could lead to a simple, quick, and inexpensive urine test for early kidney damage in diabetic patients. Early detection may allow for timely treatment, slow disease progression, lower healthcare costs, and reduce long-term reliance on dialysis. Incorporating this approach into primary healthcare settings could greatly enhance patient outcomes.



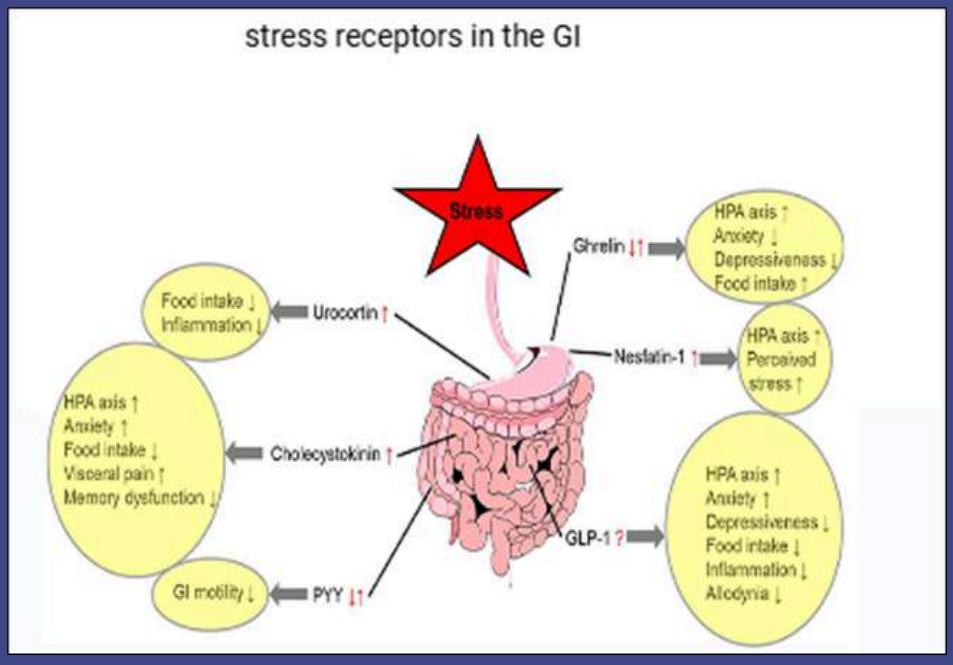
Tanish Bhat
Roll no.: 2301048

DRUG DESIGN FOR CURBING GI ISSUES DUE TO EXAM STRESS IN ADOLESCENTS

Stress caused by examinations can take a toll on both the physical and mental health of adolescents, and one such issue includes gastrointestinal problems like diarrhoea, which can hamper their preparation as well as performance. Therefore, there is a need to create a drug that is effective for most of the receptors in the GI tract that are involved in binding to stress hormones, is highly potent, and causes minimal side effects.

Drug design would require thorough knowledge of receptor binding domains and the identification of similar domains that are present in most receptors, thereby enabling the design of a drug that binds to multiple receptors. The drugs currently available in the market are receptor-specific rather than broad-spectrum and may also cause side effects. Aiming for a broad-range drug can present several challenges, as it may bind to a greater number of similar domains; hence, there are chances of binding to unintended receptors as well. Therefore, drug design must be carried out very carefully, with proper testing using bioinformatics approaches.

The first step is to study the receptor domains, followed by designing drugs and testing them using bioinformatics.



Renu Joshi
Roll no.: 2301037

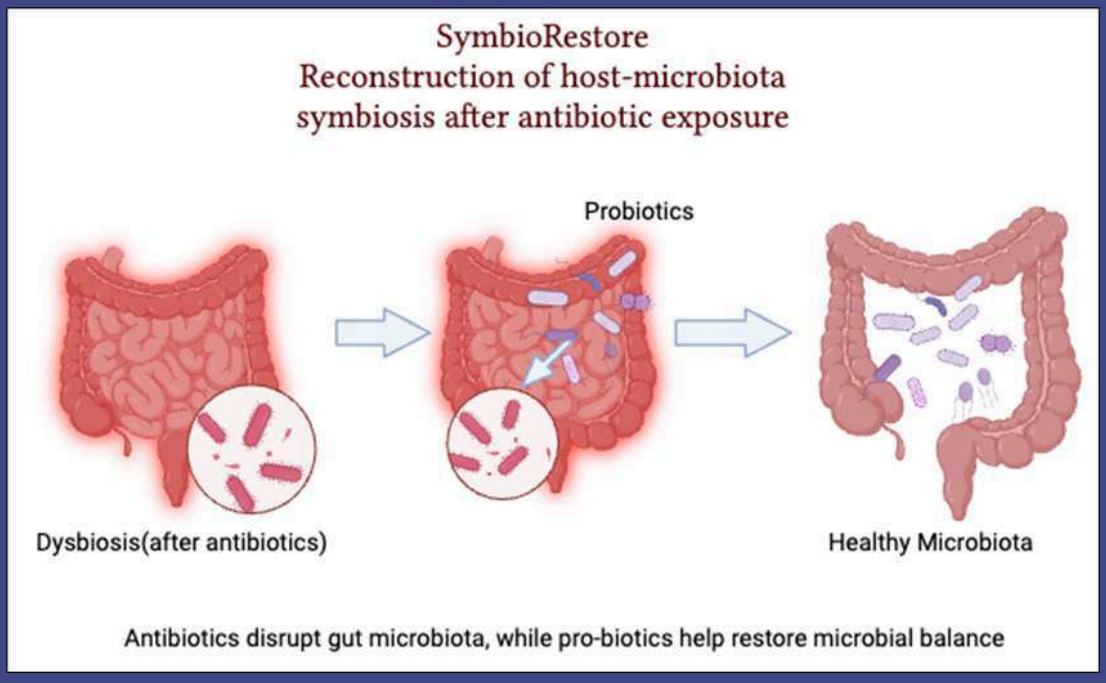
SYMBIORESTORE: RECONSTRUCTION OF HOST–MICROBIOTA SYMBIOSIS AFTER ANTIBIOTIC EXPOSURE

Background: People take antibiotics to kill bacteria that cause infections, but this is a double-edged sword. Antibiotics also disrupt the gut's natural flora. When beneficial bacteria are killed off by antibiotics, harmful microbes can surge. The consequence is gut-related issues, a weakened immune system, and increased susceptibility to other infections.

Hypothesis: The gut can be restored to a healthy state through the administration of probiotics, and symptoms induced by antibiotics can be attenuated.

Action plan: First, analyze the gut microbial composition before and after antibiotic treatment. Second, introduce probiotics and observe the results. Track the diversity levels of gut bacteria and the reduction in symptoms.

Translational Aspect: If successful, this method could enable targeted probiotic therapies that revitalize the gut, help individuals recover faster after antibiotic treatment, and minimize the risk of future infections.



Tisha
Roll no.: 2301050

INTEGRASE DEPENDENT APPROACH TO AID IN THE CURE OF HIV VIA GENETICALLY MODIFIED AAV

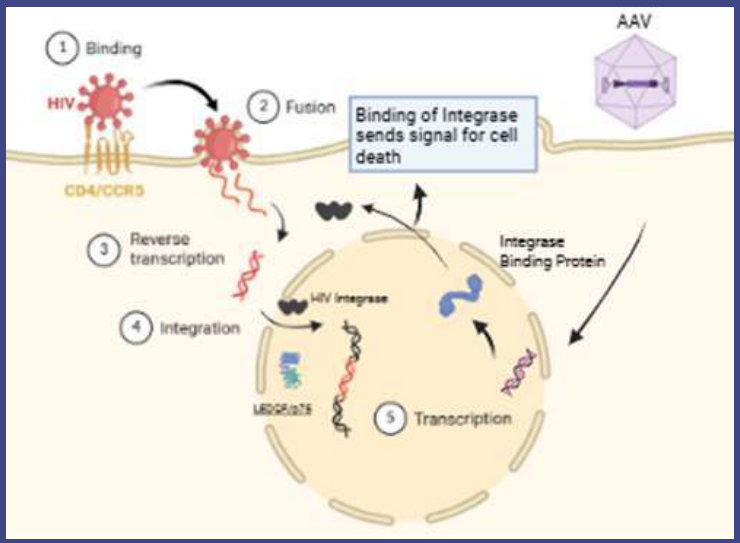
HIV (Human Immunodeficiency Virus) infects the immune cells of the host, specifically the CD4+ immune cells (memory cells). It uses the reverse transcriptase enzyme to convert its genetic material, which is RNA, into DNA and then integrates itself into the host's DNA using the enzyme integrase. A protein inside our nucleus called LEDGF/p75 (Lens Epithelium-Derived Growth Factor) guides integrase and helps the integration of viral DNA into transcriptionally active regions of our genome. Since the memory cells remain inactive until subsequent infection, the genetic material of the virus also undergoes latency. This masking of viral DNA is one of the reasons why HIV cannot be fully cured.

The use of viral vectors such as adeno-associated viruses (AAV) to deliver a protein that resembles the integrase-binding protein in our nucleus (LEDGF/p75, Lens Epithelium-Derived Growth Factor), or any synthetic protein that can specifically bind to integrase and trigger apoptosis or mark the cell so that it can be destroyed by our immune system, may be beneficial (this can probably be achieved by the use of caspase proteins). This approach will help us identify newly infected cells, which could potentially lead to a cure or significant prevention for HIV. If delivered earlier, like a vaccine, this could also act as a curative agent.

Since AAV can be very easily detected by our immune system, if we are able to identify the epitopes of the capsid, we can use rational design to change one or more amino acids. This would prevent the AAV virus from being easily recognized by our immune system.

Reference:

Ciuffi, A., Llano, M., Poeschla, E., Hoffmann, C., Leipzig, J., Shinn, P., Ecker, J. R., & Bushman, F. (2005). A role for LEDGF/p75 in targeting HIV DNA integration. *Nature medicine*, 11(12), 1287–1289. https://doi.org/10.1038/nm1329



Wishesh Joshi
Roll no.: 2301053

DO STEM CELLS HAVE A SECONDARY MEMORY OF REMOVED INJURED TISSUE, AND DOES THIS WORK IN PARKINSON'S DISEASE?

Stem cells are cells that have unique properties that allow them to divide and renew themselves. They have self-renewal and repair mechanisms that are used in treating diseases and maintaining health. Nowadays, they are used in various fields, as they have the potential to mimic any tissue and its function by differentiating into specialized cells. They are used in heart disease treatment through tissue regeneration, drug testing, organ regeneration, bone marrow transplantation, etc.

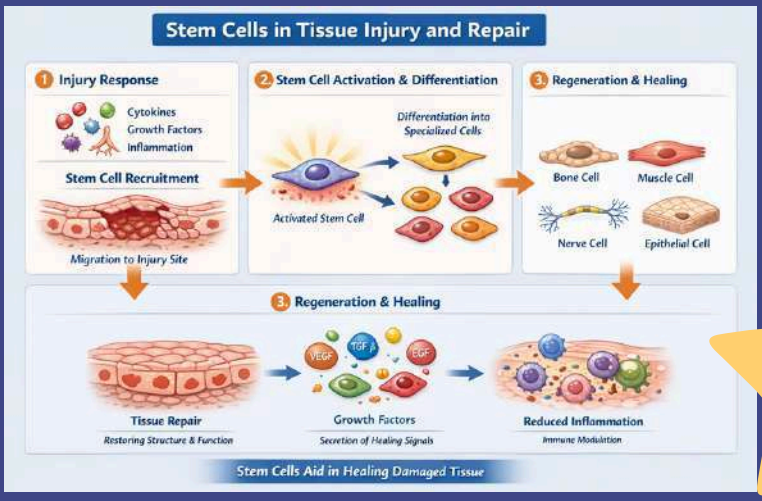
Following these advantages of stem cells, the question arises: do stem cells show a secondary response? The answer is no. Stem cells do not have secondary memory of removed or injured tissue; therefore, they cannot be used in diseases like Parkinson's disease in this way. However, they possess or show responses to disease through the following mechanisms:

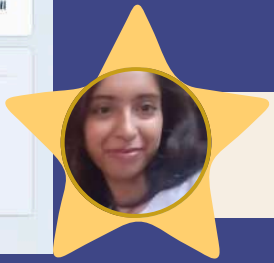
1. **Epigenetic plasticity property:** As soon as stem cells are exposed to injury, they respond to inflammation and chemical signals that actively change the gene activity of those stem cells. Upon the next exposure to the same disease or injury, they attempt to heal the injury faster.
2. **Niche:** Stem cells exist in an altered tissue environment after previous exposure; therefore, upon the next exposure, stem cells show a faster response.

These adaptive responses to injury may enable stem cells to respond faster during subsequent exposures than during the initial exposure. Although these adaptive changes show positive effects, they can also cause problems such as: genetic instability, mutations & new diseases.

In Parkinson's disease, the brain shows abnormal histone modification, distinct DNA methylation patterns, etc., and these conditions influence neuron survival and stem cell differentiation. Neural stem cells and brain cells show persistent epigenetic changes. Patient stem cells may show epigenetic memory of certain molecules. The diseased brain environment can re-imprint pathology, but stem cells cannot show epigenetic memory of removed injured regions.

Still, stem cells have various future prospects to be discovered to help humankind in diseases such as AIDS, incurable mental disorders like Parkinson's disease, the treatment of blood disorders, and anti-ageing and tissue rejuvenation.





Shalinee Siddheshwari
Roll no.: 2301044

FREEZE FRAMES: THE TIME OF BEING TOGETHER

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MEMORIAL IN REMEMBRANCE OF AASTHA

In the memory of Aastha

FAMILY OF AASTHA

SOCIETY OF DEPARTMENT OF BIOMEDICAL SCIENCE

DNAmics

Meet our Core Team 2025-26

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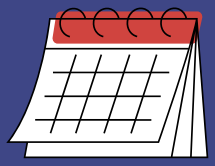

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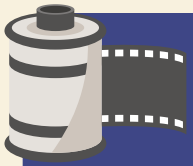

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You can't go back and change the beginning, but you can start where you are and change the ending.

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Content Writer

JYOTSNA CHATTERJEE

"Life is not about waiting for the storm to pass, it's about learning to dance in the rain"

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Designing beautiful layouts with precision while trying to understand why cells misbehave

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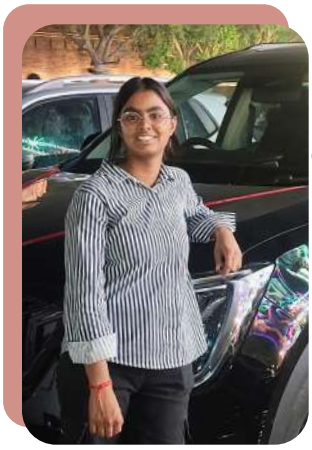

KASHAK YADAV

There's pleasure in the pathless woods,
There's rapture on the lonely shore,
There's society, where none intrudes,
By the deep sea, and music in its roar

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O Icarus of the fearless flight
For the greatest tragedy of them all
is never to see the burning light

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Hell was the journey but it brought me heaven

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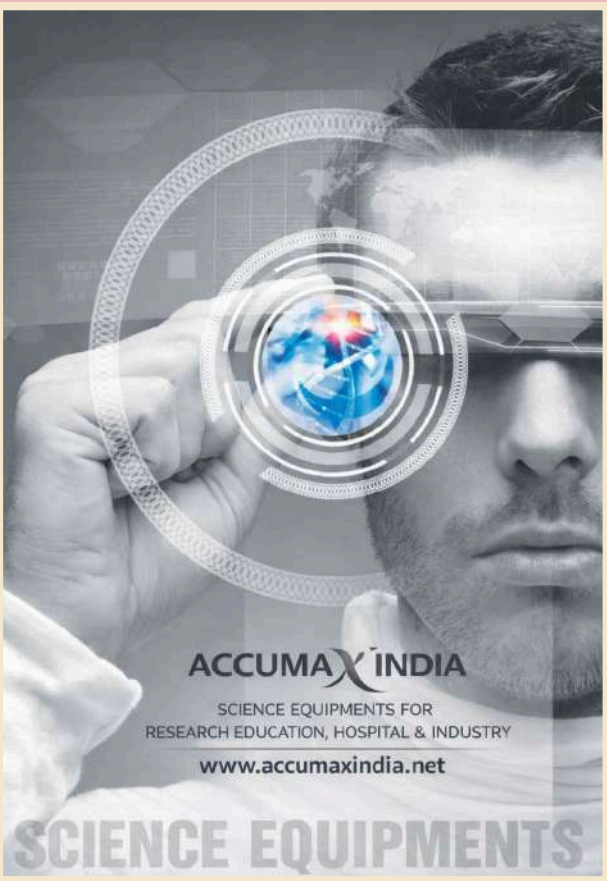

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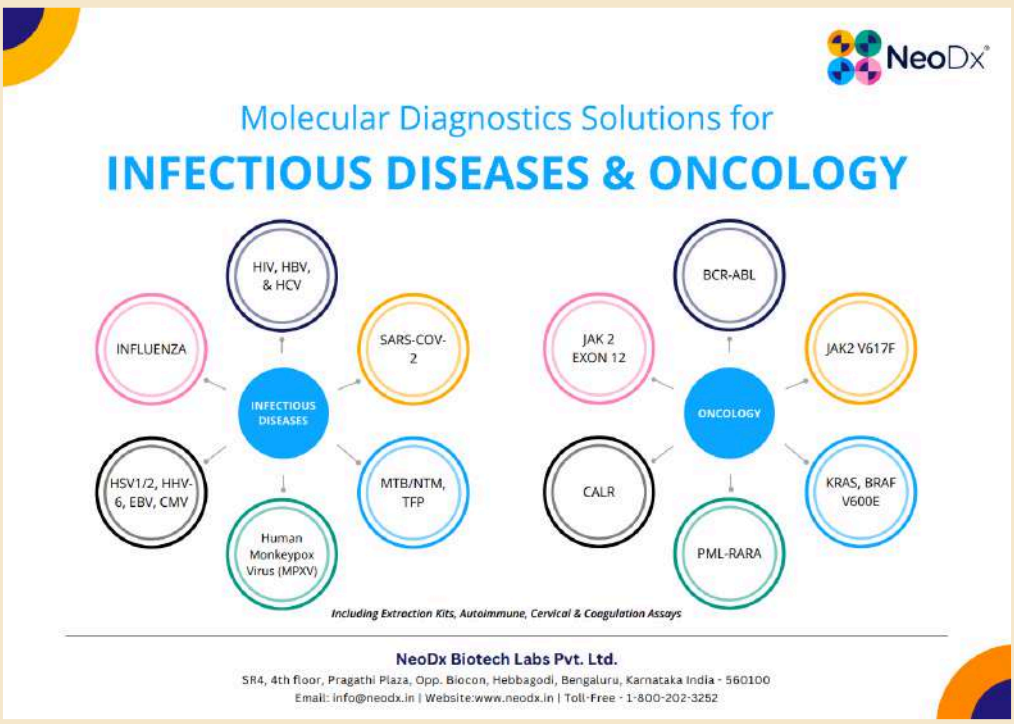

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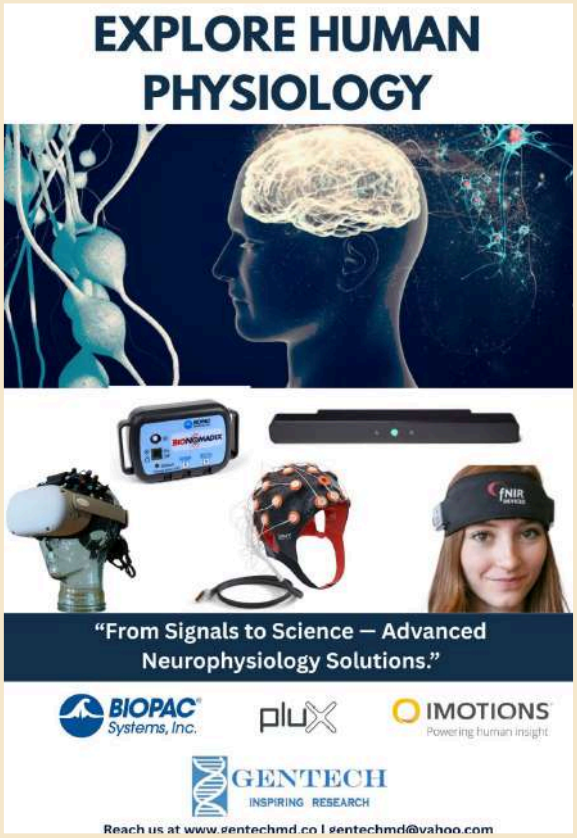

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